

Republic of Indonesia  
Ministry of Industry (MOI)  
Ministry of Industry / Metal Industry Development Center (MIDC)  
Politeknik Manufaktur Negeri Bandung (POLMAN Bandung)  
Heavy Equipment Manufacturers Association of Indonesia (HINABI)

# Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia

## Project Completion Report

March 2017

Japan International Cooperation Agency (JICA)

UNICO INTERNATIONAL CORPORATION  
Japan Development Service Co., Ltd.

IL
JR
17-013

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① 1<sup>st</sup> JCC (5 June, 2014, at 11F Conference Room of the Ministry of Industry)



② Kick-Off Seminar (21 August, 2014, at Gran Melia Hotel, Jakarta)



③ Pre-Training for Top Management (1<sup>st</sup> year)



④ Training in Japan for Top Management (1<sup>st</sup> year)



⑤ Training for Middle Management (1<sup>st</sup> year) /Casting



⑥ Heat Treatment Furnace installed in the MIDC



⑦ Technical Guidance on Melting for MIDC



⑧ Training of Target Casting for POLMAN Bandung



⑨ Annual Seminar at Ceper  
February, 2016, at Grand Tjokro Klaten)



⑩ Extension services on Production Management  
(PT Sinar Perkas Engineering)



⑪ Extension services on Production Management  
(CV Rejeki Abadi Makmur)



⑫ The first workshop of draft A/P  
(22 February, 2016, at 2F of Ministry of Industry)



⑬ Training in Ceper  
(14-18 March, 2016, at POLMAN Ceper)



⑭ Annual Seminar at Tegal  
(5 April, 2016, at Hotel Bahali inn)



⑮ Extension service on Casting  
(PT Baja Kurnia)



⑯ Extension service on Casting  
(PT Atmaja Jaya)

Target Casting



Sprocket (Small)



Bracket (Sumitomo)



Bracket (Komatsu)



Sprocket (Large)

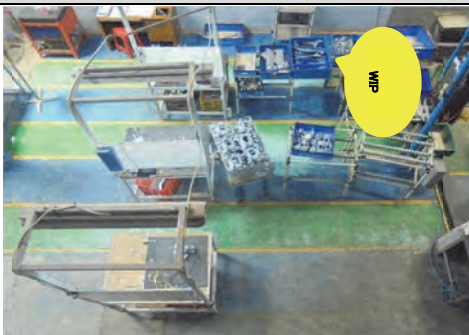


BOSS (Small)



BOSS (Large)

An example of the achievement of technical guidance on production management  
(Production Flow Improvement: PT. WIKA Industri Konstruksi)



Before



After  
(Improved Work-In-Process(WIP))



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## Abbreviations and Acronyms

/	Indonesian and/or English
AEC	ASEAN Economic Community
AFTA	ASEAN Free Trade Area
A/P	Action Plan
APLINDO	Asosiasi Industri Pengecoran Logam Indonesia / Indonesian Foundry Industries Association
ASEAN	Association of South - East Asian Nations
BPPI	Badan Penelitian dan Pengembangan Industri / Agency for Industrial Research and Development
C/P	Counterpart
DAC	Development Assistance Committee
DINAS	Dinas Perindustrian dan Perdagangan/Local Government Administrative Body
HINABI	Perkumpulan Industri Alat Besar Indonesia / Heavy Equipment Manufacturers Association of Indonesia
IE	Industrial Engineering
IJEPA	Indonesia-Japan Economic Partnership Agreement
IKM	Ditjen Industri Kecil dan Menengah / Directorate General of Small and Medium Industry
ILMATE	Ditjen Industri Logam, Mesin, Alat Transportasi, dan Elektronika/ Directorate General of Metal, Machinery, Transportation Equipment & Electronic Industries
IT	Information Technology
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
KPII	Ditjen Industri Ketahanan dan Pengembangan Akses Industri Internasional / Directorate of Industrial Resilience and International Access Development
MIDC	Metal Industries Development Center
M/M	Man-Month
MOI	Ministry of Industry
OECD	Organisation for Economic and Co-operation Development
PO	Plan of Operation
PDM	Project Design Matrix
POLMAN	Politeknik Manufaktur Negeri
QC	Quality Control
R/D	Record of Discussion
R & D	Research and Development
SMI	Small and Medium Industry
SNS	Social Networking Service
TPM	Total Productive Maintenance
UPTD	Unit Pelaksana Teknis Daerah/ Local Government Implementation Department
W/P	Work Plan

Exchange Rate (JICA 2016 fiscal rate table-February)  
100 IDR=¥0.8624=US\$0.0075



# Project Completion Report

## I. Project Information

### I.1 Country

Republic of Indonesia

### I.2 Project

Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia

### I.3 Project Period

Planned period: May 2014 - March 2017

Actual period: May 2014 - March 2017

### I.4 General Background of the Project

The Indonesian government's Master Plan for Acceleration and Expansion of Indonesia's Economic Development (MP3EI) was announced by the former administration led by President Yudoyono as a long-term plan for 2011 – 2025 in order to ensure the successful attainment of the National Long-term Development Plan 2005 – 2025. MP3EI lists infrastructure development and the mining sector as strategic fields to achieve the economic goals by 2025, which receive intensive budgetary allocation.

The development policy is inherited by President Joko Widodo who took office on October 20, 2014, with a clear commitment to the encouragement of investment from both foreign and domestic sources by building an attractive investment environment through infrastructure development and other measures. Also, the administration addresses the needs for import substitution and the increase in local content in the industrial sector as immediate goals, maintaining the Indonesia-centric and -oriented development policy announced by the former administration (priority on local products and investment, and promotion of local processing of mineral and other resources). All in all, the Indonesian government is in the course of shifting development policy toward the broadening and enhancing of the industrial structure, development of supporting industries, and promotion of value-added exports of natural resources.

Meanwhile, the Indonesian and Japanese governments effectuated the Indonesia-Japan Economic Partnership Agreement (IJEPA) in July 2008 for the purpose of further reinforcing the already close economic relationship of the two countries. IJEPA is closely aligned with National

Long-term Development Plan 2005 – 2025 and is designed to build a framework for economic cooperation in a wide range of areas including liberalization and streamlining of trade and investment, development of energy and mineral resources, upgrading of the business environment, and development of manufacturing industries. Also, it establishes a special framework, “Manufacturing Industry Development Center Initiative (MIDEC),” under which the Japanese government has agreed to provide cooperation and assistance for 14 manufacturing industries. In particular, the Indonesian government requested the Japanese government to provide technical support in the metalworking field, and after extensive discussion, they agreed on technical cooperation entitled the “Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery.” Based on the agreement, Japan International Cooperation Agency (JICA) conducted the Detailed Planning Survey in April 2013 and agreed to provide technical assistance for supporting industries of construction machinery with focus on human resource development and technological upgrading in key metalworking fields important for the target supporting industries, which was followed by the signing of a formal agreement (R/D: Record of Discussion) in November 2013. ANNEX 1 shows the R/D.

This project (hereinafter referred to as the “Project”) therefore aimed to improve ability of service delivery of targeted metalworking organizations<sup>1</sup> for foundries on casting technology (including production management), improve that for enterprises engaged in metal processing other than casting on production management, and prepare a draft Action Plan (A/P) to keep improving the service delivery capacity in these fields, thereby to contribute to upgrading of metal processing technology of supporting industries of construction machinery. ANNEX 2 shows the Project Design Matrix (PDM) (Ver.0 and Ver. 1) of the Project.

## **I.5 Overall Goal and Project Purpose**

### **I.5-1 The Objective of the Project**

The Overall Goal of the Project and the Project Purpose are as follows.

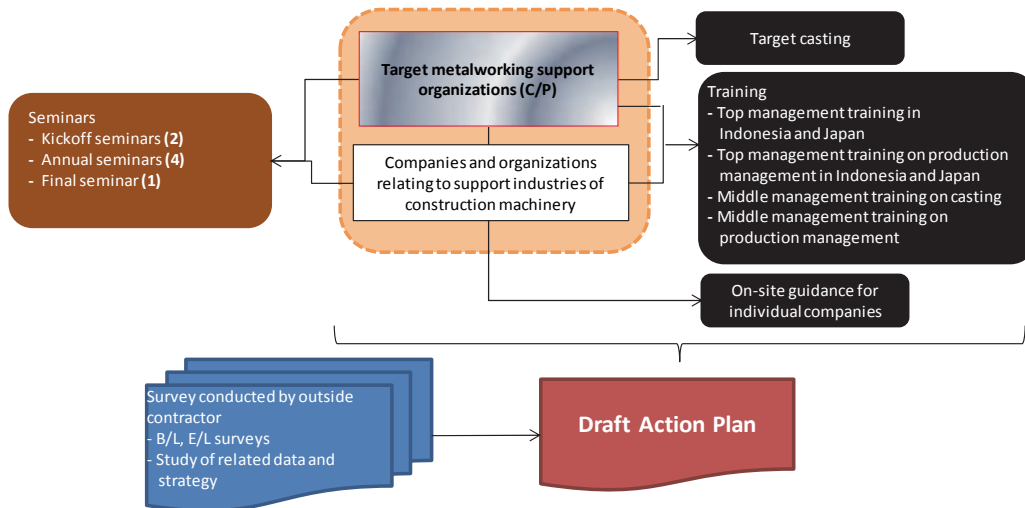
- Overall Goal: Metalworking technology of supporting industries of construction machinery will be improved.
- Project Purpose: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.

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<sup>1</sup> The targeted metalworking organizations refer to Director General of Leading Industry Based on High Technology of the Ministry of Industry (MOI), Metal Industries Development Center (MIDC), Politeknik Manufaktur Negeri Bandung (POLMAN Bandung), Heavy Equipment Manufacturer Association of Indonesia (Asosiasi Industri Alat Besar Indonesia: HINABI), Politeknik Manufaktur Negeri Ceper (POLMAN Ceper) and Tegal DINAS.

## I.5-2 Expected Outputs and Planned Activities

Activities conducted as part of the Project are classified as shown in Fig. I.5.1. They were planned to achieve the Output 1 - 3 described below.



**Figure I.5.1 Classification of Major Activities**

**【Output 1】** Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting)<sup>2</sup> including production management is improved.

- Activity 1-1 To identify technical level of targetted metalworking organizations on casting
- Activity 1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them on the basis of training and other activities
- Activity 1-3 To develop target casting
- Activity 1-4 To conduct seminars on casting for supporting industries of construction machinery
- Activity 1-5 To conduct trainings on casting for supporting industries and construction machinery
- Activity 1-6 To deliver extension services on casting for supporting industries of construction machinery

<sup>2</sup> MIDC formerly received technical assistances from JICA in the Project Fostering Supporting Industries in Casting Technology (1999-2004). Its final report concluded that for most technological fields, the casting section reached a technical level equivalent to the Class 2 skill certified in Japan. Then, “steel casting” which required advanced techniques and few local companies were able to produce was supposed to be the next challenge for Indonesia to acquire. Accordingly, this project was decided to focus on the training of steel casting based on the request of the Government of Indonesia.



**【Output 2】** Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.

- Activity 2-1 To identify technical level of targeted metalworking organizations on production management
- Activity 2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based on the results of training and other activities
- Activity 2-3 To conduct seminars on production management for supporting industries of construction machinery
- Activity 2-4 To conduct trainings on production management for supporting industries of construction machinery

**【Output 3】** An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.

- Activity 3-1 To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management
- Activity 3-2 To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on Activity 3-1, Outputs 1 and 2

## **I.6 Implementation Agency (Counterparts: C/Ps)**

The Indonesian counterpart organizations for the Project are the following metalworking organizations.

- Directorate General of Metal, Machinery, Transportation Equipment and Electronic Industries (ILMATE) of the Ministry of Industry (MOI) - Department of Machinery and Agricultural Machinery Industries
- Metal Industries Development Center (MIDC)
- Politeknik Manufaktur Negeri (POLMAN) Bandung
- Heavy Equipment Manufacturer Association of Indonesia (HINABI)
- Politeknik Manufaktur Negeri Ceper (POLMAN Ceper)<sup>3</sup>
- Tegal Local Government Administrative Body (DINAS)<sup>4</sup>

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<sup>3</sup> Not having been listed as C/Ps in the R/D, POLAMN Ceper joined as C/Ps to receive technology transfer on casting alongside MIDC in the middle of the Project. Detailed information is in the II.1-3 (1) and Activity 1-1 of this report.

<sup>4</sup> Not having been listed as C/Ps in the R/D, Tegal DINAS joined as C/Ps to receive technology transfer on Production Management alongside MIDC in the middle of the Project. Detailed information is in the II.1-3 (2) and the '2) Tegal, ● Extension Service on Production Management' in Activity 2-4 of this report.

## I.7 Other Project Information

### (1) Project Sites

Technical assistance for the targeted metalworking organizations: Jakarta and Bandung

Extension services for enterprises: Areas where many foundries and other metal processing enterprises are located such as Ceper, Tegal, and the suburbs of Jakarta (Bekasi, Karawang and Bogor)



(Source: JICA Project Team)

**Figure I.7.1 Target areas of Project Sites**

### (2) Beneficiaries

- a. Targeted metalworking organizations;
- b. Enterprises in supporting industries of construction machinery receiving training and extension services; and indirectly supporting industries of construction machinery in Indonesia as a whole

## II. Project Result

### II.1 Summary of Results

#### II.1-1 Resource Input (Japanese side)

##### (1) Assignment of experts

The JICA project team organized for implementation of the Project consists of experts in eight positions/fields, as shown in Table II.1.1.

**Table II.1.1 Organization of the JICA Project Team**

Position/Field	Name	Term of Assignment	Company
Chief advisor / supporting industries of construction machinery	Kenichiro SUGIYA	May 2014 - March 2017	UNICO International Corp.
Deputy chief advisor	Yoji WATANABE	May 2014 - March 2017	UNICO International Corp.
Metallurgy for steel casting (1)	Yoshiaki TAKEMOTO Yoshinori KOBAYASHI Ikuo ICHINO	May 2014 - July 2014 July 2014 - June 2016 June 2016 - March 2017	Japan Development Service Co., Ltd.
Metallurgy for steel casting (2)	Kyoji UZUKA	May 2014 - March 2017	Japan Development Service Co., Ltd.
Casting Process Engineering	Yoshinori KOBAYASHI Nobuharu ARAI	May 2014 - July 2014 July 2014 - March 2017	Japan Development Service Co., Ltd.
Production management	Taisuke NISHIDA	May 2014 - March 2017	Japan Development Service Co., Ltd.
Facilitation of seminar and training	Kenji HATA	May 2014 - March 2017	UNICO International Corp.
Coordinator/assistant for production management	Marie KIUCHI	May 2014 - March 2017	UNICO International Corp.

(Source: JICA Project Team)

The total work conducted by all the experts, as measured by man-month (M/M), was 80.22, and all the activities were completed in February 2017. To conduct additional activities, such as follow-up for development of the draft A/P and technical guidance for DINAS and local government organization (UPTD) in Tegal, the M/M increased by 6.23 in July 2016. ANNEX 3 shows the results of the input of all the experts and their M/M.

The chief advisor and the deputy chief advisor formed the work management group with the former being in charge of overall management and the latter providing support with his expertise and experience in industrial development study and macroeconomic analysis.

As for technical fields, the JICA project team included experts in cast steel metallurgy (including materials, melting and heat treatment) and foundry process technology (including mold design, manufacturing, and modeling), who provided overall technical guidance and assistance in casting for staff members of the targeted metalworking organizations. Also, intensive support for small and medium-sized foundries in Ceper, an area where a lot of small casting enterprises were operating, was given in the form of OJT (On-the-job Training) -based extension service, in which

the C/P staff members gave on-site guidance on technical upgrading, KAIZEN, and problem solving.

Also to raise the technological level of the supporting industries of construction machinery, an expert in production management was assigned to promote quality improvement (such as reduction of defect ratio) of metalworking companies. He provided technical guidance for staff members of the targeted metalworking organizations with regard to basic quality control techniques (including 5S<sup>5</sup>, Quality Control (QC) circle, and statistical data processing techniques using 7 QC tools<sup>6</sup>). Then, in the form of OJT-based extension service, the C/P staff members gave technical guidance on technical upgrading, KAIZEN, and problem solving to metalworking companies located in the suburbs of Jakarta (including Bekasi, Karawang and Bogor) and in Tegal.

(2) Local Cost (project costs borne by the Japanese side)

The Japanese side was responsible for costs and expenses of the following items according to the agreement in the R/D.

- Costs of implementation of the training programs in Japan
- Costs of procurement and installation of a heat treatment furnace (within the MIDC's factory)
- Costs of office equipment (as listed below)
- Costs relating to hiring facilities for training programs and seminars and preparation of materials
- Remuneration and traveling expenses for outside lecturers for seminars and other programs, and charter bus charges for factory tours
- Costs for materials used in target casting development and training programs (halving with Indonesian side)

**Table II.1.2 List of Office Equipment Purchased under the Project**

Description	Type/Model Number	Q'ty	Remark
Projector	EPSON EH-TW410	1 set	Storing in MIDC Office
Thermocouple	NSP1212R	1 set	Ditto
Multiple Printer	FX DocuCentre S2220	1 set	Ditto

Note: Excluding consumable goods

(Source: JICA Project Team)

<sup>5</sup> 5S: a method to organize a workplace composed of five activities starting with the letter "S", Sorting (*Seiri*), Setting-in-order (*Seiton*), Shining (*Seisou*), Standardizing (*Seiketsu*), and Sustaining (*Shitsuke*).

<sup>6</sup> It refers to seven analytical tools for solving numerical and quantitative problems in quality control. It consists of the following seven tools: Fishbone Diagram, Pareto Chart, Stratification Diagram, Control Chart, Check Sheet, Scatter Diagram and Histogram.

As for the heat treatment furnace, installation work was delayed about by three months as it took some time for the Indonesian C/P organizations to reach agreement with regard to where to install it. Costs of other activities were disbursed mostly as scheduled.

In addition, the following training programs and seminars were conducted to complement those agreed under the R/D though details had not been specified in the R/D.

- Ceper mini-training (in the second year): A five-day training program for local supporting companies in Ceper on cast steel production techniques which was conducted prior to the start of extension service for companies in the area;
- Training in Japan for Indonesian managing staff on industry-government-academia collaboration for the foundry industry (in the third year): A one-week policymaking training program for Indonesian personnel in charge of policymaking, as preparation for development of a draft A/P;
- KAIZEN Seminar in Tegal (in the third year): A half day KAIZEN diffusion seminar for metal working small and medium enterprises in Tegal region proposed in the Plan 4 “On-site KAIZEN (quality/productivity improvement) guidance program” of the draft A/P.

The JICA project team expended a total of 38,559,000 yen (43,959,000 yen as planned amount) during the project period between May 2014 and March 2017 for project activities in Indonesia, which primarily consisted of costs for traveling, hiring vehicles, and hiring interpreters.

### (3) Training in Japan

This project conducted the trainings in Japan listed in the table II.1.3 from the first to the third year. The detail shall be mentioned later in the chapter II.1-3.

**Table II.1.3 Trainings in Japan conducted by this project (1<sup>st</sup>- 3<sup>rd</sup> year)**

Year	Program name	Implementation schedule	No.of participants
First year	Training for top management in Japan (casting)	September 7 - 19, 2014	15
	Training for top management in Japan (Production Management)		5
Second year	Training for top management in Japan (casting)	August 23 - September 5, 2015	12
	Training for top management in Japan (Production Management)		7
Third year	Training for top management in Japan (casting)	August 21 - September 3, 2016	13
	Training for top management in Japan (Production Management)		7
	Training Course in Japan on Industry-Government-Academia cooperation for Indonesian Top Officials	October 23 - 29, 2016	5

(Source: JICA project team)

## II.1-2 Inputs by the Indonesian Side

### (1) Counterparts (C/Ps)

The Indonesian counterpart organizations for the Project were the following metalworking organizations.

- MOI/ILMATE – Department of Machinery and Agricultural Machinery Industries
- MOI/MIDC
- POLMAN Bandung
- HINABI
- POLMAN Ceper
- Tegal DINAS

ANNEX 4 shows the C/P staff member list.

The above organizations served as core members of the Joint Coordination Committee (JCC) that was managed jointly with Japanese representatives.<sup>7</sup> The JCC was responsible for approval of annual plans, review of project progress, preparation of a project monitoring plan, actual monitoring and evaluation, and the exchange of opinions on key agenda.

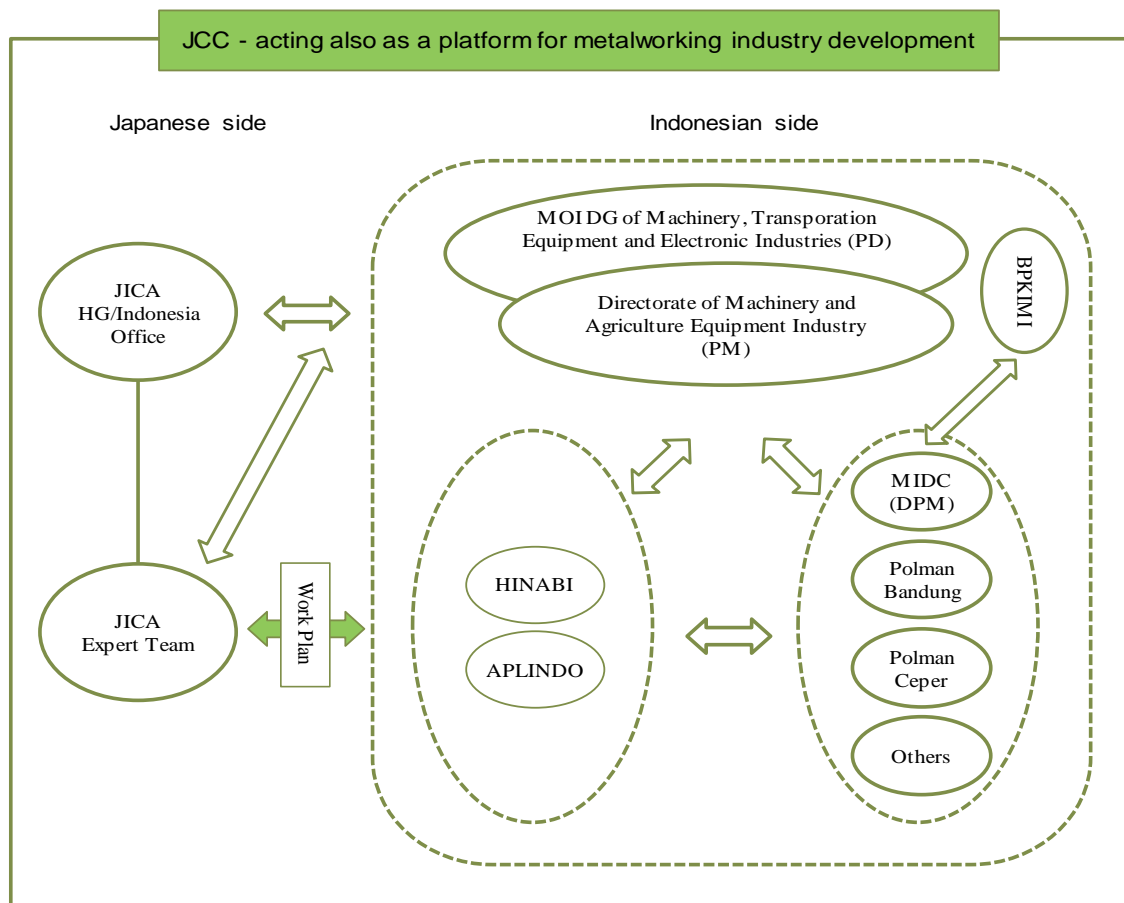
The JCC's member organizations are listed below. Based on the R/D, it was chaired by the project director (Director General of ILMATE).

- (Project Director) Director General of ILMATE
- (Project Manager) Directorate of Machinery and Agricultural Machinery Industries of ILMATE
- Head of Secretary of Directorate General of Industrial Resilience and International Access Development (KPAII) Directorate of International Industrial Cooperation for Territory II and Regional Area of KPAII
- Head of Center for Study of Technology and Intellectual Property Rights Assessment of Agency for Industrial Research and Development of the MOI
- Director of the MIDC
- Director of the POLMAN Bandung
- Representative(s) of HINABI
- Representatives of Department of Materials and Metallurgy of the University of Indonesia, Indonesian Foundry Industries Association (APLINDO), POLMAN Ceper, and Barata Indonesia

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<sup>7</sup> JICA Indonesia office, Japanese Embassy in Indonesia (observer), and JICA project team.

Fig.II.1-1 shows a revised version of the JCC's organizational structure agreed by the JICA consultation mission and ILMATE in January 2015.



(Source: Minutes of Meeting Between Japanese Consultation Mission Team and Directorate General of Leading Industry Based on High Technology)

**Figure II.1.1 JCC's Organizational Structure (Revised Version)**

(2) Local costs (project costs borne by the Indonesian C/Ps)

In addition to the assignment of C/P personnel described in (1), resource inputs by the Indonesian C/Ps, as agreed under the R/D and further discussion with ILMATE, are summarized as follows.

- Office space for the JICA project team (JICA experts)
- Facilities and equipment owned by each C/P organization
- Administration costs (including labor costs relating for C/P and other running costs)
- Operation and management costs (including facility and equipment maintenance costs)
- MIDC's vehicles

- Costs incurred relating to organizing training and seminar programs (e.g., daily allowance, accommodation and transportation costs of C/P personnel and participants from the private sector)
- Costs incurred in relation to extension service and business travel in nearby destinations (e.g., daily allowance, accommodation and transportation costs of C/P personnel )
- Costs for materials used in target casting development and trainings (halving with the Japanese side)

At the beginning of the Project, office space for JICA experts was provided at MIDC. Because of the need of frequent coordination with ILMATE, a room was also provided on the 12th floor of the building for JICA experts in January 2016.

Funds to cover the above local costs were released mostly as planned. However, due to the decreasing tendency of the MOI's budget, the training for Middle Management in the second year was made short, and was cancelled in the third year. In addition, the budget to cover the cost for extension service was not disbursed by MIDC, and MOI financed it as an additional budget in the third year of the Project.

### II.1-3 Project Activities

Table II.1.4 lists activities shows differences between the original work plan (as of preparation in May 2014) and actual implementation.

Note that these changes and delays did not disturb the achievement of the Outputs or the Project Purpose, all of which were completed during the project period, as discussed later.

**Table II.1.4 Differences between Planned Activities (May 2014) and Actual Progress (March 2017)**

	Original work plan (May 2014)	Actual implementation (March 2017)
<b>(Activity common to the Project)</b>		
Approval of the draft W/P and holding of the JCC meetings	(1) To obtain the approval on the draft Work Plan (W/P) from the C/Ps at the first JCC meeting (2) To hold the second JCC meeting in around October 2014 and to obtain the approval on the following agenda under an agreement of all C/Ps <ul style="list-style-type: none"> <li>● To fix PDM indicators</li> <li>● To fix a draft extension service plan</li> <li>● To fix a draft target casting development plan</li> </ul>	The JCC meetings were held as follows: <ul style="list-style-type: none"> <li>● First : June 2014</li> <li>● Second: April 2016</li> <li>● Thrid : May 2016</li> <li>● Fourth : Febururary 2017</li> </ul> The draft W/P was approved under the consensus of all the C/Ps on March 13, 2015. Since several stakeholder meetings equivalent to JCC meetings were held, the second JCC meeting scheduled in the first half of 2015 was not held with consensus among the C/Ps.  Then, the second JCC meeting was held in April 2016



	<b>Original work plan</b> (May 2014)	<b>Actual implementation</b> (March 2017)
	(3) The second and subsequent JCC meetings will be held according to the following schedule: <ul style="list-style-type: none"> <li>• Second: October 2014</li> <li>• Third: March 2015</li> <li>• Fourth: November 2015</li> <li>• Fifth: July 2016</li> <li>• Sixth: February 2017</li> </ul>	for the purpose of exchanging opinions among the C/Ps with regard to actual contents of the draft A/P. At the third JCC meeting, an issue relating to the budget relating to extension service was mainly discussed. <p>The fourth JCC meeting - the final meeting - was held on February 2, 2017 and approved the draft A/P and jointly reviewed the degree of achievement of the Project.</p>
<b>(Activities relating to Outputs 1 and 2)</b>		
Undertaking of extension service	To complete prototype production of six target castings at MIDC and POLMAN Bandung by the end of 2015	Due to the need for MIDC to respond to other orders, target casting development was delayed in comparison to the original schedule. One trial product was completed in mid-October 2016, and the remaining five up to mid-December of the same year. They were then submitted to HINABI to receive quality assessment.
Holding of annual seminars	To start extension service for foundries in October 2014	<p>Extension service for foundries was originally planned to start after completing target casting development, but the casting development was delayed. Extension service started in March 2016 in Ceper that has a concentration of foundries, in parallel with the target casting development. Extension service primarily covered staff members of POLMAN Ceper and supporting companies. Prior to the start, a short-term training program for representatives from companies was conducted at POLMAN Ceper. In consideration of efficiency of extension service activities, JICA experts specialized in foundry technology provided technical guidance on production management as well for foundries.</p> <p>MIDC initially faced difficulty in participation of extension service due to lack of sufficient budget for business travel of the Project, but it received budget allocation from Agency for Industrial Research and Development (BPPI) in October 2016, which resulted in participation of three persons from foundry C/P staff.</p> <p>As for extension service on production management, the original work plan targeted foundries. At the request of the C/Ps, however, the target was changed to metalworking companies. This is particularly because HINABI strongly required technical guidances for supporting companies that undertake metal working of casting products. The project sites were around Jakarta (including Bekasi, Karawang and Bogor) and Tegal. Extension service at the two areas started in August 2015 and November 2016, respectively.</p> <p>As MIDC did not have a sufficient budget for business travel and was not able to send its staff to Tegal, the Project decided to train staff members of Tegal DINAS as extension officers in charge of production management. As a result,</p>

	<b>Original work plan</b> (May 2014)	<b>Actual implementation</b> (March 2017)																			
		two of them on average participated in each visit of the extension service. Then, MIDC started to receive the budget from BPPI in November 2016, which allowed three staff to participate in the extension service in the area.																			
Holding of annual seminars	To hold the following seminars according to the following schedules: [Kickoff seminar] <ul style="list-style-type: none"> <li>Jakarta and Bandung: August 21, 2014</li> </ul> [Annual seminars] <ul style="list-style-type: none"> <li>Bekasi: October 2014</li> <li>Tegal: August 2015</li> <li>Surabaya: August 2015</li> <li>Ceper: March 2016</li> </ul> [Wrap-up seminar] <ul style="list-style-type: none"> <li>Jakarta: February 2015</li> </ul>	<p>The seminars were held as follows.</p> <table border="1"> <thead> <tr> <th>Seminar name</th> <th>Place</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>Kickoff seminar</td> <td>Jakarta</td> <td>Aug. 21, 2014</td> </tr> <tr> <td rowspan="3">Annual seminars</td> <td>Bekasi</td> <td>Oct. 1, 2015</td> </tr> <tr> <td>Ceper</td> <td>Feb. 10, 2016</td> </tr> <tr> <td>Tegal</td> <td>Apr. 5, 2016</td> </tr> <tr> <td>Wrap-up seminar</td> <td>Jakarta</td> <td>Jan. 26, 2017</td> </tr> <tr> <td>KAIZEN seminar (hosted by IKM)</td> <td>Tegal</td> <td>Feb. 9, 2017</td> </tr> </tbody> </table> <p>As Bandung was close to Jakarta and did not have many foundries, it was requested by the Indonesian C/Ps to cancel the seminar in Bandung in consideration of cost effectiveness, which was then canceled.</p> <p>As for the annual seminar in Bekasi, which had been scheduled to be held in October 2014, it was postponed in response to the requests by the Indonesian C/Ps who wanted to report on the training program for middle management in November as its activity as well as to focus on target casting development. Accordingly, holding of the subsequent annual seminars were delayed.</p> <p>As for the annual seminar in Surabaya, it was decided at the second JCC meeting to cancel it because Surabaya was removed from target areas of extension service at the request of the C/Ps.</p> <p>Finally, in the third year of the Project, the holding of a KAIZEN seminar in Tegal was proposed in connection with the Plan 4 (On-site KAIZEN (quality/productivity improvement) guidance program) of the draft A/P, and it was held under the auspices of Directorate of Small and Medium Industry (IKM).</p>	Seminar name	Place	Date	Kickoff seminar	Jakarta	Aug. 21, 2014	Annual seminars	Bekasi	Oct. 1, 2015	Ceper	Feb. 10, 2016	Tegal	Apr. 5, 2016	Wrap-up seminar	Jakarta	Jan. 26, 2017	KAIZEN seminar (hosted by IKM)	Tegal	Feb. 9, 2017
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	Tegal	Apr. 5, 2016																			
Wrap-up seminar	Jakarta	Jan. 26, 2017																			
KAIZEN seminar (hosted by IKM)	Tegal	Feb. 9, 2017																			
<b>(Activity relating to outputs 3)</b>																					
Organization of a working group on the draft A/P	To form a working group which prepares the draft A/P within the period between August and October 2014 to start individual and plenary meetings to discuss a general direction of the draft A/P	In February 2016, ILMATE organized a stakeholder meeting to form a working group for preparation of the draft A/P. Then, meetings have been held from time to time under the leadership of ILMATE to handle various matters such as the decision on organizations responsible for individual plans under the draft A/P and detailed examination on individual activities.																			

(Source: JICA Project Team)

<sup>8</sup>

As Plan 4 of the draft A/P is designed to disseminate on-site KAIZEN activity to SMEs in supporting industries of construction equipment, IKM, not a C/P of the Project, is designated as the implementation body because it is in charge of SME service

Activities and their results are discussed below according to the Outputs and activities listed in the PDM.

(1) Activities for Output 1

<b>Output 1</b>	Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting) including production management is improved.
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Activity 1-1 To identify technical level of targeted metalworking organizations on casting

Immediately after the commencement of the Project, technical levels of casting-related personnel at MIDC and POLMAN Bandung, who gave technical guidance for individual foundries in the Project, were examined. Interview was conducted to check each person's technical level of casting by using a check sheet.

As for MIDC, 23 officials in the casting division were selected as receivers of technical transfer on casting.<sup>9</sup> Only one out of the 22<sup>10</sup> staff members of the casting vision was rated as B (to have some degree of knowledge and experience) and the remaining 21 were rated as C (to have little knowledge and experience).<sup>11</sup> The average score was 57.2 out of 180, indicating the need to learn casting technology and knowledge in a systematic way.

In POLAMN Bandung, 10 officials were selected for the C/P staff. Among them, 6 staff members were rated as B and 3 as C.<sup>12</sup> While the average score was not very high (89.3 out of 180), the organization had a relatively high level of knowledge and technology in the entire area as compared to MIDC. It should be noted, however, that the standard deviation was large ( $\sigma=22.5$ ), indicating a more or less large variation in technical levels among the individuals. POLMAN Ceper was not listed as a C/P organization in the R/D. However, MIDC and POLMAN Bandung which were supposed to be the main receivers of technology transfer were not able to secure the budget for travel expenses of their personnel. Therefore, the initial plan was changed to train personnel of POLMAN Ceper, a local school for technical education on casting, to conduct extension service with them, and nine of them received training from JICA experts as the C/P staff. Technical

<sup>9</sup> ANNEX 4 shows a list of MIDC's C/P staff. The C/P staffs of POLMAN Bandung and POLMAN Ceper are also shown in the ANNEX.

<sup>10</sup> One of the C/P members was in absence when their technical levels were examined. The Project never got an opportunity to meet him later, which resulted in evaluation of technical levels of the remaining 22 only.

<sup>11</sup> It was evaluated based on the criterion of 3 stages, A, B and C. The judgment are as follows; A) Based on the abundant knowledge of casting technology, capable of giving technical guidances on quality control and production technique in a more economical way, B) Having some knowledge and experience of casting, C) Having little knowledge and experience of casting

<sup>12</sup> One of the C/P members was in absence when their technical levels were examined. The Project never got an opportunity to meet him later, which resulted in evaluation of technical levels of the remaining 9 only.

levels of 5 of them were rated as B and those of the remaining as C. The average score was 82 out of 180.

In the comparison of the results of the technical level evaluation of the three organizations, the evaluation average points of POLMAN Bandung and POLMAN Ceper were relatively higher for MIDC. An academic background can be considered as a factor that caused the disparity between MIDC and the other two organizations. Since the C/P staffs of POLMAN Bandung and POLMAN Ceper were all teachers, they seemed to have a certain level of knowledge accumulation already, while about half of the MIDC C/P staff's final education levels were general upper secondary high schools. This inferred that there was a difference in knowledge amount between those organizations in the first place.

The technical levels of MIDC, POLMAN Bandung and POLMAN Ceper examined at the end of the Project presented that everyone has raised their evaluation points. In the comparison of those three organizations, the evaluation average scores of POLMAN Bandung and POLMAN Ceper were relatively high, 119 points and 98.1 points, respectively.

On the other hand, MIDC's score was 66.8, again resulting in the disparity between the scores of the other two organizations. This could be attributed to the differences in the opportunities of practicing technology in addition to the issue of academic backgrounds as mentioned above. POLMAN Bandung and Ceper routinely produced casting products at their own schools as they had orders from companies and/or for the practices for their students. Meanwhile, due to the MIDC's character as a R&D institution, it had few orders of production from companies, meaning limited opportunities to practice technology which was essential to acquire practical knowledge. However, their growth rates were approximately 17% ( $\frac{66.8-57}{57}$ ) for MIDC, approximately 19% ( $\frac{119-100.4}{100}$ ) for POLMAN Bandung and about 20% ( $\frac{98.1-82}{82}$ ) for POLMAN Ceper, which confirmed that the skill levels of all three organizations were gradually improved.<sup>13</sup>

ANNEX 5 shows a check sheet used for technical level evaluation and its results (before and after the trainings) of each C/P organization.

**Activity 1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them on the basis of training and other activities**

Technical guidance was given to the MIDC C/P staff in the form of lectures by the JICA experts of the field from October 2014 until February 2017. Specifically, lectures on basic casting technology were given around one hour and a half each day in principle. In addition, on-site guidance was given with an aim to upgrade skills as well as knowledge of the MIDC staff members. The average attendance rate over the entire training period was 51.6%. Although this

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<sup>13</sup> The elongation rates were calculated by comparing only the subjects of the ex-post evaluation.

rate was relatively low, additional guidances were conducted for the absentees of each class resulting in the increase of the knowledges of all members. After August 2015, on-site guidance was given in the course of trial production of target castings, as discussed later.

Technical guidance on casting for the C/P staff at POLMAN Bandung was also given by JICA experts for half a day for four days in October 2014. The average attendance rate was 75% in the first year. In the second year and later, on-site training was continued for them in the form of target casting development

Technical guidance for POLMAN Ceper started in March 2016 in parallel with the commencement of extension service in the area and the 9 C/P staff attended lectures on basic casting technology given by JICA experts.

Table II.1.5 shows the list the lectures conducted for each C/P organization.

**Table II.1.5 List of the lectures conducted for each C/P organization**

C/P Organization	Duration	Frequency	Length of the each lecture
MIDC	October 2014 – February 2017	Everyday (in principle)	Approximately one hour and a half
POLMAN Bandung	21, 24, 28 and 31 October 2014	(Four days of intensive training course)	Half a day
POLMAN Ceper	March 2016 – February 2017	Once a week	Approximately one hour

(Source: JICA Project Team)

As for teaching materials, textbooks for the middle-management training program which emphasized practical skills were used, with some corrections and additions made according to reactions of the C/P staffs during the lectures. Also, to ensure sustainability of relevant activities after the end of the Project, an extension service manual for casting operation was prepared on the basis of the teaching materials. The manual was revised and upgraded from time to time on the basis of feedback from actual extension service activity so as to maximize its applicability in field operation. It was finalized under an agreement of MIDC that was responsible for field activity among the targeted metalworking organizations. ANNEX 6 shows the manual of extension service on casting.

#### Activity 1-3 To develop target casting

Target casting development was conducted from October 2014 to early December in 2016.

Drawings of six cast steel products, which HINABI was willing to purchase from local suppliers, were obtained from HINABI in October 2014 to develop and make prototype products by MIDC (four products) and POLMAN Bandung (two). However, it was found that POLMAN

Bandung was unable to perform the production process after casting, so that it was decided that POLMAN would be responsible for the casting process only, and that MIDC would do surface treatment and machining for them.

MIDC had received orders from local companis and it continued from the end of 2015 to the end of the Project, which caused delay in target casting development at MIDC. Only in early December 2016, four products were completed and submitted to HINABI for quality assessment.

On the other hand, POLMAN Bandung completed trial production of the two products by the end of 2015 and delivered them to MIDC for surface treatment and machining. Eventually, they were processed and submitted with the four products made by MIDC to HINABI for quality assessment in the early December 2016.

Note that all the trial products passed internal tests conducted by JICA experts with regard to chemical composition, mechanical properties, and internal defects. HINABI's inspection checked dimensions, external appearance, and machining to make overall evaluation that included the results of the international tests. Table II.1.6 shows the results of quality assessment on the six trial products for target castings.

**Table II.1.6 Quality Assessment on Target Castings**

Responsible organization	Product name	Casting materials					Processed products			O* <sup>1</sup>	Remark
		C**	M**	I**	A**	D**	D**	AP**	S**		
MIDC	BOSS (Small)	○	○	○	○	○	△	△	—	△	Chemical composition and mechanical properties complied with applicable standards, while problems relating to dimension, external appearance, and machining were identified.
	BOSS (Large)	○	○	○	○	○	△	△	—	△	Chemical composition and mechanical properties complied with applicable standards, while problems relating to dimension, external appearance, and machining were identified
	BRACKET (KOMATSU)	○	○	○	○	○	△	○	—	○	While problems relating to dimension and machining were pointed out, chemical composition, mechanical properties, and appearance complied with applicable standards, resulting in overall evaluation that indicates acceptability.
	SPROCKET (Small)	○	○	○	○	○	△	△	— *2	△	Chemical composition and mechanical properties complied with applicable standards, while problems relating to dimension, external appearance, and machining were identified.

Responsible organization	Product name	Casting materials					Processed products			O* <sup>1</sup>	Remark
		C**	M**	I**	A**	D**	D**	AP**	S**		
POLMAN Bandung	BRACKET (SUMITOMO)	○	○	○	○	○	△	△	—	△	Chemical composition and mechanical properties complied with applicable standards, while problems relating to dimension, external appearance, and machining were identified.
	SPROCKET (Large)	○	○	○	○	○	△	△	— *2	△	Chemical composition and mechanical properties complied with applicable standards, while problems relating to dimension, external appearance, and machining were identified.

※ C: Chemical composition, M: Mechanical property, I: Internal defect, A: Appearance, D: Dimensions, AP: Appearance of Processed surface, S: Surface treatment, O: Overall evaluation

Note1: △: Requiring further quality improvement, ○: Conforming to applicable standards overall with some non-conforming items, ◎: Conforming to applicable standards

Note2: SPROCKET has specifications of surface treatment (induction hardening) after processing as product specifications. However, it was not implemented due to the immature surface treatment technology in the country,

(Source:JICA Project Team)

Thus, the overall evaluation including machining has found that only the bracket made by MIDC (Komatsu) reached HINABI's standards. As the Project focused on transfer of casting technology (especially cast steel), however, all the trial products passed HINABI's test in terms of chemical composition and mechanical properties. Thus, all of them were considered to reach high quality standards set by HINABI for castings. On the other hand, as for machining and related quality items, MIDC did not have production facilities and equipment that can meet specification and dimensional requirements for the target castings, so that it made and submitted to HINABI the trial products with the degree of completion that could be achieved by its present resources. As a result, all the products other than the bracket inevitably received comments implicating that machining remains a further challenge. ANNEX 7 shows a quality evaluation sheet on the target castings received from HINABI.

MIDC has an intention to make use of those knowledges acquired through target casting development, for supporting metalworking enterprises including supporting industries of construction machinery in Indonesia.

Activity 1-4 To conduct seminars on casting for supporting industries of construction machinery

The seminars listed in the figure II.1.7 were held in the first to third years of the Project.

**Table II.1.7 Seminars Held during the Project Period**

Title	Place	Date	No. of participants
Kick-off seminar	Jakarta	August 21, 2014	94
Annual seminars	Bekasi	October 1, 2014	70
	Ceper	February 10, 2016	75
	Tegal	April 5, 2016	70
Wrap Up seminar	Jakarta	January 26, 2017	83
KAIZEN seminar (hosted by IKM)	Tegal	February 9, 2017 (scheduled)	71

(Source: JICA Project Team)

While all the seminars were intended for supporting industries of construction machinery, a seminar targeted supporting industries of casting (annual seminar) and was held at Grand Tjokro Klaten Hotel in the suburb of Ceper on February 10, 2016. Under cooperation of POLMAN Ceper, a letter of invitation was issued to around 50 companies in supporting industries of casting, located in Ceper, and the seminar was attended by around 75 persons, mainly representatives of local companies.

In the first part, speeches were made by representatives of MIDC, ILMATE, the chamber of commerce and industry in Klaten, and JICA, followed by introduction on government support policies and programs for the foundry industry. In the second part, the JICA project team outlined the Project and HINABI the current state of the construction machinery industry in Indonesia. Then, in consideration of concentration of foundries in Ceper, JICA experts in casting illustrated the business environment for the foundry industry and MIDC reported on the progress of target casting development.

#### Activity 1-5 To conduct trainings on casting for supporting industries and construction machinery

- The following training programs were conducted for supporting industries of construction machinery and related organizations from August 2014 to September 2016. Pre-training program for top management in Indonesia (casting)

The pre-training program was conducted for one week in Indonesia (at MIDC) and was designed in combination with the training program in Japan. It was intended for those with decision-making authority, namely manager-class personnel of the C/P organizations, and corporate owners. It was conducted three times during the project period, once per year. It served as the preliminary training prior to the training program in Japan, mainly consisting of lectures on basic knowledge relating to casting and steel casting, production management and quality control at foundries, and a foundry visit to a casting company.

In the first year, JICA experts mainly served as lecturers and the C/P staffs attended the program as candidates for lecturers in the subsequent years. In the second year, C/P



staffs also taught some lectures. The number of lectures taught by the C/P staffs further increased in the third year with an aim to upgrade training capability of the C/P organizations.

- Training program for top management in Japan (casting)

It was conducted for two weeks with major to deepen knowledge of the participants on relevant fields, on the basis of basic knowledge learned in the pre-training program conducted in Indonesia, including advanced foundry technology in Japan and industry-government-academia collaboration conducted in Iwate Prefecture.

Table II.1.8 shows the actual schedules of the above training programs in the first to third years of the Project with the numbers of the participants.

**Table II.1.8 Training for Top Management (Casting)**

Program name	Implementation schedule	Period	No. of participants
First year: Training for top management in Indonesia (casting)	August 25-29, 2014	One week	15
First year: Training for top management in Japan (casting)	September 7-19, 2014	Two weeks	
Second year: Training for top management in Indonesia (casting)	August 3-7, 2015	One week	12
Second year: Training for top management in Japan (casting)	August 23 - September 5, 2015	Two weeks	
Third year: Training for top management in Indonesia (casting)	August 1-5, 2016	One week	13
Third year: Training for top management in Japan (casting)	August 21 - September 3, 2016	Two weeks	

(Source: JICA project team)

Also, ANNEX 8 shows the summary report (curriculum, and feedback) on the training program in Indonesia in the third year and the completion report on the training in Japan of the same year.<sup>14</sup>

Note that the training programs were held concurrently with training programs for top management (production management).

- Training for middle management in Indonesia (casting)

The training program was designed to teach foundry technology at MIDC for middle management of supporting industries of construction machinery and of related organizations, and leaders in the production field. In consideration of participation by field managers, the program consisted of on-site training and practical training relating to development of target castings, in addition to lectures and a field tour which composed the training program for top management.

<sup>14</sup> The summaries of the trainings in Indonesia and the completion reports of the trainings in Japan in the first and the second years are attached in the Progress Report (I) and the Monitoring Sheet (Ver.3).

As is the case with the training program for top management, JICA experts mostly served as lecturers in the first year, and three MIDC staff conducted some lectures in the second year for the purpose of upgrading training capability of the C/P organizations.

Note that the first-year training program was conducted for three weeks according to the R/D. However, there were requests to shorten the program period because of the burdens on trainees' workplace. Also, MOI has limited budget, accordingly, the program period was implemented in shorter length of two weeks in the second year.

The training program was planned to be held three times, once per year, as agreed in the R/D. However, in the third year, ILMATE's budget for implementation of the training programs under the Project was cut off due to the reduction of MOI's budget. Meanwhile, the C/P organizations called for implementation of extension services for companies in the remaining project period. In consultation with ILMATE, in order to make effective use of the project period and lead to the achievement of Outputs, it was decided to cancel the training program for middle management in the third year. Instead, extension services for companies were implemented intensively for the period during which the training was planned to be carried out.

For the above programs, Table II.1.9 shows the actual schedules of the above programse in the first and second years of the Project with the numbers of the participants.

**Table II.1.9 Training for Middle Management (Casting)**

Program name	Implementation schedule	Period	No. of participants
First year: Training for middle management in Indonesia (casting)	November 3-21, 2014	Three weeks	14
Second year: Training for middle management in Indonesia (casting)	November 2-13, 2015	Two weeks	11
Third year: Training for middle management in Indonesia (casting)	(Canceled)	-	-

(Source: JICA project team)

- Ceper mini-training

In preparation for extension service held in Ceper, as discussed in the next section, a mini-training program was held at POLMAN Ceper, for five days from March 14, 2016, targeting local companies in supporting industries of casting. 30 persons participated, representing 28 companies. 3 MIDC staff served as lecturers and 9 POLMAN Ceper staff s as instructors for practical training. In Ceper, few training programs had been conducted for upgrading of skills in the past, so that the program received generally good evaluation as judged from the feedback from the participants.

In the mini-training program, it became apparent that POLMAN Ceper must upgrade its equipment as well as technical capability and skills, if it was to serve as a core organization in the area to promote technology dissemination among local supporting industries.

POLMAN Ceper's equipment is aged and deteriorated to require renewal. As the capacity of the furnace is low in terms of the maximum temperature and capacity size, it is difficult to make steel casting products with it. In fact, on the second day of the training program, a melting furnace, a kneader motor, and a shot blast broke down during the field guidance on steel casting production, which necessitated change the training program from exercise-centered training to lecture-centered one.

As for human resources, skill levels of the 9 staffs who participated as instructors were evaluated to find that their technical capability and skills should be upgraded if they were to provide guidance for companies. To ensure that they are capable of providing guidance for the entire production process, it is imperative to make them have experience in all the casting processes by means of periodical transfer. Note that, for the extension service discussed later, 3 out of the 9 staffs, who were judged as having relatively high skill levels, were selected as extension officers.<sup>15</sup>

#### Activity 1-6 To deliver extension services on casting for supporting industries of construction machinery

As discussed earlier, it was decided to conduct extension service concurrently with the target casting development work and started in the late March of 2016, following the completion of the mini-training in Ceper, and was continued regularly until February 2017.

In preparation for extension service, JICA experts in casting diagnosed companies referred by POLMAN Ceper and selected companies in supporting industries to receive extension service in June and November in 2015. Selection criteria were set to give high priority to equipment and skills relating to steel casting production because selected companies were expected to be engaged in trial production of the target castings. Although most of the companies which had sent personnel to the mini-training were willing to receive extension service, it turned out that few of them were able to produce steel casting from the aspects of facility and technique. As a result of two selection sessions in June and November 2015, 3 companies (PT Baja Kurnia, PT Atmaja Jaya, and CV Karya Hidup Sentosa) were selected.<sup>16</sup> Then, extension service was conducted to the 3 companies. Note that a request was made to POLMAN Ceper and a cooperative of foundries in

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<sup>15</sup> The results of skill check made for the nine staffs from POLMAN Ceper is shown in ANNEX 5.

<sup>16</sup> CV Karya Hidup Sentosa has its head office and factories in Jog Jakarta adjacent to Ceper, but not in Ceper. It was accepted in February 2016, based on the recommendation by MOI, after verification on its production capability.

Ceper to introduce eligible companies, however no company having steel casting production capability, in terms of equipment and technology, was found.<sup>17</sup>

From March until September 2016, extension service was conducted mainly with POLMAN Ceper C/P staff in stead of MIDC staff. However, as a result of negotiation with BPPI which was the MIDC’s supervising organization, the budget for business travel relating to extension service for the period between October and December 2016 was allocated, and three of the MIDC staff playing a central role in the project activities at MIDC were appointed as extension officers to work together with JICA experts. In October 2016, they started to participate in extension service alongside of those belonging to POLMAN Ceper.<sup>18</sup>

Extension service made steady progress. In particular, CV Karaya Hidup Sentosa received good evaluation from HINABI for trial production of the small boss and started supply contract negotiation with PT Sumitomo Construction Machinery which provided the drawings. Activities relating to extension service are shown in Table II.1.10.

**Table II.1.10 Activities relating to Extension Service**

Client company	Activity outline
CV. Karya Hidup Sentosa	1) Technical guidance on trial production (boss – small): The trial product submitted to HINABI received favorable rating according to its quality standard. 2) Technical guidance on defect control measures was given at its new factory
PT. Baja Kurnia	Technical guidance on trial production (boss – large): Machining problems were pointed out for the trial product submitted to HINABI, and rework is carried out under the advice of experts.
PT. Atmaja Jaya	Technical guidance on trial production (bracket - Komatsu): two trial products have been made but have failed to meet quality standards set by Japanese experts, and rework is underway.

<sup>17</sup> As far as the JICA project team confirmed the actual condition of supporting industries by visiting Ceper, most foundries were small in size and family operated, and most employees were hired on a short- or medium-term contract basis, with a small number of them being operated as a company. As a result, few owners were interested in upgrading of employees’ skills, while wanting improvement of product quality, and few of them conducted technical education and training for their employees. Also, few companies conducted sales activity, suggesting the need to make improvement in terms of business operation if they are to contract with HINABI member companies.

<sup>18</sup> Mr. Husen Taufiq, Mr. Purbaja Adi, who became a manager in charge of casting in October 2016, and Mr. Pujiyanto, who was appointed manager in charge of machining, were selected as extension officers to visit Ceper.

## (2) Activities for Output 2

### **Output 2**

Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.

#### **Activity 2-1 To identify technical level of targeted metalworking organizations on production management**

As done in Activity 1-1, personnel to receive technical guidance in production management were selected at MIDC and POLMAN Bandung. 10 persons from each organization were selected and their skill levels were rated by means of personal interview on production management techniques using a check sheet.

As for technical terms of production management, few of them had knowledge high enough to be able to use them in actual work, while showing some level of understanding. Meanwhile, 2 of them, who had participated in another training program relating to the field, demonstrated relatively high skill levels. The overall rating is level II (having good understanding of the concept).<sup>19</sup>

The result of the skill level check of MIDC C/P staff conducted at the end of the project shows that more than half of the staff members had increased their evaluation scores. ANNEX 9 shows a check sheet used for skill level evaluation and a set of the evaluation results.

#### **Activity 2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based the results of training and other activities**

For the C/P staffs of MIDC (10 people), who had been selected under Activity 2-1, a series of lectures on production management techniques by the JICA expert in on-site work were given continuously since October 2014 and ended in August 2015 when extension service was started. They used teaching materials for the three-week training program for middle management. Makeup lectures were given for those who had been absent from formal sessions, which made the attendance rate 100%.

Then, supplemental lectures were given to teach knowledge and skills which were found insufficient in the course of extension service.

JICA expert of Production Management also gave half day technical guidances to the C/P staff of POLMAN Bandung (10 people in total) for four days in October 2014, intensively.

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<sup>19</sup> Evaluation criteria was three stages: I) Do not know or have heard it, II) Understand the contents well, III) Practice myself and guide others.

Particularly important subjects of the middle management training was excerpted and used as the training materials for the C/P training.

Table II.1.11 shows the list the lectures conducted for each C/P organization.

**Table II.1.11 List of the lectures conducted for each C/P organization**

C/P Organization	Duration	Frequency	Length of the each lecture
MIDC	October 2014 – August 2015	Everyday (in principle)	Approximately one hour and a half
POLMAN Bandung	21, 24, 28 and 31 October 2014	(Four days of intensive training course)	Half a day

(Source: JICA Project Team)

Finally, to help ensure sustainability of activities relating to production management after the end of the Project, an extension service manual was prepared on the basis of the textbooks used for the training program for middle management which emphasized practical contents. To maximize its applicability in field operation, the manual was revised and upgraded from time to time on the basis of feedback from actual extension service activity. It was then finalized under an agreement with MIDC that was responsible for field activity among the targeted metalworking organizations.

ANNEX 10 shows the manual of the extension service on production management.

#### Activity 2-3 To conduct seminars on production management for supporting industries of construction machinery

On April 5, 2016, an annual seminar was held in Tegal. It was intended for supporting industries of machining in consideration of presence of many companies with business relations with HINABI in Tegal. Companies in machining-related supporting industries were invited in cooperation of DINAS in Tegal. As a result, the seminar was attended by around 70 persons, mainly representatives of local companies.

In the first part, speeches were made by representatives of MIDC, ILMATE, and JICA, followed by introduction on the government's SME support policies and programs. In the second part, the JICA project team outlined the Project and HINABI summarized the current state of the construction machinery industry in Indonesia. Then, in response to the request by local supporting industries, the JICA expert in charge of production management gave an introductory lecture.

#### Activity 2-4 To conduct trainings on production management for supporting industries of construction machinery

The following training programs were conducted for the companies in the supporting industries for construction machinery and related organizations from August 2014 to December 2016.

- Training for top management in Indonesia (production management)

As done in Activity 1-5, the training program in Indonesia was conducted for one week, prior to the training program in Japan, for the purpose of teaching basic knowledge on production management by means of lectures and a field tour to those with decision-making authority, namely manager-class personnel of the C/P organizations and corporate owners. It was conducted three times during the project period, once per year.

- Training for top management in Japan (production management)

As done in Activity 1-5, the training program in Japan was conducted for two weeks as the second part of the training program for top management. It was designed to deepen knowledge of the participants on production management, on the basis of basic knowledge learned in the training program in Indonesia, together with industry-government-academia collaboration in the context of assistance by technical support organizations and case studies on factory management by Japanese foundries. Finally, in consideration of the need to learn casting technology as well as production management techniques so as to upgrade the organization's overall capability, the training program included lectures and field tours relating to casting.

Table II.1.12 shows the actual schedules of the above programs in the first to third years of the Project with the numbers of participants.

**Table II.1.12 Training for Top Management (Production Management)**

Program name	Implementation schedule	Period	No. of participants
First year: Training for top management in Indonesia (production management)	August 25-29, 2014	One week	5
First year: Training for top management in Japan (production management)	September 7-19, 2014	Two weeks	
Second year: Training for top management in Indonesia (production management)	August 3-7, 2015	One week	7
Second year: Training for top management in Japan (production management)	August 23 - September 5, 2015	Two weeks	
Third year: Training for top management in Indonesia (production management)	August 1-5, 2016	One week	7
Third year: Training for top management in Japan (production management)	August 21 - September 3, 2016	Two weeks	

(Source: JICA project team)

The above training programs have generally received favorable comments from the participants in terms of satisfaction partly because they were systematically designed to cover a whole range of technology from basics to advanced technology used in Japan, and partly because they allowed the participants to learn actual application and practice in terms of production management through the study tours on foundries.

ANNEX 11 shows the summary report (curriculum and feedback) on the training program in Indonesia in the third year and the completion report on the training in Japan of the same year.<sup>20</sup>

Note that the training programs in Japan were conducted concurrently with those on casting. As for the numbers of participants in the two courses, it was originally agreed to have 15 in the casting course and 5 in the production management course according to the R/D. In and after the second year of the Project, however, ILMATE requested to increase the number of participants in the production management course. The JICA project team responded to the request by adjusting the proportion of participants in the two courses, while maintaining the total number per year at 20.

- Training program for middle management in Indonesia (production management)

As done in Activity 1-5, the training program on production management techniques was conducted at MIDC for middle management of supporting industries of construction machinery and of related organizations, and leaders in the production field. Note that it was identical to the training program for middle management under Activity 1-5, in terms of the number of times conducted and the program periods.

Implementation schedules of the program up to the second year of the Project and the number of participants in each program are summarized in Table II.1.13.

**Table II.1.13 Training for Middle Management (Production Management)**

Program name	Implementation schedule	Period	No. of participants
First year: Training for middle management in Indonesia (production management)	November 3-21, 2014	Three weeks	13 <sup>21</sup>
Second year: Training for middle management in Indonesia (production management)	November 2-13, 2014	Two weeks	14
Third year: Training for middle management in Indonesia (production management)	(Canceled)	-	-

(Source: JICA project team)

<sup>20</sup> Please refer to the first Progress Report and the Monitoring Sheet (Ver.3) for the circumstances of training in Indonesia and Japan in the first and the second years.

<sup>21</sup> At the beginning of the program, 16 persons participated. Then, it became difficult for three of them to continue training because of their work duties and resigned. As a result, 13 persons completed the program.



As in the case of the casting course, in both the training program for top management in Indonesia and the training program for middle management in Indonesia (production management) of the second and third years, MIDC staff who had participated in a previous program gave lectures with an aim to upgrade teaching and training capabilities of the targeted metalworking organizations as a whole.

Skill levels of the MIDC staff assigned to the production management course were relatively high with little variation. Therefore, in the second and third years, most lectures were given jointly by the MIDC staff and the JICA expert.

- Extension service on production management

- 1) Areas in the suburbs of Jakarta

From August 2015 until early September 2016, extension service on production management was intermittently conducted in the suburbs of Jakarta. It covered the following five companies, all of which were HINABI's subcontractors or metalworking companies that were qualified to work for HINABI. Table II.1.14 lists companies that received extension service in production management with outlines of technical guidance.

**Table II.1.14 List of Companies that Received Extension Service in Production Management and Summary of Technical Guidance**

Company name	Outline of technical guidance
PT. Kongo Citra Manufaktur Indonesia	QC Cycle, QC 7 tools, Process Capability, On-site guidance
PT. Arkha Jayanti Persada	5S, QC Cycle, QC 7 tools, On-site guidance
PT. Trieka Aimex	QC 7 tools, On-site guidance
PT. Sinar Perkasa Engineering	QC Cycle, QC 7 tools, On-site guidance
PT. Wika Industri Konstruksi	Inventory control, Levelled production, Layout, On-site guidance

(Source: JICA project team)

MIDC did not have a sufficient budget for business travel since the beginning of extension service, August 2015. Although the service was started in the suburbs of Jakarta, instead of Tegal to ease cost burdens, MIDC result in sporadic participation in the extension service due to its budget limitation. However, in the suburbs of Jakarta, extension service had kept conducted even only by the JICA expert to the end responding to the strong request from ILMATE.

- 2) Tegal

In Tegal, extension service was conducted for the following five companies from November until early December 2016. It generally covered data collection techniques, cause analysis by using cause effect diagram, Pareto analysis, and 5S, with details

varying among companies. Table II.1.15 lists the companies that received extension service, together with the contents of guidance.

**Table II.1.15 List of Companies that received Extension Service in Production Management and Service Outline (Tegal)**

Company name	Service outline
PT. Prima Karya	5S, QC Cycle, Defect data sheet, Levelled production, On-site guidance
PT. Gaya Teknik Utama	5S, QC cycle, Layout, On-site guidance
CV. Rejeki Abadi Machinery	5S, QC cycle, Layout, On-site guidance
PT. Milako Tehnik Mandiri	QC 7 tools, Defect data sheet, On-site guidance
PT. Karya Paduyasa	Inventory control, On-site guidance

(Source: JICA project team)

Due to the budget constraints of MIDC, it was decided to train staff members of DINAS in Tegal (local organization) whose participation in the service generated no business travel cost.

Prior to the start of extension service in Tegal, a training program was conducted for DINAS staff to teach basic knowledge on production management in early August 2016. The training curriculum was prepared on the basis of that for the training program for middle management to cover QC theory, case study on improvement by QC, Industrial Engineering (IE) theory and introduction on cases of improvement, and Total Productive Maintenance (TPM). As Tegal DINAS had a section in charge of corporate guidance, its 5 extension officers in charge of corporate guidance and 5 university students (who studied production management and would be hired by DINAS as contract employees until finding a permanent job) were selected and participated in the training program. Then, they started extension service for the selected companies in Tegal.

Meanwhile, MIDC negotiated with its umbrella organization, MOI/BPPI with regard to an additional budget, and a business travel budget was allocated to MIDC for extension service in November 2016. As a result, three MIDC employees who served as the central figures of the production management C/P staff<sup>22</sup> were selected as extension officers to work jointly with the JICA expert.

As for methodology of extension service implementation, the JICA expert and the three MIDC staff were organized into teams in charge of different companies. As the extension service program was designed to provide OJT for C/P staff members, a joint

<sup>22</sup> In consideration of workloads of the C/P members in their original positions, three members (Mr. Agus Hermawan, Mr. Helmi Hariyadi, and Mr. Hafid) were selected as extension officers in consultation with a MIDC's manager, Dr. Bimo. While Mr. Hermawan, the leader of MIDC's production management C/P staff, participated in the service on a continuing basis, Mr. Hariyadi and Mr. Hafid participated by a two-week alternative shift.

meeting for reviewing activities by all the teams was held after each service, where the JICA expert provided consultation for and advice to the teams led by the MIDC staff. From Tegal DINAS, around two staff members joined in the team led by the JICA expert every time and received OJT guidance from him.

(3) Output 3

**Output 3**

An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.

**Activity 3-1** To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management

In cooperation with MOI's Information Service Center and Central Bureau of Statistics (CBS), data collection was started in May of the first year, and a study report was completed, as scheduled, before the middle of the second year.<sup>23</sup>

The report analyzed social and economic conditions of the project areas on the basis of indices such as regional production, industrial structure, the number of companies, positioning of the foundry industry, and the value of trade, primarily depending upon CBS's data.

The present national development plan as well as development strategies and policies were also reviewed.

**Activity 3-2** To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on 3-1, Output 1 and 2

Originally, it was planned to organize a working group sometime in August – October 2014 and start individual and plenary meetings to discuss a general direction of the draft A/P. Due to differences in opinions on the Project Purpose among the targeted metalworking organizations, the start of the discussion was delayed.

In August 2015, the C/P organizations coordinated their views on a future direction on provision of service for supporting industries of construction machinery, and the first stakeholder meeting (participated by 29 persons) was held under the leadership of ILMATE on February 29, 2016. As a result, a working group on the draft A/P was organized by Indonesian stakeholders.

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<sup>23</sup> The "Report of Statistic Data in line with Supporting Industries of Construction Machinery" written in collaboration with the JICA project team and local consultant is attached to the Monitoring sheet (Ver.3).

Then, the stakeholder meetings were held under ILMATE’s leadership, to discuss responsible organizations for plans to be included in the draft A/P and detailed activities. The meetings were occasionally held until February 2017 when the draft A/P was approved in the JCC.

In particular, the stakeholder meeting to finalize the draft A/P was held twice, on November 29 and December 8, 2016. The composition of the draft A/P is shown in Table II.1.16.

**Table II.1.16 Final Composition of the Draft A/P and its relevancy with the Activity 3-1, Output 1 and 2**

Draft A/P	
Plan 1	Establishment of the industry-government-academia collaboration platform for promotion of supporting industries of construction machinery in Indonesia
	To establish a foundation to execute the A/P under the government-private collaboration for the purpose of ensuring sustainability of Outcomes 1 and 2 after the end of the Project by using technology transferred to the Indonesian C/P organizations.
Plan 2	Program to train workers with casting skills (including cast steel) by HINABI
	To aim for strengthening of competitiveness of companies making cast iron and steel products for the construction machinery industry in Indonesia by initiating HINABI’s training programs on quality and production management, in addition to machining skills.
Plan 3	Technical service program for the casting/cast steel industry
	To train workers with casting skills through technical support service relating to actual production of casting parts and upgrade technical capability of individual companies, while transferring production process and quality and production management techniques to companies with an aim to improve technical capability of the whole industry and drive import substitution for construction machinery parts.
Plan 4	Program to disseminate on-site KAIZEN (quality/productivity improvement) practice
	To disseminate and deploy KAIZEN (quality/productivity improvement) initiative, which is widely required in supporting industries of construction machinery in Indonesia, through seminars, workshops and consulting service for individual companies, with an aim to improve overall production management capability as well as competitiveness of the entire industry

(Source: JICA project team)

ANNEX 12 shows the final version of the draft A/P approved by the JCC in February 2017. This draft A/P is supposed to be notified as an official document to relevant parties by ILMATE. Regarding the specific plan of activities of the draft A/P, the Council of Promoting Supporting Industries of Construction Machinery in Indonesia is to hold stakeholders’ meetings regularly to further refine the contents and officially finalize it as A/P on the basis of final approval of the Council. In the process of examining the draft A/P, a total of eight plans were proposed. In the finalization process, however, feasibility of each plan and implementation schedule was evaluated and it was decided to exclude four of them in the discussion with C/Ps. Table II.1.17 summarizes the plans excluded from the draft A/P and outlines of the decisions. Note that, the Plan 5, 6 and 8

which have a possibility to be conducted by Indonesian side over a medium- to long-term forecast were shown in ANNEX 13.

Although not included in the draft A/P, MOI showed a strong intention to promote development of the casting industry in Ceper and requested technical support for preparation of a relevant action plan. In response, a development plan for the casting industry in Ceper was made and proposed to MOI.

**Table II.1.17 Plans excluded from the Draft A/P and Outlines of Related Decisions**

	Plan name	Outline of decision
Plan 5	Plan for reinforcement of MIDC's activities	Decided to mention it in the project completion report as a recommendation
Plan 6	Program to establish and operate a casting skills certification system	Decided to eliminate it from the plan and not to discuss it anymore (While the A/P will be implemented only by the Indonesian C/Ps after the end of the Project, they requested additional support of JICA as a necessary condition for implementation of this plan, which lead to a negative judgement on the feasibility.)
Plan 7	MIDC's development and marketing service on prospective parts	Decided to eliminate it from the plan and not to discuss it anymore (Because MIDC has been already conducting a similar activity, it requested to exclude it from the draft A/P.)
Plan 8	Plan to promote the foundry industry in Ceper	Decided to share information as a proposal of MOI (IKM and other departments)

(Source: JICA project team)

Also, in the formulation of the draft A/P, "Indonesia Training Course in Japan on Industry-Government-Academia cooperation for the Top Officials" was conducted for one week for the purpose of assisting related policymakers in Indonesia to develop capability to formulate effective promotional policies and strategies for the foundry industry. In the training course, advanced cases on industry-government-academia collaboration in relation to the foundry industry and promotion of supporting industries in Japan were presented with an aim to promote understanding of the entire industry-government-academia collaboration process from perspectives of each sector, namely from planning to budgeting, implementation, evaluation, and monitoring. Feedback from the participants indicates a high level of satisfaction; many of them expressed willingness to make effective use of what they have learned, including applying knowledge obtained with regard to industry-government-academia collaboration to the preparation of the draft A/P.

ANNEX 14 presents a completion report on the training programme in Japan.<sup>24</sup>

<sup>24</sup> The curriculum, participant list and feedback are included in the completion report.

(4) Other activities

Common activities and their outlines are shown in Table II.1.18.

**Table II.1.18 Common Activities and Outlines**

Common activities		Outlines
JCC meeting	[Time held] First: June 2014 Second: April 2016 Third: May 2016 Fourth: February 2017	Held as shown in the table II.1-5. <sup>25</sup> ANNEX 15 shows the MoM of the fourth JCC meeting.
Submission of reports	Work plan	The draft W/P was submitted to JICA in July 2014. The draft W/P was finally approved under the consensus of the C/P organizations in March 2015.
	Progress Report (I)	Progress Report (I) was submitted to JICA in March 2015, making report on all the project activities conducted from the start of the Project up to mid-January 2015.
	Progress Report (II)	Progress Report (II) was submitted to JICA in September 2015, making report on all the project activities conducted from late January to late July 2015.
	Monitoring Sheet (ver.3)	Monitoring Sheet (ver.3) was submitted to JICA in March 2016, accounting for all the project activities implemented from early August to late December 2015. (Due to the introduction of the monitoring sheet, a form of reporting was changed from progress report (No.3) to the monitoring sheet).
	Monitoring Sheet (ver.4)	Monitoring Sheet (ver.4) was submitted to JICA in September 2016, accounting for all the project activities implemented from early January to late July 2016.
	Project Completion Report	Project Completion Report is scheduled to be submitted in March 2017, covering all the project activities and outputs, results of joint review with the C/P organizations, lessons learned from project activities, and a prospect of achievement of the Overall Goal.
Strengthening of overall coordination of the Project activities , and PR activity	Creation and upgrading of the Project's web site	Web pages were created on MIDC's official web site to announce information on the Project, consisting of the following contents. The information on the site was updated along with the publication of newsletters. <ul style="list-style-type: none"> <li>a. Purpose of the Project</li> <li>b. Major organizations involved in the Project and their roles</li> <li>c. Goals, outputs and activities of the Project</li> <li>d. Implementation process of the Project</li> <li>e. Progress of the Project</li> </ul>
	Publication and distribution of newsletters	Since the publication of the first issue in January 2015, newsletters were published up to the fifth one. (As it was decided to use newsletters to announce results of project activities at the request of the C/P organizations, the schedule of publication was adjusted according to the progress of project activities.
	Information sharing by use of groupware	In December 2014, a web site dedicated to project stakeholders was created at Google+ for transmission and collection of project-related information by project stakeholders. Also, to enable the participants in the training program in Japan to share project information, ILMATE opened a SNS group site.

(Source: JICA project team)

<sup>25</sup>

The MoMs from the first to third JCC meetings were attached to the Progress report (I) and Monitoring sheet (ver.4).

## II.2 Level of Achievement relating to the Project

### II.2-1 Level of Achievement in terms of Output

As the PDM (Version 1) with evaluation indicators was approved with the W/P in March 2015, specific levels of achievement for the Overall Goal, the Project Purpose and the Outputs were established. Project activities such as training, extension service, and target casting development were conducted to satisfy them.

Table II.2.1 summarizes the levels of achievement of each Output. All the items are considered to have been satisfied or over-achieved.<sup>26</sup>

**Table II.2.1 Levels of Achievement of the Outputs**

Narrative Summary	Indicator for achievement	Level of achievement *
<p><b>Output</b></p> <p>1. Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting) including production management is improved.</p>	<p>1-1 Number of trainers who is capable of conducting extension services and lectures on casting: <u>11 trainers</u></p>	<p>◎ Extension officers capable of conducting extension service and giving lectures on casting: <u>12</u></p> <ul style="list-style-type: none"> <li>- MIDC: 5</li> <li>- POLMAN Bandung: 3</li> <li>- POLMAN Ceper: 4</li> </ul> <p>Technical guidances were conducted through training programmes and target casting development.</p> <p>MIDC and POLMAN Bandung have staff members who are capable to give lectures in the training programs.</p> <p>With regard to extension service, it was decided that POLMAN Ceper would provide extension service for companies in Ceper. 9 staff members of POLMAN Ceper were trained as instructors and then, four of them were selected as extension officers who would receive training, including participation in the training and field service. When they were unavailable, some of the remaining instructors participated.</p> <p>In October 2016, 3 MIDC staff started participating in extension service on a continuous basis. As a result of technical guidance conducted as part of the Project, skill levels of extension service personnel increased and the C/P became capable of performing extension service and conducting lecture without the assistance of JICA experts. ANNEX 4 lists extension officers.</p>

<sup>26</sup> Achievement is rated in the following three levels: some concern about achievement (△), achieved (○), and over-achieved (◎).

Narrative Summary	Indicator for achievement	Level of achievement*
	1-2 Development of manual for casting and its revision	○ Based on feedback obtained from extension service, teaching materials for the training programs on casting for top and middle management, were customized to a manual. The contents were agreed with MIDC by the end of 2016.
2. Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.	2-1 Number of trainers who is capable of conducting on-site consultation services and lectures on production management: <u>11 trainers</u>	○ Extension officers capable of conducting extension service and giving lecture on production management: <u>11</u> - MIDC: 9 - DINAS: 2  MIDC's production management C/Ps had generally high levels of knowledge on the field, and 8 of them served as lecturers in the training program for middle management in the second year. In addition, 9 staff was engaged in extension service.  As for extension service in Tegal, an average of 2 persons accompanied the extension service.  As a result of technical guidance conducted as part of the Project, skill levels of extension service personnel increased and the C/P became capable of performing extension service and conducting lecture without the assistance of JICA experts. ANNEX 4 lists extension officers.
	2-2 Development of manual for production management and its revision	○ Based on feedback obtained from extension service, teaching materials for the training programs on production management for top and middle management were customized to a manual. The contents were agreed with MIDC by the end of 2016
3. An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.	3-1 Development of a future action plan	○ In February 2016, the first stakeholder meeting was held to form a working group. After that, stakeholder meetings were held from time to time under the leadership of ILMATE to handle various matters such as the decision on organizations responsible for individual plans under the draft A/P and detailed examination on individual activities.  The stakeholder meeting to evaluate feasibility of each plan and thereby finalize the draft A/P was held twice, on November 29 and December 8, 2016, and it was agreed to include four plans in the draft A/P. After further evaluation by the stakeholders, the final version of the draft A/P was approved by the JCC meeting



Narrative Summary	Indicator for achievement	Level of achievement*
		held on February 7, 2017. This draft A/P is supposed to be notified as an official document to relevant parties by ILMATE. Regarding the specific plan of activities of the draft A/P, the Council of Promoting Supporting Industries of Construction Machinery in Indonesia is to hold stakeholders' meetings regularly to further refine the contents and officially finalize it as A/P.

\*Note: △ Some concern about achievement, ○ achieved, ◎ achieved and exceeded numerical value of the relevant indicator

(Source: Prepared by the JICA project team on the basis of the PDM (Version 1) agreed on March 13, 2015, in the forum of MoU.)

## II.2-2 Level of Achievement in terms of Project Purpose

<b>Project Purpose</b>	A draft action plan for sustainable development of service delivery capability relating to metalworking for supporting industries of construction machinery is prepared.
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The level of achievement relating to the Project Purpose is summarized in Table II.2.2. All the items are considered to have been achieved or over-achieved as measured by the indicators. In particular, the number of companies that received extension service in the area of casting and production management substantially exceeded the target figure set in the indicators. However, for the companies with a certain technical level, technical supports provided by targeted metalworking organizations do not fully meet their expectations. Therefore, those targeted metalworking organizations are required further efforts of technical improvement.

**Table II.2.2 Level of Achievement in terms of the Project Purpose**

Project purpose	Index	Level of achievement*
<b>Project purpose</b> Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.	1. Satisfaction level of companies in supporting industries of construction machinery with the technical services provided by the Project (as measured by a questionnaire survey to be conducted for targeted companies).	○ As judged from the results of technical level check of the participants from companies in the training programs which were conducted under the Project (see "Progress Report(I)"), companies in supporting industries of construction machinery are considered to have basic casting knowledge and techniques. However, there was high demand for technical guidance, because few companies in Indonesia have experience in steel casting production. In response, steel casting production techniques were taught to MIDC and POLMAN Ceper by means of the C/P training programs and OJT, and then technical guidance for individual

Project purpose	Index	Level of achievement*
		<p>companies was given in the form of extension service.</p> <p>[Evaluation of the trainings for top and middle management conducted from the first to the third year]</p> <p>In the feedback surveys on the training programs both casting and production management, positive answers were obtained for all question items related to satisfaction.<sup>27</sup> With this result, these trainings have achieved generally high levels of satisfaction. ANNEX 11 shows the results of the feedback surveys of the pre-training and the training in Japan for top management in the third year.</p> <p>Many small and medium-sized metalworking companies lack basic knowledge on production management, so that many of them can improve productivity by small efforts. There are cases where participants in the training programs applied learned knowledge to their companies, thus contributing to reduction of defect ratio and/or improvement of production efficiency.</p> <p>[Evaluation of extension services]</p> <p>In comparison with the B/L and E/L survey, all of the companies received extension services were found improved their technical levels. With this result, extension services can be evaluated to achieve high levels of satisfaction from the receiving companies. ANNEX 16 shows the results of the E/L survey.</p>
	<p>2. Number of companies which receive technical services<sup>28</sup> on casting: <u>30 companies</u></p>	<p>◎ Number of companies which receive technical service on casting: <u>43</u><sup>29</sup></p>

<sup>27</sup> The scales of the responses were set in 3 to 5 steps. All the responses were in the top two stages in every question items (ex. 'Very Clear', 'Clear', 'Highly suited to the objective', 'Some what suited to the objectives', 'Excellent', 'Good', 'Just right' and so on.)

<sup>28</sup> It is synonymous with the 'provision of technology' mentioned in the 'indicator 1', 'project goal'. It refers to all the trainings and extension services conducted in this Project.

<sup>29</sup> Some participants attended from the same company as previous participants of the trainings during 3 years. In addition, participation in the trainings was obligated to the receiving companies of extension services. Therefore, the sum of the participating companies and the receiving companies of extension services in each year does not agree with the "Number of companies which receive technical service on casting".

Project purpose	Index	Level of achievement *
		<p>The training programs for top and middle management (casting) held in the first and second years were attended by representatives of companies in supporting industries or HINABI member companies. In the third year, while the training program for middle management was canceled, that for top management was attended by those from companies. The numbers of companies which attended these programs are as follows:</p> <ul style="list-style-type: none"> <li>- First year: 11 companies (16 persons)</li> <li>- Second year: 9 (13)</li> <li>- Third year: 5 (5)</li> </ul> <p>In the training program for top management (Indonesia) in the first year, some lectures were given by POLMAN Bandung staff. In the training program for top and middle management in the second and third years, MIDC staff gave some lectures.</p> <p>Extension service in Ceper was started in March 2016 by selecting 3 companies in casting related supporting industries.</p> <p>Prior to the start of the extension service, a mini-training program was held at POLMAN Ceper under the attendance of 30 persons representing 28 companies in casting-related supporting industries, including the three companies that received the extension service.</p>
	<p>3. Technical level of target casting which targeted metalworking organizations can develop. (as measured on the basis of evaluation by JICA experts and survey of construction machinery manufacturers to which the castings have been shipped).</p>	<p>○ A total of 6 target castings were developed at MIDC and POLMAN Bandung. Drawings of 5 of them were provided by Sumitomo Construction Machinery Co., who thus evaluated the trial products. The remaining one was evaluated by Komatsu Construction Machinery which provided the drawings for it. As shown in Table II.1.6, overall rating indicated that the bracket (Komatsu) made by MIDC met HINABI's standards. Also, all the trial products were accepted by HINABI in terms of chemical composition and mechanical properties. This means, all of them were considered to reach HINABI's high quality standards for castings.</p>

Project purpose	Index	Level of achievement <sup>*</sup>
	4. Number of companies which receive technical services on production management: <u>30 companies</u>	◎ Number of companies which receive technical service on production management: <u>31<sup>30</sup></u>  The training programs for top and middle management (production management) held in the first and second years were attended by representatives of companies in supporting industries or HINABI member companies. In the third year, while the training program for middle management was canceled, that for top management was attended by those from companies. The numbers of companies which attended these programs are as follows:  - First year: 13 companies (14 persons) - Second year: 18 (18) - Third year: 3 (3)  Starting in the training program for middle management in the first year, some lectures were given by MIDC staff.  Also, extension service was conducted around Jakarta (starting in August 2015) and in Tegal (starting in November 2015), for 5 companies each (10 in total).

\*Note: △ Some concern about achievement, ○ achieved, ◎ achieved and exceeded numerical value of the relevant indicator  
 (Source: Prepared by the JICA project team on the basis of the PDM (Version 1) agreed on March 13, 2015, in the form of MoU.)

### II.3 Modification of PDM

As of the start of the Project, PDM indicators had yet to be set. They were then fixed under discussion with the C/P organizations as shown in the table below, followed by upgrading (from Ver.0 to Ver.1) made concurrently with the approval of the W/P in March 2015. Table II.3-1 summarizes key points in PDM modification.

<sup>30</sup> Some participants attended from the same company as previous participants of the trainings during 3 years. In addition, participation in the trainings was obligated to the receiving companies of extension services. Therefore, the sum of the participating companies and the receiving companies of extension services in each year does not agree with the "Number of companies which receive technical service on production management".

**Table II.3.1 Modification of PDM**

Item	Ver.0	Ver.1
Overall goal: Metalworking technology for supporting industries of construction machinery is upgraded.		
1.	Number of companies in supporting industries that receive high evaluation on casting technology and production management techniques by construction machinery manufacturers and/or users: __ companies specialized in casting; __ companies specialized in metalworking	5 foundries / 10 metalworking companies
2.	Number of companies in supporting industries that newly manufacture steel casting productions that meet the needs of the construction machinery industry	4 companies
3.	Types of steel casting products that were newly produced by supporting industries and meet the needs of the construction machinery industry __ types	6 types
Project purpose: The targeted metalworking organizations provide high quality technical service on metalworking for supporting industries of construction machinery.		
1	Level of satisfaction by companies in supporting industries of construction machinery that receive technology transfer under the Project	(No quantitative target was set, and estimation was made on the basis of questionnaire surveys of beneficiary companies.)
2	Number of companies that have received casting technology related service __ companies	30 companies
3	Level of target castings manufactured by the targeted metalworking organizations	(No quantitative target was set, and estimation was made on the basis of evaluation by JICA experts and construction machinery manufacturers that inspected the target castings.)
4	Number of companies that have received production management related service __ companies	30 companies
Output 1: Capability of the targeted metalworking organizations to provide technical service on casting (especially steel casting) for foundries, including production management, is upgraded.		
1-1	Number of persons capable of providing extension service and lecture on casting __ persons	11
1-2:	Development and revision of casting technology manuals	(No quantitative goal has been established.)
Output 2: Capability of the targeted metalworking organizations to provide technical service on production management for foundries, including production management, is upgraded.		
2-1:	Number of persons capable of providing extension service and lecture on production management __ persons	11
2-2:	Development and revision of production management manuals	(No quantitative goal was set.)
Output 3: A draft action plan for sustainable development of service delivery capability relating to metalworking for supporting industries of construction machinery is prepared.		
3-1	Preparation of the action plan	(No quantitative goal was set.)

(Source: JICA project team)

## II.4 Others

### II.4-1 Progress relating to Environmental and Social Consideration (in applicable)

The Project does not fall under the category of projects subject to environmental and social consideration. It should be noted that few SMEs engaged in casting take environmental protection measures in their production facilities. As these SMEs become subcontractors of large enterprises such as HINABI member companies, they may be examined with regard to environmental consideration in the pre-contract review process. Under the Project, technical guidance with regard to environmental measures such as countermeasures for hume<sup>31</sup> and dust<sup>32</sup> were provided in the course of extension services.

### II.4-2 Progress relating to Gender, Peacebuilding, and Poverty Reduction Consideration (if applicable)

The Project does not fall under the category of projects subject to consideration on gender, peacebuilding, and poverty reduction.

## III. Results of Joint Review

### III.1 Results of Review according to DAC's Evaluation Criteria

The Project was reviewed at the time of its ending, on the basis of Organisation for Economic Co-operation and Development (OECD) - Development Assistance Committee (DAC)'s five evaluation criteria: i) relevance; ii) effectiveness; iii) efficiency; iv) impact; and v) sustainability, and its results are summarized as follows.

#### III.1-1 Relevance

Relevance – high

(1) Consistency with policy of Indonesian government and development needs

Under the Indonesia-Japan Economic Partnership Agreement (IJEPA), which was effectuated in July 2008, the Japanese government made a formal commitment to cooperation for the manufacturing sector in 14 fields by means of the Initiative for Manufacturing Industry

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<sup>31</sup> There is a case that harmful white smoke is generated due to the material of the melting scrap. As a measure, to use good scrap was encouraged.

<sup>32</sup> Instructed as a part of the 5S maintenance in a factory.

Development Center (MIDEC). After several discussions, it was agreed at MIDEC's high level meeting in November 2011 to implement a cooperation project aiming at supporting industries of construction machinery in the field of metalworking.

Indonesia's national policy also gives priority to industrial diversification and promotion of import substitution (domestic production), which is adopted as MOI's policy. "National Industry Policy (2008)" aims to develop industrial clusters including supporting and related industries with a particular focus on the ten core industries including construction machinery, while "MOI's Strategic Plan 2010 - 2014 (2010)" and "Ditto 2015-2019 (2015)" gives priority to development and strengthening of the heavy machinery industry under Activity 4 "Growth of Machinery and Agricultural Machinery Industries" relating to Program III "Growth of Leading Industries on the basis of Advanced Technology."

Meanwhile, MOI/ILMATE – a main C/P of the Project – designated the construction machinery industry as Development Priority of IUBTT (Direktur Jenderal Industri Unggulan Berbasis Teknologi Tinggi) at the work meeting<sup>33</sup> in 2013. Then, "Master Plan for Development of the Machinery Industry in Indonesia" formulated in August 2016 by ILMATE's Department of Machinery and Agricultural Machinery Industries states the need to strengthen supporting industries in Tier 2 (component/semi- finished) and Tier 3 (raw materials) for Tier 1 (assemblers) including the construction machinery industry.

With regards to the needs of the construction machinery industry, it was projected in 2012 – when the Project was planned – that annual sales of construction machinery would exceed the historical high of \$4 billion, following a steady growth path.<sup>34</sup> On the other hand, components and parts of construction machinery – especially castings – were not highly localized with varying rates of 20% - 40% by the respective manufacturers, making the fostering of local foundries a urgent matter for the construction machinery industry from the viewpoint of not only meeting increasing demand but also controlling the production cost by reducing reliance on expensive import parts. Subsequently, however, as the mining industry – one of the major customers for the construction machinery industry – became sluggish and caused construction machinery demand to be in a great slump, contrary to the forecast. Meanwhile, as the Project's primary purpose is to improve technical capability of the supporting (casting) industry, and as the construction machinery industry has not changed its policy to raise the procurement rate of locally produced parts, the industry's condition does not affect the evaluation as "high relevance".

## (2) Consistency with Japan's aid policy for Indonesia

Japan's Country Assistance Policy for the Republic of Indonesia (April 2012) sets forth "Assistance for well-balanced development and enhancement of capacity to address issues of the

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<sup>33</sup> A meeting which determine departmental policy in each year

<sup>34</sup> According to a survey by VDMA (Verband Deutscher Maschinen- und Anlagenbau - German Engineering Federation), the construction machinery market in Indonesia was expected to grow from around \$4 billion in 2011 to \$7 billion in 2017.

Asian region and international society” as a basic policy of assistance. Also, Priority Area indicates “(1) Assistance for further economic growth.” In this context, the Project is positioned as a program to improve institutions and systems relating to the business environment as a means to provide support for the fostering of domestic industries in Indonesia, including supporting industries, so as to help achieve the goals. At the same time, the Project accords with Japan’s development aid policy and strategy as it is implemented within the framework of MIDECA’s cooperation under the IJEPA.

### (3) Appropriateness of the Project strategy

Under the Project, it was decided to conduct extension service in Cepur for on casting and in Tegal and the suburbs of Jakarta for on production management, in response to MOI’s request. In Cepur, around 300 companies in supporting industries are located to form a major contribution of foundries in consideration of the fact that the country has a relatively small number of such operations. Similarly, according to Tegal DINAS, there are around 2,500 metalworking companies in Tegal, suggesting that technical support designed under the Project agrees with the needs of companies in the served target areas.

MIDECA, which has played the a central role in metalworking organizations, uses some of production equipment which were made in Japan and provided under the technical cooperation “Project on Supporting Industries Development for Casting Technology in Indonesia (1999 to 2004),” and many companies in supporting industries also use Japanese equipment. Also, supporting industries in casting have strong confidence in Japanese casting technology, which has thus a strong advantage. Thus, the sending/dispatch of Japanese experts under the Project is considered to be highly significant.

In consideration of these factors, the relevance of the Project is highly relevant.

## III.1-2 Effectiveness

### Effectiveness – high

As discussed in II.2-1, all the Outputs were accomplished to indicate steady implementation of activities toward the accomplishment of the Project Purpose<sup>35</sup>. As the Project Purpose has already been achieved, logical consistency between the Outputs and Project Purpose has been verified.

Notably, training programs as a principal activity (including those for top and middle management) have obtained high levels of satisfaction according to the results of the feedback surveys conducted afterward.

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<sup>35</sup> The targeted metalworking organizations provide high quality technical service on metalworking for supporting industries of construction machinery.



As for extension service, the results of the E/L survey, in comparison to those of the B/L survey conducted at the start of the Project, confirmed that most companies of supporting industries experienced technical upgrading and had high levels of satisfaction.

For both the training and extension service programs, competent staffs of the targeted metalworking organizations were selected to service as lecturers or instructors, starting in the first year, with an aim to upgrade their teaching capability and skills. As a result, by the end of the third year, 12 persons in casting and 11 persons were trained<sup>36</sup> to become capable of serving as lecturers/instructors of the training programs as well as extension officers by themselves (without assistance of JICA experts).

The above results indicate high effectiveness of the Project.

### III.1-3 Efficiency

#### Efficiency – moderate

Since all the Outputs have been achieved, the timing, quality and quantity of inputs are considered to be appropriate. It is, however, observed that a part of project activities, such as the installation of equipment and extension service, were delayed, and activity plan was also modified, in addition to that efficiency is evaluated at moderate level in consideration of the following factors.

(Personnel assignment of JICA experts and C/P staffs and activity schedule)

The total M/M increased by 9.22 relative to the original plan, as an input of JICA experts, due to unexpected activities, including additional basic lectures and trainings for MIDC staff, training programs and lectures for the extension service given at POLMAN Ceper and Tegal DINAS, follow-up activities relating to the preparation of the draft A/P, and the training program for the “Supporting Industry Promotion through Industry-Government-Academia Collaboration for the Top Officials of Indonesia”. Furthermore, the activity schedule was also changed due to the delay of budget allocation for project activities in the MOI and MIDC, and another delay of approval for the installation location of the necessary equipment (heat treatment furnace). Also, the aforementioned increase of the targets for guidance and the modification of instructors’ business trip schedule were occurred due to the institutional and budgetary restriction on the MOI even though the extension service was planned on the basis of conditions such as geographical restriction. Later on, the extraordinary budget was allocated by the MOI, and then the extension service was able to implement intensively from November 2016. Thus expected Outputs were achieved, it can, however, be said there could be a negative impact from the perspective of efficiency.

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<sup>36</sup> Indicators of the Outputs 1 and 2 set the number of trainers who can conduct extension service and give lectures at 11 each on casting and on production management.

(Cost and equipment)

As stated above, despite MOI's budgetary cutback in the third year, resource input by both Japanese and Indonesian C/Ps were made mostly as planned, while negative impacts occurred in the progress of the following activities.

- 1) A part of budget for the training course for middle-management and extension service was not allocated.
- 2) As for the raw material cost for target casting development, it was originally agreed in the course of discussion on the R/D to share fifty-fifty between the Indonesian and Japanese sides: The plan was that MIDC's cost sharing would gradually increase in the second year and thereafter. In reality, however, most of the cost was borne by the Project due to MIDC's budget constraint.

(Collaboration with preceding projects)

Efforts were made to establish close collaboration and generate synergy with the project on "Small and Medium Industry (SMI) Development Based on Improved Service Delivery in Indonesia" implemented by MOI/IKM (March 2013 – February 2016), with the aim of preparing for development of SMI development model, as it was conducted in Tegal, where extension service on production management was conducted under the Project. Actual collaboration included the exchange of information on local metalworking companies and the provision of an advanced lecture for persons who had learned basic knowledge on production management under the preceding project, which led to further upgrading of their technical levels.

In addition, information sharing (especially on casting industry) was made on regular basis with the JICA Industrial Development Adviser sent to MOI/ KPAII as well as senior volunteers working at a national enterprise (PT. Barata Indonesia, Gresik, East Java), which led to smooth implementation of the project activity..

### **III.1-4 Impact**

**Impact – some positive impacts recognized (expected)**

The Overall Goal sets forth the following three indicators, all of which are linked to activities required to accomplish the Project Purpose. Achievement of the Project is expected to have ripple effects contributing to that of the Overall Goal.

*(Indicator 1: Number of supporting industry companies which the metalworking technology and management is highly evaluated by construction machinery manufacturers and/or user companies of construction machinery: 5 casting companies / 10 metalworking companies)*

Under the Project, more than 50 casting and metalworking companies in supporting industries of construction machinery received some training, and the improvement of their skill levels was recognized as judged from the results of the feedback surveys conducted thereafter. Then, 3 foundries and 10 metalworking companies were selected for extension service. In particular, trial products made by a foundry were highly evaluated by a HINABI member company, and contract negotiation is underway. Also, according to HINABI's survey, 5 metalworking companies that received extension service on production management improved productivity and reduced rejection rates.

*(Indicator 2: Number of companies in supporting industries which can newly produce steel casting parts that meet the needs of construction machinery industry: 4 companies)*

Target casting development was carried out as an activity for Output 1. Production drawings for steel casting products, which HINABI intended to procure locally, were provided for the metalworking organizations for trial production. Then, the metalworking organizations transferred production technology to the three companies through extension service. A trial product by one company has met the entire strict product standards set by HINABI, including the quality of machining, the final stage of production<sup>37</sup>, and the casting products manufactured by other two companies also made the passing mark on mechanical property, chemical composition and inner defect test.

*(Indicator 3: Number of kinds of steel casting parts which can be newly produced by supporting industries and which meet the needs of construction machinery industry: 6 kinds of parts)*

As discussed in relation to the indicator 2 above, the target castings are steel casting products that meet the needs of the construction machinery industry, and HINABI provided production drawings for six parts. Under the Project, the metalworking organizations made trial products of all the six kinds. As part of extension service, the three companies made a total of four types of target castings.

Clearly, certain progress toward the accomplishment of the Overall Goal was identified as a result of the Project, and it can be thus said that the achievement ratio toward the target values set forth under indices 1, 2 and 3 are increasing. Finally, no negative impact has been found.

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<sup>37</sup> According to evaluation by JICA experts, castings made by other two companies meet specifications on mechanical property, chemical composition and internal defect. Defects HINABI pointed out were only about external appearance and dimensions, areas related to machining.

### III.1-5 Sustainability

#### Sustainability – moderate (expected)

As for sustainability, relatively high rating can be given for the “policy and institutional perspective” as well as the “organizational perspective”. On the other hand, there are some concerns with regard to the “financial perspective” because of uncertainty about execution of the draft A/P budget, although it is expected that budget is to be secured. Also, with regard to the “technical perspective,” interpersonal and institutional transfer of technology remains as a concern. In overall consideration of the four perspectives, sustainability was rated as moderate.

#### (Policy and institutional perspectives)

As discussed in III.1-1, the Indonesian government has been consistently promoting import substitution (localization) as the highest priority in national policy. The Joko Widodo administration, which inaugurated in 2014, sets an ambitious goal of increasing exports at an annual rate of 60% over the five-year term.

MOI sets its policy along the line, where ILMATE designates the construction machinery industry as one of priority sectors, which is the largest size in ASEAN countries. Also, Department of Machinery and Agricultural Machinery sets forth the improvement of technical capability of supporting industries of construction machinery as a major goal under the “Master Plan for Development of Machinery Industry in Indonesia” formulated in August 2016. At the current moment, the policy formulated by the Indonesian government will not be likely to be changed for a while.

#### (Organizational perspective)

Industry-government-academia collaboration, which had not existed in supporting industries of construction machinery, was formed under the leadership of JCC members formed in the Project. The collaborative formation is expected to lead to the establishment of “Council on Promotion of Supporting Industries of Construction Machinery in Indonesia”, which was proposed in Plan 1 of the draft A/P, namely the establishment of a platform for industry-government-academia collaboration for development of supporting industries of construction machinery in Indonesia. An organizational foundation for the accomplishment of the Overall Goal is underway. It is therefore important to ensure that MOI/ILMATE as the central organization will show their leadership, and drive and develop the industry-government-academia collaboration process.

In addition, metalworking organizations is also expected to cooperate with research institutions of academics and major firms in order to deal with demands for the high and advanced technology from supporting enterprises.

(Financial perspective)

As for development of the draft A/P, plans were drawn up by giving priority to prospect of budget availability. This means, funds for the plans 1-4 of the draft A/P are backed up by a formal budget secure or commitment for budge allocation made by each responsible authority. All the plans require cost sharing by private companies, but basically it is assumed to use MOI's budget and/or subsidies. Because MOI's budget disbursement remains highly uncertain, it is imperative to check the situation in detail whether the budgets for activities are smoothly executed.

(Technical perspective)

Partly due to the accomplishment of Outputs 1 and 2, staff members of the targeted metalworking organizations, particularly MIDC, POLMAN Bandung and POLAMNCeper, improved their technical capabilities in casting and production management to the levels sufficiently high enough to provide extension service and lectures. It is thus important to maintain and further improve the learned capabilities.

As the skill handover at the time of personnel reshuffling and retirement of staffs can be issue in the near future, under the Project, personnel to receive technical training was generally selected from young or middle-aged staff who would be expected to become a leader in the organization. In addition, manuals relating to casting technology and production management were developed in order to take over the cultivated skill which secures the sustainability of activities. From now on, it is expected to strengthen the sustainability on a technical level by means of examinations on countermeasures such as establishment of a formal system to ensure skill handover, including the mentor system at each metalworking organization.

Also to maintain skills learned through the Project, the metalworking organizations should make active interchange with private companies by implementing Plan 3 under the draft A/P, "technical service program for foundry and casting steel industries," so as to secure work orders from companies and conduct joint research. As a result, it is also anticipated to lead the sustainment of acquired skill levels.

## **III.2 Major Factors affecting Implementation and Outputs**

### **III.2-1 Positive Factors**

A factor giving positive impacts on the Project's implementation and outcome is a steady establishment of the foundation for the industry-government-academia collaboration relating to casting-related supporting industries, under the leadership of the C/P organizations. In particular, after the commencement of the A/P drafting process in the third year of the Project, the working group has been holding meetings on regular basis, increasing opportunity for exchange of opinions,

together with a sense of unity. Throughout the process, there has been increasing contact and communication among the person in charge of the relevant organizations, e.g., close cooperation among industry, government, and academia has greatly contributed to successful attraction of participants in seminars designed for the related industries.

### **III.2-2 Negative Factors**

During implementation of the Project, the construction machinery industry fell into a serious recession largely due to a great slump in the mining sector, with sales dropping continuously. The rapid demand decline was not expected in 2012 when the Project was planned. According to HINABI's data, unit production of construction machinery peaked out in 2012 at 9,000 units and then continued to decline, falling below 4,000 units, one half the peak volume, in 2015. The slump discouraged some construction machinery makers from fostering their supporting industries, on the one hand, and supporting companies also started manufacturing products other than construction machinery parts to make up for a rapid decrease in orders from the construction machinery industry. It also had negative impacts on the Project, e.g., supporting companies decided not to participate in a training program or extension service implemented under the Project.

### **III.3 Consideration with regard to Results of Project Risk Management**

In PDM, necessary conditions for achievement of the Project Purpose and the Outputs are listed as important assumptions. Changes of the conditions during the project period are summarized as follows.

*(Project Purpose: Quitting a job or movement of the trainers does not give a trouble for the project activities)*

In case of Indonesia, government employees are less likely to resign to change jobs. In fact, none of the trained C/Ps resigned during the project period. Nevertheless, periodical transfer in position cannot be avoided in public organizations, and a formal mechanism to ensure transfer of knowledge and skills should be enhanced.

*(Output: Trained counterparts remain at targeted metalworking organizations)*

As discussed above, no C/P staffs, who had received technical training under the Project quit their metalworking organizations during the project period. However, at Tegal DINAS, all of the C/Ps who received training in the course of extension service are contract employees with a fixed term (up to December 2017), causing a concern about transfer of acquired production management techniques and knowledge. In response to the concern, Tegal DINAS has negotiated with the prefectural government on the possibility to have the trained C/Ps hired as regular staffs.

Other than the above, no risk to hinder the progress of the Project is found.

### III.4 Lessons Learned

The following table summarizes lessons learned from the project activities, with their description, countermeasures to take, and suggestions.

- (1) Establishment of platform consists of the related parties of supporting industry of construction machinery

The Project's C/P organizations in Indonesia, i.e., the targeted metalworking organizations, represent different sectors – industry, government, and academia – that assume different roles and functions in society. Thus, at the commencement of the Project, there were concerns that instability of platform for project implementation, which are stemmed from discrepancy on a strategic direction<sup>38</sup> among C/Ps, might have an adversary affect on effectiveness and efficiency of the Project.

From January 2016, the stakeholders' meeting – the same level as the JCC meeting – has been periodically held under MOI's leadership, and working group has also been formed. Working group was established for the purpose of summarizing and adjusting the respective opinions regarding the future direction of the development of casting industry in the country, and finally formulating the draft A/P. The solidarity among the stakeholders was gradually strengthened with each time meeting. Such platform is thought to be highly useful not only for the creation of the collaborative framework of industry-government-academia, but also for formulation of the effective policy in combination with superiority of the three parties. Also as in the case that cooperation by related organizations is expected to produce a multiplier effect, such as in the Project, it is important to create a formal or informal place for related parties to meet and discuss on a periodical basis, preferably in the early stage of the project, in addition to the JCC.

- (2) Active use of private sector-driven initiatives

Some construction machinery manufacturers, which belong to HINABI, are engaged in human resource development in the form of private sector-driven initiative to complement efforts of the public metalworking support organizations, by conducting various activities including

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<sup>38</sup> The Project's C/P organizations in Indonesia, i.e., the targeted metalworking organizations, represent different sectors – industry, government, and academia – that assume different roles and functions in society. As a result, while the four organizations agree on the Overall Goal of the Project, "Metalworking technology of supporting industries of construction machinery will be improved," they differ in an approach to the accomplishment of the goal. For instance, MOI desires to focus on project activities that would directly benefit supporting industries in the areas with high concentration of metalworking shops and foundries, such as Tegal and Ceper. On the other hand, MIDC wants to give priority to the upgrading of technical capability of MIDC staff members, who are expected to take a lead in fulfilling the mission of the targeted metalworking organizations to provide appropriate technical support for supporting industries according to the R/D.

human resource development service for companies registered with HINABI. The Project has used HINABI to understand a general trend relating to private companies and collect their opinions, while taking every opportunity to use the private sector-initiated initiatives and drawing up the draft A/P to ensure continuity of such initiatives after the completion of the Project. In order to ensure continuous provision of technical service that meets the standards demanded by the private sector, it is important to encourage the involvement of companies through active interaction with them, which would also help identify the changes in the needs of the construction machinery industry.

#### **IV. For Accomplishment of the Overall Goal after the Completion of the Project**

##### **IV.1 Outlook for Accomplishment of the Overall Goal**

As a wrap-up of the Project, the JICA project team and MOI/ILMATE as the representative of the C/Ps evaluated an outlook for accomplishment of the following Overall Goal and shared the results.

<p>Overall Goal Metalworking technology of supporting industries of construction machinery will be improved</p>
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##### **IV.1-1 Indicator 1: Number of supporting industry companies which the metalworking technology and management is high evaluated by construction machinery manufacturers and/or user companies of construction machinery: 5 casting companies / 10 metalworking companies**

As for casting, availability of enterprises with steel casting production capability (i.e. those with potential to become suppliers of large construction machinery manufacturers, or HINABI member companies) was examined in Ceper and its surrounding areas, and 3 companies were selected for extension service. The companies made trial target casting products (steel casting), which were then evaluated by construction machinery manufacturers from technical perspectives. All of them passed an inspection on quality standards related to casting, while not all of them met those with regard to machining. One company received very good evaluation and started negotiation on a supply contract with a HINABI member company.

As for production management targeting supporting companies in metalworking, extension service under the Project was conducted for 10 companies (5 around Jakarta and 5 in Tegal). They introduced 5S and QC circle activities, and successfully improved efficiency and decreased rejection rates. HINABI valued the results highly although they did not undergo assessment of



HINABI members on their products like those who received extension service on casting technology did.

Thus, during the project period alone, 3 foundries and 10 metalworking companies that had received extension service got high evaluation from HINABI. 2 more foundries need to be rated highly by HINABI, but the first indicator of the Overall Goal (i.e. 5 casting companies and 10 metalworking companies which the metalworking technology and management is high evaluated by construction machinery manufacturers and/or user companies of construction machinery) is expected to be satisfied if the metalworking organizations continue to provide extension service for companies.

**IV.1-2 Indicator 2: Number of companies in supporting industries which can newly produce steel casting parts that meet the needs of construction machinery industry: 4 companies**

As pointed out earlier, three companies specialized in casting in Ceper received extension service under the Project and made steel casting products which HINABI members were willing to buy from local enterprises. Although the target value of the indicator is set to 4 companies, it is, hereinafter, expected that corporate guidance is given to foundries that did not benefit from extension service of the Project to duplicate the achievement of the Project.

Finally, two plans proposed in the draft A/P, namely Plan 2 “Program to train workers with casting skills (including cast steel) by HINABI” and Plan 3 “Technical service program for casting/cast steel industry,” primarily target companies of supporting industries with an aim to improve production capability relating to castings and steel casting products for the construction machinery industry. By implementing these plans effectively, the second indicator (i.e. 4 companies which can newly produce steel casting parts that meet the needs of construction machinery industry) is highly expected to be easily satisfied.

**IV.1-3 Indicator 3: Number of kinds of steel casting parts which can be newly produced by supporting industries and which meet the needs of construction machinery industry: 6 kinds of parts**

The target castings made on a trial basis under the Project are all steel casting and construction machinery parts that HINABI members currently rely on imports but are willing to procure locally in the future. So far, 6 steel casting parts have been made at two metalworking organizations (MIDC and POLAMN Bandung), and a total of 4 products were made by 3 companies in the course of extension service. From now on, the metalworking organizations are expected to make further technology transfer to companies in supporting industries which were not

selected for extension service, so as to ensure that as many companies as possible will become able to make steel casting products on a commercial basis.

As is the case with the indicator 2 described above, the indicator 3 can be accomplished by implementing Plans 2 and 3 of the draft A/P. In this connection, attention should be paid to the changing needs for steel casting products by the construction machinery industry, due to model or spec changes of construction machinery; it is important for companies of supporting industries and the metalworking organizations to exchange information closely with HINABI and grasp such changes.

#### **IV.2 Activity Plan and Implementation System for Achievement of the Overall Goal**

In order to achieve the Overall Goal of the Project, a draft A/P has been developed to set forth a specific direction to be taken, after the end of the Project, by organizations relating to supporting industries of construction machinery in Indonesia.

The members of the JCC, which was formed under the Project, will continue to serve as members of the working group under the industry-government-academia collaboration platform set forth in Plan 1 of the draft A/P, followed by the Council on Promotion of Supporting Industries of Construction Machinery in Indonesia. For this purpose, it is planned that MOI/ILMATE holds a stakeholders' meeting periodically as continued from the Project period, so as to facilitate communication among related organizations and to promote implementation of the draft A/P by aligning directions of the construction machinery and supporting industries in terms of future development.

#### **IV.3 Proposal to the Indonesian C/Ps for Accomplishment of the Overall Goal**

##### **(1) Steady implementation of A/P**

As the draft A/P was formulated in order to achieve the Overall Goals in the Project, the draft A/P should be immediately implemented by the MOI. In particular, Plan 1 "Establishment of the industry-government-academia collaboration platform for promotion of supporting industries of construction machinery in Indonesia" is the foundation of the draft A/P and should be implemented smoothly to build a collaboration system under the leadership of ILMATE that serves as the secretariat for the working group of the platform. Under Plan 1, 9 organizations relating to supporting industries of construction machinery will form the collaboration platform (the "Council on Promotion of Supporting Industries of Construction Machinery in Indonesia") with an aim to provide technical support for the supporting industries according to the needs of the construction machinery industry and thereby to accomplish the Overall Goal.

- (2) Continuous improvement of technical capability of metalworking support organizations (particularly MIDC)

In order for MIDC to remain in the position capable of providing technical guidance for companies in the form of trainings and extension services after the completion of the Project, it must continue to improve technical capability. In so doing, it is imperative to formulate and implement its organizational strategy to address the issue of technology transfer relating to personnel change, an in-house education and training system, and the development of a system and organization capable of dealing with an increase in orders by private companies, while accumulating expertise and experience in casting operation. The first step that should be taken toward the goal is to clearly define the role and responsibility of MIDC in its future course of action and to set forth its general direction, which should be considered as the precondition to proceed with organizational improvement. Furthermore, for the purpose of development of its ability as a research institute, MIDC shall in the future cooperate with research institutes of universities and/or enterprises in order to acquire the advanced technology.

#### **IV.4 Monitoring Plan between the End of the Project and Ex-post Evaluation**

After the end of the Project, monitoring up to ex-post evaluation will be planned and implemented by JICA Indonesia office in consultation with the JICA headquarter. It will primarily examine the progress of activities under each plan proposed in the draft A/P. In addition, JICA dispatches an expert on industrial development to the MOI, and will also continue to monitor it through the JICA expert.

## ANNEXES

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- ANNEX 1 Record of Discussions (R/D)
- ANNEX 2 Project Design Matrix (PDM)
- ANNEX 3 Expert Assignment Schedule / Actual
- ANNEX 4 Counter Part (C/P) Staff List
- ANNEX 5 Evaluations on Casting Technical Levels of the Targeted Metalworking Organizations
- ANNEX 6 A Manual for Extension Services on Casting
- ANNEX 7 Quality Evaluation Sheet on Target Castings
- ANNEX 8 Overviews of the Pre-training and the Training in Japan on Casting for Top Management in the Third Year
- ANNEX 9 A Evaluation on Production Management Technical Level of a Targeted Metalworking Organization
- ANNEX 10 A Manual for Extension Services on Production Management
- ANNEX 11 Overviews of the Pre-training and the Training in Japan on Production Management for Top Management in the Third Year
- ANNEX 12 Future Action Plan (draft)
- ANNEX 13 Future Action Plan (draft): Plan5, 6 and 8
- ANNEX 14 The Completion Report of Training in Japan for Indonesian Managing Staff on Industry-government-academia Collaboration for the Foundry Industry
- ANNEX 15 The Minutes of Meeting of the Final Joint Coordinating Committee Meeting
- ANNEX 16 Report of the End Line (E/L) Survey for the Supporting Industries of Construction Machinery in Indonesia



ANNEX 1

Record of Discussions (R/D)

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**RECORD OF DISCUSSIONS**

**BETWEEN**

**DIRECTORATE GENERAL OF LEADING INDUSTRY BASED ON  
HIGH TECHNOLOGY  
MINISTRY OF INDUSTRY  
REPUBLIC OF INDONESIA**


**AND**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

**ON**

**PROJECT ON ENHANCEMENT OF METALWORKING  
CAPACITY FOR SUPPORTING INDUSTRIES OF  
CONSTRUCTION MACHINERY**

Jakarta, 28 November 2013



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Mr. Atsushi Sasaki  
Chief Representative,  
JICA Indonesia Office  
Japan International Cooperation Agency  
Japan



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Dr. Budi Darmadi  
Director General of Leading Industry  
Based on High Technology  
Ministry of Industry  
The Republic of Indonesia



Based on the Minutes of Meeting between Japanese Detailed Planning Survey Team and Authorities Concerned of the Government of the Republic of Indonesia on the Project on Development of Metalworking Technology to Support the Indonesia Heavy Equipment Industry signed on 25<sup>th</sup> April 2013 , Japan International Cooperation Agency (hereinafter referred to as "JICA") held series of discussions with related units under the Ministry of Industry (hereinafter referred to as "MOI") and relevant organizations to develop a detailed plan of the Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery (hereinafter referred to as "the Project").

Both parties agreed the details of the Project and main points discussed as described in the Appendix 1 and the Appendix 2.

Both parties also agreed that MOI, the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Indonesia (hereinafter referred to as "Indonesia").

The Project will be implemented within the framework of the Colombo Plan Technical Cooperation Scheme.

Appendix 1: Project Description  
Appendix 2: Main Points Discussed

## PROJECT DESCRIPTION

### I. BACKGROUND

Within the framework of the Initiative for Manufacturing Industry Development Center (hereinafter referred to as "MIDEC") under the Indonesia-Japan Economic Partnership Agreement (IJEPA) which went into effect in July 2008, metalworking was decided to be cooperated by Japan as one of the 14 Indonesian manufacturing sub-sectors.

After a series of discussions and at the MIDEC High Level Meeting held in November 2011, both Parties agreed that the contents of cooperation should be focused on supporting industries of construction machinery.

Based on this background, JICA conducted the Data Collection Survey on Metalworking from February to March 2012. As a result of the survey, it is clarified that especially casting and production management should be the focus in the cooperation.

Under these circumstances, the Government of Indonesia (hereinafter referred to as "GOI") requested a technical cooperation project to the Government of Japan (hereinafter referred to as "GOJ"), which accepted the request in 2013. In response to the acceptance of the request, JICA conducted the Detailed Planning Survey from 7<sup>th</sup> April 2013 to 26<sup>th</sup> April 2013. Both Parties agreed the outline of the Project as follows.

### II. OUTLINE OF THE PROJECT

Details of the Project are described in the Project Concept (Annex 1), the Logical Framework (Project Design Matrix: PDM) (Annex 2) and the tentative Plan of Operation (Annex 3).

1. Title of the Project  
Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery
2. Overall Goal  
Metalworking technology of supporting industries of construction machinery will be improved.
3. Project Purpose  
Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.

#### 4. Outputs

- i) Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting) including production management is improved.
- ii) Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.
- iii) An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.

#### 5. Activities

- i-1) To identify technical level of targeted metalworking organizations on casting.
- i-2) To make capacity building plans and materials on casting based on i-1), and to revise them based on i-3), i-4), i-5) and i-6).
- i-3) To Develop Target Casting.
- i-4) To conduct seminars on casting for supporting industries of construction machinery.
- i-5) To conduct trainings on casting for supporting industries of construction machinery.
- i-6) To deliver extension services on casting for supporting industries of construction machinery.
- ii-1) To identify technical level of targeted metalworking organizations on production management.
- ii-2) To make capacity building plans and materials on production management based on ii-1), and to revise them based on ii-3) and ii-4).
- ii-3) To conduct seminars on production management for supporting industries of construction machinery.
- ii-4) To conduct trainings on production management for supporting industries of construction machinery.
- iii-1) To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management.
- iii-2) To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on iii-1), Output i) and Output ii).

#### 6. Input

##### (1) Input by JICA

##### (a) Dispatch of Experts

Chief Advisor / Supporting industries of construction machinery

Metallurgy for Steel Casting

Casting Process Engineering

Production Management

Project Coordinator

\* Other experts (experts on specific technology and seminar lecturers) are dispatched based on necessity

- (b) Counterpart Training in Japan
  - (c) Machinery and Equipment; Heat Treatment Furnace for Steel Making and others if necessary for Project implementation
  - (d) Support of other administrative cost: telecommunications for International call expenses necessary for the implementation of the Project
- Input other than indicated above will be determined through mutual consultations between JICA and MOI during the implementation of the Project.

(2) Input by MOI

- (a) MOI's counterpart personnel and administrative personnel as referred to in II-7;
- (b) Office space with basic office equipment;
- (c) Machinery, equipment and transportation for the implementation of the Project;
- (d) Information as well as support in obtaining medical service;
- (e) Credentials or identification cards;
- (f) Available data (including maps and photographs) and information related to the Project;
- (g) Running expenses necessary for the implementation of the Project;

7. Implementation Structure

The Project organization chart is given in the implementation structure (Annex 4). The roles and assignments of relevant organizations are as follows:

(1) MOI

- (a) Project Director  
Director General of Leading Industry Based on High Technology of MOI will be responsible for overall administration and implementation of the Project.
- (b) Project Manager  
Director of Machinery and Agricultural Equipment Industry of MOI will be responsible for managerial and technical matters.
- (c) Deputy Project Manager  
Director of MIDC will be responsible for managerial and technical matters under the supervision of Project Manager.

(2) JICA

The JICA experts will give necessary technical guidance, advice and recommendations to MOI on any matters pertaining to the implementation of the Project.

(3) Joint Coordinating Committee

Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held at least once a year and whenever deems it necessary. JCC will approve an annual work plan, review overall progress, conduct monitoring and evaluation of the Project, and exchange opinions on major issues that arise during the implementation of the Project. A list of proposed members of JCC is shown in the Annex 6.

#### 8. Project Site(s) and Beneficiaries

- (1) Project Site(s): The project implementation organizations located in Jakarta and Bandung.
- (2) Beneficiaries: Trainers of targeted metalworking organizations who are trained in the Project and supporting industries of construction machinery.

#### 9. Duration

The duration of the Technical Cooperation for the Project under this Attached document will be three (3) years commencing from the arrival of Japanese expert.

#### 10. Environmental and Social Considerations

MOI agreed to abide by 'JICA Guidelines for Environmental and Social Considerations' in order to ensure that appropriate considerations will be made for environmental and social impacts of the Project.

### **III. UNDERTAKINGS OF MOI**

In the implementation of the Project, MOI shall undertake the following measures:

1. MOI will take necessary measure to:
  - (1) ensure that the technologies and knowledge acquired by the Indonesia nationals as a result of Japanese technical cooperation contributes to the economic and social development of Indonesia, and that the knowledge and experience acquired by the personnel of Indonesia from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project;
  - (2) Provide facilitation of tax exemption, including income tax and value added tax or duties to JICA experts referred to in II-6 (1) and their families, as well as facilitation to obtain necessary entry and exit visas, resident permits and travel documents required for their stay in Indonesia; which are no less favorable than those granted to their experts of third countries performing similar missions in Indonesia under the Colombo Plan Technical Cooperation Scheme;
  - (3) provide security-related information as well as measures to ensure the safety of the JICA experts; and
  - (4) permit the JICA experts to enter, leave and sojourn in Indonesia for the duration of their assignment therein and exempt them from foreign registration requirements and consular fees.

### **IV. EVALUATION**

JICA and MOI will jointly conduct the following evaluation and review:

Terminal Evaluation during the last six (6) months of the cooperation term

JICA will conduct the following evaluations and surveys to mainly verify sustainability and impact of the Project and draw lessons. MOI is required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis.

#### **V. PROMOTION OF PUBLIC SUPPORT**

For the purpose of promoting support for the Project, MOI and JICA will take appropriate measures to make the Project widely known to the people of Indonesia.

#### **VI. MUTUAL CONSULTATION**

JICA and MOI will consult each other whenever any major issues arise in the course of Project implementation.

#### **VII. AMENDMENTS**

Any amendment to this Record of Discussions may be made after consultation and agreed by the Parties through Minutes of Meetings. The amendment shall come into effect in such date as will be determined by the Parties and shall constitute as an integral part to this Record of Discussions. The minutes of meetings will be signed by authorized persons of each side who may be different from signers of the record of discussion.

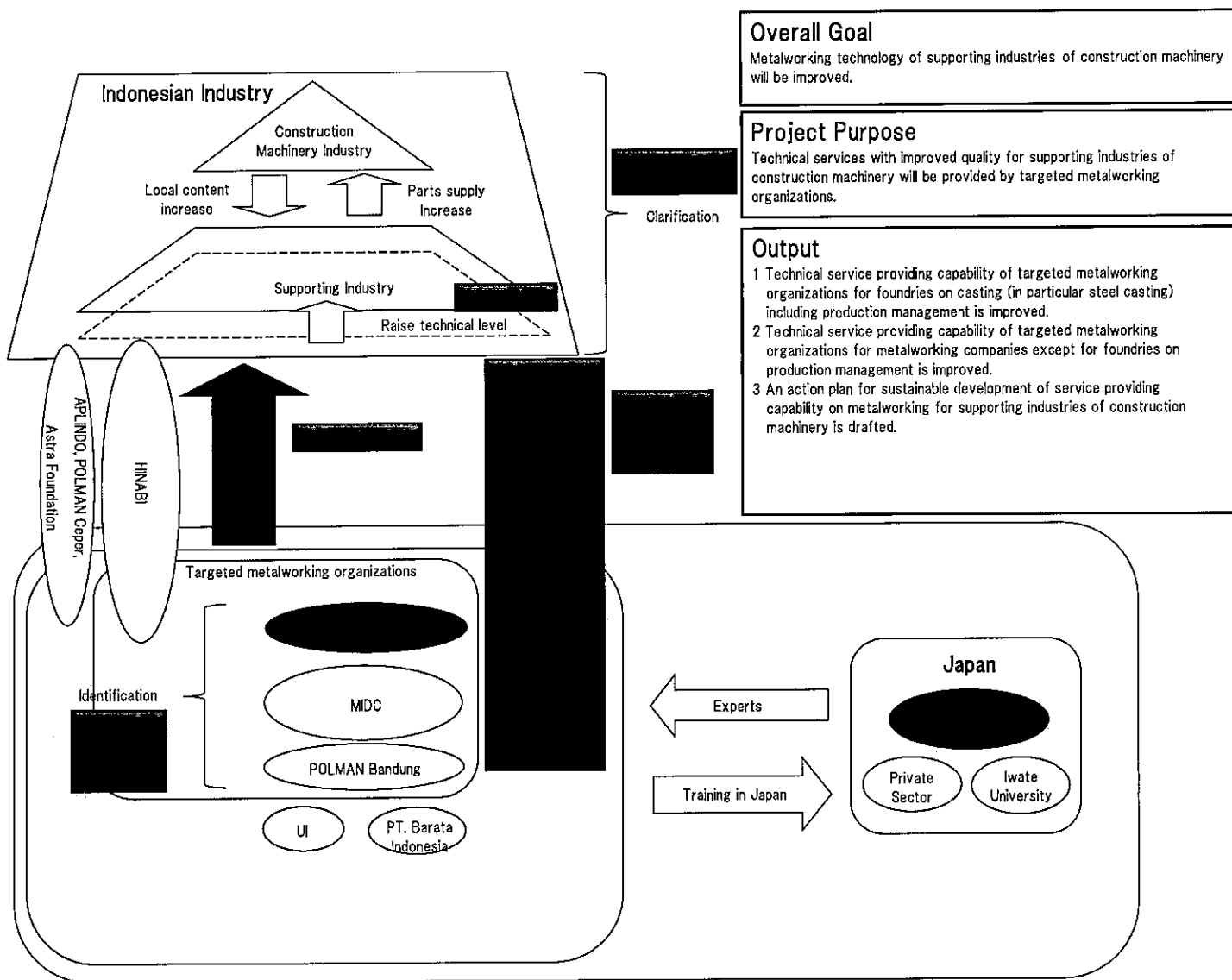
- Annex 1 Project Concept
- Annex 2 Logical Framework (Project Design Matrix: PDM)
- Annex 3 Tentative Plan of Operation (PO)
- Annex 4 Implementation Structure
- Annex 5 Tentative list of planned trainings and seminars
- Annex 6 A List of Proposed Members of Joint Coordinating Committee/  
Steering Committee

**MAIN POINTS DISCUSSED**

1. Both sides confirmed that the Project is categorized as "Goods / Services" stipulated in Article 42 (1) c of Government Regulation No. 10/2011.
2. In accordance with Regulation of Minister of Finance No. 191/PMK.05/2011, MOI shall submit BAST (handover delivery certificate of goods / services) to the Ministry of Finance of Indonesia. In order to secure the accuracy of BAST, JICA Indonesia Office will provide MOI with data on semester basis as follows.
  - Goods: name and price (in effective currency) per item of equipment handed over during last six months
  - Services: total expenditure (in effective currency) of last six months for expert, training and mission
3. MOI will make and sign BAST based on the data provided by JICA and after obtaining JICA's confirmation, submit to the Ministry of Finance.
4. The vehicle provided by JICA for use in MIDC in the previous project (Project on Supporting Industries Development for Casting Technology) will be utilized for the Project.
5. Indonesian side requested JICA to provide a heat treatment furnace for steel casting for MIDC. JICA explained its possibility was limited but would consider the request within its budget constraints.
6. Indonesian side requested JICA to let sufficient number of participants join trainings in Indonesia and Japan. JICA will consider the request within its budget constraints.
7. In the implementation of the Project, JICA shall undertake the following measures:
  - (1) bear cost of a round-trip ticket between an international airport designated by JICA and Japan, and Travel Insurance from arrival to departure in Japan for the participants during the training period in Japan.
  - (2) provide the following expenses for the participants of the training in Japan.
    - (a) allowances for accommodation and living expenses
    - (b) expenses for study tours (basically in the form of train tickets).
    - (c) free medical care for participants who become ill after arriving in Japan (costs related to pre-existing illness, pregnancy, or dental treatment are not included)
    - (d) expenses for program implementation, including materials
  - (3) hold a pre-departure orientation at the JICA Indonesia office to provide participants with details on travel to Japan, conditions of the workshop, and other matters.

**Project Concept**

**Project Title : Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia**



<JICA Proposal>

■ **Output 1:**  
Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting) including production management is improved.

■ **Implementing Organizations :**  
MOI, MDC, POLMAN Bandung, HINABI

■ **Related Organizations :**  
UI, APLINDO, POLMAN Ceper, PT. Barata Indonesia

■ **Activities:**

- 1-1 To identify technical level of targeted metalworking organizations on casting.
- 1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them base on 1-3, 1-4, 1-5 and 1-6.
- 1-3 To Develop Target Casting.
- 1-4 To conduct seminars on casting for supporting industries of construction machinery.
- 1-5 To conduct trainings on casting for supporting industries of construction machinery.
- 1-6 To deliver extension services on casting for supporting industries of construction

■ **Output 2:**  
Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.

■ **Implementing Organizations :**  
MOI, MDC, POLMAN Bandung, HINABI

■ **Related Organizations :**  
UI, Astra Foundation, PT. Barata Indonesia

■ **Activities:**

- 2-1 To identify technical level of targeted metalworking organizations on production management.
- 2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based on 2-3 and 2-4.
- 2-3 To conduct seminars on production management for supporting industries of construction machinery.
- 2-4 To conduct trainings on production management for supporting industries of construction machinery.

■ **Output 3:**  
An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.

■ **Implementing Organizations :**  
MOI, MDC, POLMAN Bandung, HINABI

■ **Related Organizations :**  
UI, APLINDO, POLMAN Ceper, PT. Barata Indonesia

■ **Activities:**

- 3-1 To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management.
- 3-2 To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on 3-1, Output 1 and Output 2.

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## Logical Framework (Project Design Matrix: PDM)

PDM (version 0.)

Project Title : Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery

Target area: All Indonesia

Project period: 3 years

Target group: MOI, MIDC, POLMAN Bandung, HINABI

Narrative Summary	Objective Verifiable Indicators	Means of Verification	Important Assumptions
<p><b>Overall Goal :</b> Metalworking technology of supporting industries of construction machinery will be improved.</p>	<p>1 Number of supporting industry companies which the metal working technology and management is highly evaluated ** by construction machinery manufacturers and / or user companies of construction machinery: XX companies</p> <p>2 Number of companies in supporting industries which can newly produce steel casting parts that meet the needs of construction machinery industry: XX companies</p> <p>3 Number of kind of steel casting parts which can be newly produced by supporting industries and which meet the needs of construction machinery industry: XX kind of parts</p>	<ul style="list-style-type: none"> <li>• Interview to construction machinery manufacturers</li> <li>• Questionnaire construction machinery manufacturers</li> </ul>	<p>Construction machinery industry in Indonesia does not largely turn worse.</p>
<p><b>Project Purpose :</b> Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations*.</p>	<p>1 Satisfaction level of companies in supporting industries of construction machinery with the technical services provided by the Project</p> <p>2 Number of companies which receive technical services on casting: XX companies</p> <p>3 Technical level of target casting which targeted metalworking organizations can develop</p> <p>4 Number of companies which receive technical services on production management: XX companies</p>	<p>Activity record</p>	<p>Quitting a job or movement of the trainers does not give a trouble for the project activities.</p>
<p><b>Outputs :</b></p> <p>1 Technical service providing capability of targeted metalworking organizations foundries on casting (in particular steel casting) including production management is improved.</p>	<p>1-1 Number of trainers who is capable of conducting extension services and lectures on casting: XX trainers</p> <p>1-2 Development of manual for casting and its revision</p>	<p>Activity record</p>	<p>Trained counterparts remain at targeted metalworking organizations.</p>
<p>2 Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.</p>	<p>2-1 Number of trainers who is capable of conducting on-site consultation services and lectures on production management: XX trainers</p> <p>2-2 Development of manual for production management and its revision</p>	<p>Activity record</p>	

<p>3 An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.</p>	<p>3-1 Development of the future action plan</p>	<p>Activity record</p>	
<p>Activities :</p> <p>1-1 To identify technical level of targeted metalworking organizations on casting.</p> <p>1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them based on 1-3, 1-4, 1-5 and 1-6.</p> <p>1-3 To develop target casting.</p> <p>1-4 To conduct seminars on casting for supporting industries of construction machinery.</p> <p>1-5 To conduct trainings on casting for supporting industries of construction machinery.</p> <p>1-6 To deliver extension services on casting for supporting industries of construction machinery.</p> <p>2-1 To identify technical level of targeted metalworking organizations on production management.</p> <p>2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based on 2-3 and 2-4.</p> <p>2-3 To conduct seminars on production management for supporting industries of construction machinery.</p> <p>2-4 To conduct trainings on production management for supporting industries of construction machinery.</p> <p>3-1 To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management.</p> <p>3-2 To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on 3-1, Output1 and Output2.</p>	<p style="text-align: center;">Input</p> <p>Japan</p> <p>1. Dispatch of Japanese experts</p> <p>1) Chief advisor / Supporting industries of construction machinery</p> <p>2) Metallurgy for steel casting</p> <p>3) Casting process engineering</p> <p>4) Production management</p> <p>5) Project coordinator</p> <p>6) Other experts (experts on specific technology and seminar lecturers if necessary)</p> <p>2. Training in Japan</p> <p>3. Machinery and equipment</p>	<p>Indonesia</p> <p>1. Counterpart personnel (each party)</p> <p>2. Facility (MIDC)</p> <p>1) Office space and facility for Japanese experts</p> <p>3. Usage of machinery and equipment owned by Indonesian side(MIDC)</p> <p>4. Maintenance and operation of machinery and equipment(MIDC)</p> <p>5. Administrative cost and other expenses</p> <p>1) Personnel cost for counterparts and other running expenses (each party)</p> <p>2) Maintenance cost of facility, equipment and materials(MIDC)</p> <p>6. Other administrative cost (each party)</p>	<p style="text-align: center;">Pre-Condition</p> <p>Related industries are cooperative to the Project.</p>

\* Targeted metalworking organizations: MOI, MIDC, POLMAN Bandung and HINABI

\*\* Items of evaluation assume to be amount of productions and delivery, rejection rate and so on.

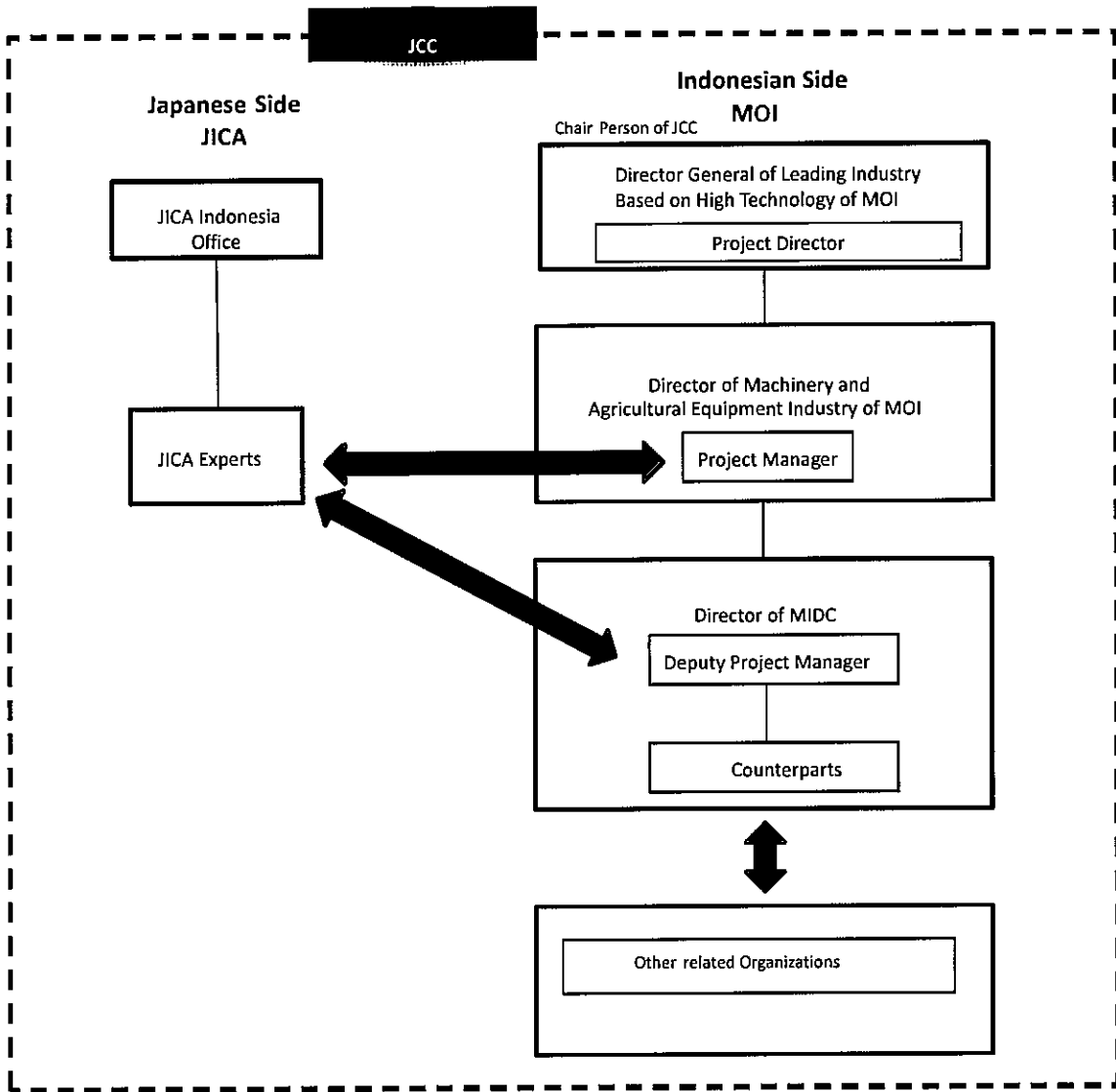
XX presents a number that will be determined by the JCC at the meeting held approximately 6 months after the commencement of the Project.

- Abbreviations:
- APLINDO: Asosiasi Industri Pengecoran Logam Indonesia
  - HINABI: Heavy Equipment Manufacturer Association of Indonesia
  - MOI: Ministry of Industry
  - MIDC: Metal Industries Development Center
  - POLMAN: Politeknik Manufaktur Negeri

## Project Title: Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery

Activity	Schedule (from 2013 to 2016)																Implementing Organization		Related Organization	Remarks
	2013				2014				2015				2016				Japan	Indonesia		
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q				
Project Duration	[Gantt chart showing project duration from 2013 Q1 to 2016 Q4]																			
Output 1: Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting) including production management is improved.																				
1-1 To identify technical level of targeted metalworking organizations on casting.				■				■										JICA	MOI, MIDC, POLMAN Bandung, HINABI	
1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them based on 1-3, 1-4, 1-5 and 1-6.				■				■										JICA	MIDC, POLMAN Bandung, HINABI	
1-3 To develop target casting.																		JICA	MOI, MIDC, POLMAN Bandung, HINABI	
1-4 To conduct seminars on casting for supporting industries of construction machinery.				■	■			■	■					■	■			JICA	MOI, MIDC, POLMAN Bandung, HINABI	UI, APLINDO, POLMAN Ceper, PT. Barata Indonesia
1-5 To conduct trainings on casting for supporting industries of construction machinery.								■	■					■	■			JICA	MIDC, POLMAN Bandung, HINABI	POLMAN Ceper, PT. Barata Indonesia
1-6 To deliver extension services on casting for supporting industries of construction machinery.																		JICA	MIDC, POLMAN Bandung, HINABI	
Output 2: Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.																				
2-1 To identify technical level of targeted metalworking organizations on production management.				■				■										JICA	MOI, MIDC, POLMAN Bandung, HINABI	
2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based on 2-3 and 2-4.				■				■										JICA	MIDC, POLMAN Bandung, HINABI	
2-3 To conduct seminars on production management for supporting industries of construction machinery.				■	■			■	■					■	■			JICA	MOI, MIDC, POLMAN Bandung, HINABI	POLMAN Ceper, UI, PT. Barata Indonesia
2-4 To conduct trainings on production management for supporting industries of construction machinery.								■	■					■	■			JICA	MIDC, POLMAN Bandung, HINABI	POLMAN Ceper, UI, PT. Barata Indonesia
Output 3: An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.																				
3-1 To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management.																		JICA	MOI, MIDC, POLMAN Bandung, HINABI	
3-2 To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on 3-1, Output1 and Output2.																		JICA	MOI, MIDC, POLMAN Bandung, HINABI	APLINDO, UI, POLMAN Ceper, PT. Barata Indonesia

Annex 4 Implementation Structure



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## Tentative list of planned trainings and seminars

## 1. Trainings

No.	Name of the training	Place	Target group	Main target technology	No. of expected participants	Provisional timing of the training	Duration	Remarks	Hosted by
1	Training in Japan on casting for top management	Japan	Targeted metalworking organizations / Top management of foundries	Casting (In particular steel casting) including production management for foundry	A total of 15-45 (5-15 per year)	Every July (once a year from 2014 for three years)	2 weeks	<ul style="list-style-type: none"> <li>Classroom lecture (one week)</li> <li>Observation of factories (one week)</li> </ul>	JICA
2	Pre-training on casting for top management	Indonesia (MIDC)	Participants of the training 1 above	Casting (In particular steel casting) including production management for foundry	A total of 15-45 (5-15 per year)	Every April (once a year from 2014 for three years)	1 week	Conducted before training in Japan	MOI and JICA

3	Training on casting for middle management	Indonesia (MIDC and others)	Targeted metalworking organizations / Middle management of foundries	Casting (In particular steel casting) including production management for foundry	A total of 15-30 (5-10 per year)	Every August or February (once a year from 2014 for three years)	3 weeks	<ul style="list-style-type: none"> <li>Classroom lecture</li> <li>Practical training</li> <li>Observation of factories</li> </ul>	MOI and JICA
4	Training in Japan on production management for top management	Japan	Targeted metalworking organizations / Top management of HINABI member companies	Production management	A total of 9-15 (3-5 per year)	Every July (once a year from 2014 for three years)	2 weeks	<ul style="list-style-type: none"> <li>Classroom lecture (one week)</li> <li>Observation of factories (one week)</li> </ul>	JICA
5	Pre-training on production management for top management	Indonesia (MOI and HINABI)	Participants of the training 4 above	Production management	A total of 9-15 (3-5 per year)	Every April (once a year from 2014 for three years)	1 week	<ul style="list-style-type: none"> <li>Conducted before training in Japan</li> </ul>	HINABI, MOI and JICA
6	Training on production management for middle management	Indonesia (MOI and HINABI)	Targeted metalworking organizations / Middle management of HINABI member companies	Production management	A total of 30-45 (10-15 per year)	Every August or February (once a year from 2014 for three years)	3 weeks	<ul style="list-style-type: none"> <li>Classroom lecture</li> <li>Practical training</li> <li>Observation of factories</li> <li>Practical training at HINABI member factories</li> </ul>	HINABI, MOI and JICA

2. Seminars

No.	Name of the seminar	Place	Targeted group	No. of expected participants	Provisional timing of the seminar	Duration	Remarks
1	Kick off seminar for supporting industries of construction machinery	Jakarata and Bandung	All persons involved in the Project	A total of 300 (150 per one seminar)	December 2013	Half a day or one day	<ul style="list-style-type: none"> <li>Lecturers will be invited from Indonesia and Japan</li> <li>Targeted practical and concrete presentations will be provided</li> <li>Joint seminar with HINABI may be considered</li> </ul>
2	Annual seminar	Held in turn (such as Ceper, Tegal, Surabaya and Bekasi)	All persons involved in the Project	A total of 400 (100 per one seminar)	Once a year (Total of 3 times)	One day or two	<ul style="list-style-type: none"> <li>Held on the first day of the Pre-training in Japan for top management</li> <li>Site tour is included (visit approximately 2 companies in a half day as options)</li> <li>Lecturers will be invited from Indonesia and Japan</li> <li>Joint seminar with HINABI may be considered</li> </ul>
3	Graduation seminar	Jakarta	All persons involved in the Project	100	Once before the completion of the Project	Half a day	<ul style="list-style-type: none"> <li>Report of the project activities</li> <li>Consultation and discussion on draft future action plan</li> </ul>

3. Extension service (visiting consultation to foundries)

No.	Place	Targeted group	No. of target companies	Provisional Timing	Outline
1	All Indonesia	Casting companies as supporting industries for construction machinery	Same as or below the number of target companies which have participated in training in Japan	Before and after training in Japan	<ul style="list-style-type: none"> <li>As a follow up for those who participate in training in Japan</li> <li>Consultation will be conducted by Indonesian counterparts supported by Japanese experts</li> </ul>



## A List of Proposed Members of Joint Coordinating Committee

1. Indonesian side

- Director General of Leading Industry Based on High Technology of MOI(Chair)
- Director of Machinery and Agricultural Equipment Industry of MOI
- Secretary of Directorate General of International Industrial Cooperation of MOI
- Director of International Industrial Corporation, Zone II and Regional
- Head of Center for Study of Technology and Intellectual Property Rights of Agency for Study of Industrial Policy , Climate and Quality of MOI
- Director of MIDC
- Director of POLMAN Bandung
- Representative(s) of HINABI
- Representative(s) of relevant organizations such as Material and Metallurgy Department of University of Indonesia, APLINDO, POLMAN Ceper, PT. Barata Indonesia

2. Japanese side

- JICA Expert Team
- JICA Indonesia Office
- Embassy of Japan (Observer)

Other personnel are allowed to be invited as observers upon the agreement between the Chair and JICA.

ANNEX 2  
Project Design Matrix (PDM)

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# 1. Project Design Matrix (PDM)

Date: 28<sup>th</sup> November 2013

Version 0

Project Title: Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery

Target area: All Indonesia

Project period: Three years

Target groups: MOI, MIDC, POLMAN Bandung, HINABI

Narrative Summary	Objective Verifiable Indicators	Means of Verification	Important Assumptions
<p>Overall Goal: Metalworking technology of supporting industries of construction machinery will be improved.</p>	<ol style="list-style-type: none"> <li>Number of supporting industry companies which the metalworking technology and management is high evaluated<sup>1</sup> by construction machinery manufacturers and/or user companies of construction machinery: XX companies</li> <li>Number of companies in supporting industries which can newly produce steel casting parts that meet the needs of construction machinery industry: XX companies</li> <li>Number of kind of steel casting parts which can be newly produced by supporting industries and which meet the needs of construction machinery industry: XX kinds of parts</li> </ol>	<ul style="list-style-type: none"> <li>Interview to construction machinery manufacturers</li> <li>Questionnaire construction machinery manufacturers</li> </ul>	<p>Construction machinery industry in Indonesia does not largely turn worse.</p>
<p>Project Purpose: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations<sup>2</sup>.</p>	<ol style="list-style-type: none"> <li>Satisfaction level of companies in supporting industries of construction machinery with the technical services provided by the Project</li> <li>Number of companies which receive technical services on casting: XX companies</li> <li>Technical level of target casting which targeted metalworking organizations can develop.</li> <li>Number of companies which receive technical services on production management: XX companies</li> </ol>	<ul style="list-style-type: none"> <li>Activity record</li> </ul>	<p>Quitting a job or movement of the trainers does not give a trouble for the project activities.</p>
<p>Outputs: 1. Technical service providing capability of targeted metalworking organizations foundries on casting (in particular steel casting) including production management is improved.</p>	<ol style="list-style-type: none"> <li>1-1 Number of trainers who is capable of conducting extension services and lectures on casting: SS trainers</li> <li>1-2 Development of manual for casting and its revision</li> </ol>	<ul style="list-style-type: none"> <li>Activity record</li> </ul>	<p>Trained counterparts remain at targeted metalworking organizations.</p>
<p>2. Technical service providing capability of targeted metalworking organizations for</p>	<ol style="list-style-type: none"> <li>2-1 Number of trainers who is capable of conducting on-site</li> </ol>	<ul style="list-style-type: none"> <li>Activity record</li> </ul>	

<sup>1</sup> Items of evaluation assume to be amount of productions and delivery, rejection rate and so on.

<sup>2</sup> Targeted metalworking organizations: MOI, MIDC, POLMAN Bandung and HINABI

metalworking companies except for foundries on production management is improved.	consultation services and lectures on production management 2-2 Development of manual for production management and its revision		
3. An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.	3-1 Development of a future action plan	• Activity record	
Activities:	Input		Pre-Conditions
<p>1-1 To identify technical level of targeted metalworking organizations on casting.</p> <p>1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them based on 1-3, 1-4, 1-5 and 1-6.</p> <p>1-3 To develop target casting.</p> <p>1-4 To conduct seminars on casting for supporting industries of construction machinery.</p> <p>1-5 To conduct trainings on casting for supporting industries of construction machinery.</p> <p>1-6 To deliver extension services on casting for supporting industries of construction machinery.</p> <p>2-1 To identify technical level of targeted metalworking organizations on production management.</p> <p>2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based on 2-3 and 2-4.</p> <p>2-3 To conduct seminars on production management for supporting industries of construction machinery.</p> <p>2-4 To conduct trainings on production management for supporting industries of construction machinery.</p> <p>3-1 To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management.</p> <p>3-2 To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on 3-1, Output 1 and Output 2.</p>	<p>Japan</p> <p>1. Dispatch of Japanese experts</p> <p>1) Chief advisor/supporting industries of construction machinery</p> <p>2) Metallurgy for steel casting</p> <p>3) Casting process engineering</p> <p>4) Production management</p> <p>5) Project coordinator</p> <p>6) Other experts (experts on specific technology and seminar lecturers if necessary)</p> <p>2. Training in Japan</p> <p>3. Machinery and equipment</p>	<p>Indonesia</p> <p>1. Counterpart personnel (each party)</p> <p>2. Facility (MIDC)</p> <p>1) Office space and facility for Japanese experts</p> <p>3. Usage of machinery and equipment by Indonesian side (MIDC)</p> <p>4. Maintenance and operation of machinery and equipment</p> <p>5. Administrative cost and other expenses</p> <p>1) Personnel cost for counterparts and other running expenses (each party)</p> <p>2) Maintenance cost of facility, equipment and materials (MIDC)</p> <p>6. Other administrative cost (each party)</p>	

# 1. Project Design Matrix (PDM)

Date: 13<sup>th</sup> March 2015

PDM (Version. 1)

Project Title: Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery

Target area: All Indonesia

Project period: Three years

Target groups: MOI, MIDC, POLMAN Bandung, HINABI

Narrative Summary	Objective Verifiable Indicators	Means of Verification	Important Assumptions
<p>Overall Goal: Metalworking technology of supporting industries of construction machinery will be improved.</p>	<ol style="list-style-type: none"> <li>Number of supporting industry companies which the metalworking technology and management is high evaluated<sup>1</sup> by construction machinery manufacturers and/or user companies of construction machinery: 5 casting companies / 10 metalworking companies</li> <li>Number of companies in supporting industries which can newly produce steel casting parts that meet the needs of construction machinery industry: 4 companies</li> <li>Number of kind of steel casting parts which can be newly produced by supporting industries and which meet the needs of construction machinery industry: 6 kinds of parts</li> </ol>	<ul style="list-style-type: none"> <li>Interview to construction machinery manufacturers</li> <li>Questionnaire construction machinery manufacturers</li> </ul>	<p>Construction machinery industry in Indonesia does not largely turn worse.</p>
<p>Project Purpose: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations<sup>2</sup>.</p>	<ol style="list-style-type: none"> <li>Satisfaction level of companies in supporting industries of construction machinery with the technical services provided by the Project (will be measured by feedbacks from the targeted companies of extension services)</li> <li>Number of companies which receive technical services on casting: 30 companies</li> <li>Technical level of target casting which targeted metalworking organizations can develop (will be measured by JICA experts and feedbacks from the construction machinery manufacturers having been supplied target castings)</li> <li>Number of companies which receive technical services on production management: 30 companies</li> </ol>	<ul style="list-style-type: none"> <li>Activity record</li> </ul>	<p>Quitting a job or movement of the trainers does not give a trouble for the project activities.</p>
<p>Outputs: 1. Technical service providing capability of targeted metalworking organizations foundries on casting (in particular steel casting) including production management is improved.</p>	<ol style="list-style-type: none"> <li>1-1 Number of trainers who is capable of conducting extension services and lectures on casting: 11 trainers</li> <li>1-2 Development of manual for casting and its revision</li> </ol>	<ul style="list-style-type: none"> <li>Activity record</li> </ul>	<p>Trained counterparts remain at targeted metalworking organizations.</p>

<sup>1</sup> Items of evaluation assume to be amount of productions and delivery, rejection rate and so on.

<sup>2</sup> Targeted metalworking organizations: MOI, MIDC, POLMAN Bandung and HINABI

<p>2. Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.</p>	<p>2-1 Number of trainers who is capable of conducting on-site consultation services and lectures on production management: 11 trainers</p> <p>2-2 Development of manual for production management and its revision</p>	<p>• Activity record</p>	
<p>3. An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.</p>	<p>3-1 Development of a future action plan</p>	<p>• Activity record</p>	
<p>Activities:</p> <p>1-1 To identify technical level of targeted metalworking organizations on casting.</p> <p>1-2 To make capacity building plans and materials on casting based on 1-1, and to revise them based on 1-3, 1-4, 1-5 and 1-6.</p> <p>1-3 To develop target casting.</p> <p>1-4 To conduct seminars on casting for supporting industries of construction machinery.</p> <p>1-5 To conduct trainings on casting for supporting industries of construction machinery.</p> <p>1-6 To deliver extension services on casting for supporting industries of construction machinery.</p> <p>2-1 To identify technical level of targeted metalworking organizations on production management.</p> <p>2-2 To make capacity building plans and materials on production management based on 2-1, and to revise them based on 2-3 and 2-4.</p> <p>2-3 To conduct seminars on production management for supporting industries of construction machinery.</p> <p>2-4 To conduct trainings on production management for supporting industries of construction machinery.</p> <p>3-1 To review existing data, development plans, strategies and policies about construction machinery industries, the supporting industries, casting and production management.</p> <p>3-2 To draft future action plan (including sharing roles and coordination system of relevant institutions) for service providing on metalworking for supporting industries of construction machinery based on 3-1, Output 1 and Output 2.</p>	<p>Input</p>		<p>Pre-Conditions</p>
	<p>Japan</p> <p>1. Dispatch of Japanese experts</p> <p>1) Chief advisor/supporting industries of construction machinery</p> <p>2) Metallurgy for steel casting</p> <p>3) Casting process engineering</p> <p>4) Production management</p> <p>5) Project coordinator</p> <p>6) Other experts (experts on specific technology and seminar lecturers if necessary)</p> <p>2. Training in Japan (Iwate University)</p> <p>3. Machinery and equipment</p>	<p>Indonesia</p> <p>1. Counterpart personnel (each party)</p> <p>2. Facility (MIDC)</p> <p>1) Office space and facility for Japanese experts</p> <p>3. Usage of machinery and equipment by Indonesian side (MIDC)</p> <p>4. Maintenance and operation of machinery and equipment (MIDC)</p> <p>5. Administrative cost and other expenses</p> <p>1) Personnel cost for counterparts and other running expenses (each party)</p> <p>2) Maintenance cost of facility, equipment and materials (MIDC)</p> <p>6. Other administrative cost (each party)</p>	<p>Related industries are cooperative for the project</p>

ANNEX 3

Expert Assignment Schedule / Actual

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Expert Assignment Schedule/Actual

Supervisor's seal of Confirmation: Minoru YAMADA Seal

Name of the contracted project: Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia

1. Field Work

Name (Position)	Grade	No. of Trips	2014												2015												2016												2017			Day	Mon-Month	
			5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3							
Kenichiro SUGIYA (Chief advisor/ supporting industries of construction machinery)	2	Planned	17	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			445	14.83
		Actual	17	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			445	14.83
Yoji WATANABE (Deputy chief advisor)	3	Planned	6	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			116	3.87
		Actual	6	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			116	3.87
Ikuko ICHINO (Replacement) ※2 Yoshinori KOBAYASHI (Former) Yoshiaki TAKEMOTO (Former) (Metallurgy for steel casting 1)	2	Planned	11	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			392	13.07
		Actual	1	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			19	0.63
			7	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			281	9.37
Ikuko ICHINO (Replacement)		3	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			92	3.07	
Kyoji UZUKA (Metallurgy for steel casting 2)	2	Planned	1	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			28	0.93
		Actual	1	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			28	0.93
Nobuharu ARAI (Replacement) ※2 Yoshinori KOBAYASHI (Former) (Casting Process Engineering)	2	Planned	11	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			421	14.03
		Actual	11	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			421	14.03
Taisuke NISHIDA (Production management)	3	Planned	8	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			343	11.43
		Actual	8	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			343	11.43
Kenji HATA (Facilitation of seminar and training)	4	Planned	6	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			160	5.33
		Actual	6	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			160	5.33
Marie KIUCHI (Coordinator/assistant for production management)	5	Planned	12	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			475	15.83
		Actual	12	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]			475	15.83

※1: Air fare and travel days (3 days) will be borne by the consultant team.

※2: Replacement of JICA experts was done based on the consolidated book as of July 9, 2014. After that, Ichino expert succeed as Metallurgy for steel casting 1, on June 6, 2016 based on the consolidation book.

Total in Field	Planned	2,380	79.32
	Actual	2,380	79.32

Expert Assignment Schedule/Actual

2. Home Office Work

Name (Position)	Grade	No. of Trips	2014												2015												2016												2017			Day	Mon- Month
			5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3						
Kenichiro SUGIYA (Chief advisor/ supporting industries of construction machinery)	2	Planned	● (3)																																				● (3)	6	0.30		
		Actual	■ (3)																																					■ (3)	6	0.30	
Ikkuo ICHINO (Replacement) ※2 Yoshinori KOBAYASHI (Former) Yoshiaki TAKEMOTO (Former) (Metallurgy for steel casting 1)	2	Planned	● (3)																																				● (3)	6	0.30		
		Actual	■ (3)																																					■ (3)	3	0.15	
Ikkuo ICHINO (Replacement) (Metallurgy for steel casting 1)		Actual																																					■ (3)	3	0.15		
Nobuharu ARAI (Replacement) ※2 Yoshinori KOBAYASHI (Former) (Casting Process Engineering)	2	Planned	● (3)																																				● (3)	6	0.30		
		Actual	■ (3)																																					■ (3)	3	0.15	
Nobuharu ARAI (Replacement) (Casting Process Engineering)		Actual																																					■ (3)	3	0.15		
Remarks : ■ Actual implementation      ● Plan of implementation      ══ Cost was borne by the consultant team																						Total in Home Office			Planned	18	0.90																
																									Actual	18	0.90																
																						Grand Total			Planned	80.22																	
																									Actual	80.22																	
Reporting																																						△					
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ANNEX 4  
Counter Part (C/P) Staff List

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## The List of C/P members

### **MOI/ILMATE**

(Ministry of Industry /Directorate of Metal, Machinery, Transportation Equipment & Electronic Industries)

Position	*	Name	Institution
Project Director		I Gusti Putu Suryawirawan	Directorate of the Metal, Machinery, Transportation Equipment and Electronic Industries, Ministry of Industry
Project Manager		Zakiyudin	Director of the Machinery and Equipment Agriculture Industry, Directorate of Metal, Machinery, Transportation Equipment and Electronic Industries, Ministry of Industry
Member		Katri Wahyuningsih	Vice Director of the Machinery and Equipment Agriculture Industry, Directorate of Metal, Machinery, Transportation Equipment and Electronic Industries, Ministry of Industry
		Nerhasanah Timbuieng	Machinery and Equipment Agriculture Industry, Directorate of Metal, Machinery, Transportation Equipment and Electronic Industries, Ministry of Industry
/		(Arus Gunawan)	(Previous Director of the Machinery and Equipment Agriculture Industry, Directorate of Metal, Machinery, Transportation Equipment and Electronic Industries, Ministry of Industry)
		(Teddy Caster Sianturi)	(Director Before Arus Gunawan / Machinery and Equipment Agriculture Industry, Directorate of Metal, Machinery, Transportation Equipment and Electronic Industries, Ministry of Industry)

\* ○ : A trainer who is capable of conducting extension services and lectures.

**MOI/MIDC**

(Ministry of Industry / Metal Industries Development Center)

Position	*	Name	Institution
Head		<u>Enuh Rosdeni</u>	Chairman of the Metal Industries Development Center (MIDC), Ministry of Industry
Lead		Sri Bimo Pratomo	Head of the Research and Development Division
Member of Casting	<input type="radio"/>	Purbaja Adi	Head of the Casting and Heat treatment Section
	<input type="radio"/>	Dedi Supriatna	Head of Pattern, Casting and Heat treatment Section
	<input type="radio"/>	Husen Taufiq	Head of Engineering , Casting and Heat treatment Section
		Rahmat	Head of Production Planning and Inventory Control (PPIC), Casting and Heat treatment Section
	<input type="radio"/>	Hasanudin	Head of Melting, Casting and Heat treatment Section
		Eva Afrilinda	Staff of Engineering, Casting and Heat treatment Section
		Nana Jumena	Staff of Pattern, Casting and Heat treatment Section
		Jalu	Staff of Pattern, Casting and Heat treatment Section
		Maulana Arifin	Staff of Molding, Casting and Heat treatment Section
		Ganjar Priatna	Staff of Molding, Casting and Heat treatment Section
		M. Taufik	Staff of Engineering, Casting and Heat treatment Section
		Deden Barkah Gustaman	Staff of Engineering, Casting and Heat treatment Section
		Dian Hermawan	Staff of Melting, Casting and Heat treatment Section
		Rahmat Mulyono	Staff of Melting, Casting and Heat treatment Section
		Yayan Hendrayana	Staff of Engineering, Casting and Heat treatment Section
	Yudha	Staff of Maintenance, Casting and Heat treatment Section	
	Oma Wijaya	Staff of Molding, Casting and Heat treatment Section	
	<input type="radio"/>	Dagus Resmana Djuanda	Staff of Engineering, Casting and Heat treatment Section
Member of Production Management	<input type="radio"/>	Agus Hermawan	Head of the Marketing and Cooperation Section Cooperation and Development services Engineering Division
	<input type="radio"/>	Agus Budiman	Head of the Design and Engiinerig Section Research and Development Division

	<input type="radio"/>	Helmi Hariyadi	Head of the Training Section Cooperation and Development services Engineering Division.
	<input type="radio"/>	Gugum Gumilar	Certification Section Comformity Assessment Division
	<input type="radio"/>	Rizalul Kalam	Programming and Reporting Sub Division Administration Division.
	<input type="radio"/>	Hafid	Chief of Researcher
	<input type="radio"/>	Rurut Amiru	Calibration Section Comformity Assessment Division
	<input type="radio"/>	Mirantie Dwiharsanti	Programming and Reporting Sub Division Administration Division
	<input type="radio"/>	(Purbaja Adi)	Head of the Casting and Heat treatment Section (A member of Production Management until September 2016)
		(Eddy Siswanto)	(Previous Chairman of MIDC, Ministry of Industry)

\*  : A trainer who is capable of conducting extension services and lectures.

## **POLMAN Bandung**

(POLITEKNIK MANUFAKTUR NEGERI BANDUNG)

Position	*	Name	Institution
Head		Dede Buchori Muslim	Director of the POLITEKNIK MANUFAKTUR NEGERI BANDUNG (POLMAN Bandung)
Lead		Yuliadi Erdani	Vice Director for the Research, Development, Production and Partnership, POLMAN Bandung
Member		Beny Bandanadjaja	Head of the Department of Metal Casting Technique
		Ahmad Sambas	Head of the Study Program Metal Casting Techniques
	<input type="radio"/>	Ari Siswanto	Lecturer
	<input type="radio"/>	Ery Hidayat	Head of the Laboratory of Metal Casting
	<input type="radio"/>	Kus Hanaldi	Lecturer
		M. Nahrowi	Lecturer

\*  : A trainer who is capable of conducting extension services and lectures.



## HINABI

(Heavy Equipment Manufacturer Association of Indonesia)

Position	*	Name	Institution
Head		Jamalludin	Chairman of the Heavy Equipment Manufacturer Association of Indonesia (HINABI)
Member		Rony Octoriza Kawi	Vice Chairman of the HINABI
		Budi Setyo Utomo	Advisor of the HINABI
		Togar Pangaribuan	Secretary General of the HINABI
		Sahlan Widodo	Secretary of the HINABI

\*  : A trainer who is capable of conducting extension services and lectures.

## POLMAN Ceper

(POLITEKNIK MANUFAKTUR NEGERI CEPER)

Position	*	Name	Institution
Head		Annas Yusuf Mahmudi	Director of the POLITEKNIK MANUFAKTUR NEGERI CEPER (POLMAN Ceper)
Lead	<input type="radio"/>	Sumeru Yoso	Vice Director of the POLMAN Ceper
		Didik Parnadi	Vice Director of the POLMAN Ceper
Members of Casting & Production Management	<input type="radio"/>	Tri Daryanto	Head of the Academic and Student Affairs
	<input type="radio"/>	Lutiyatmi	Head of the Laboratory
	<input type="radio"/>	Toto Carwita	Head of the Production
		Achmad Cosa Nurhadi	Instructor
		Hanif Ali Ghufro	Instructor
		Hariningsih	Instructor
		Ari Fakhrudin	Production staff
		Basuki Dwi Santoso	Laboratory technician
	Verry Junaidi Rachmawan	Staff of the Laboratory	

\*  : A trainer who is capable of conducting extension services and lectures.

## Tegal DINAS

Position	*	Name	Institution
Head		Bambang Susanto	Chairman of the Tegal DINAS
Member		Reza Dwi Anggono	Industry and Commerce Extension Officer, Department of Industry and Commerce
	○	Isti Ifadatul Ulya	Small and Medium Enterprise Field Extension Personnel, Department of Industry and Commerce
		Annisatul Izzan Wahyuni	Small and Medium Enterprise Field Extension Personnel, Department of Industry and Commerce
		Riska Amelia	Small and Medium Enterprise Field Extension Personnel, Department of Industry and Commerce
	○	Uli Fauziah	Small and Medium Enterprise Field Extension Personnel, Department of Industry and Commerce
		Laely Nersi	Industry and Commerce Extension Officer, Department of Industry and Commerce
		Suyanto	Metals staff of ILMATE division, Department of Industry and Commerce

\* ○ : A trainer who is capable of conducting extension services and lectures on production Management.



## ANNEX 5

### Evaluations on Casting Technical Levels of the Targeted Metalworking Organizations

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## Tabel penilaian level CP pada Casting

Nama target yg dinilai: \_\_\_\_\_

Tanggal penilaian: \_\_\_\_\_

Item	Isi	Level			Poin nilai	
		I (Poin nilai 1)	II (Poin nilai 3)	III (Poin nilai 5)	Per isi	Nilai item
		Tdk tahu, atau Pernah dengar saja	Memahami isinya dengan benar	Dipraktekkan sendiri, diajarkan ke orang lain		
Dasar casting	Bentuk solidifikasi logam lebur					10
	Diagram kesetimbangan fasa iron alloy					
Kategori Cast steel dan pemanfaatannya	Bahan utama cast steel					10
	Aplikasi bahan utama					
Proses produksi cast steel	Flow Chart Proses produksi					5
Sifat khusus Carbon steel utk welding	Komponen tipikal					15
	Struktur Casting					
	Sifat mekanik					
pengontrolan High Mn Steel	Komponen tipikal					15
	Struktur casting					
	Sifat mekanik					
Furnace peleburan dan metoda peleburan cast steel	Furnace peleburan yang umum					15
	Metoda peleburan masing-masing					
	Poin kontrol masing-masing (komponen, bahan oksida, gas H <sub>2</sub> , dll)					
Disain casting	Yg penting pada disain perencanaan pouring gate					20
	Disain pouring gate umum utk produk kecil menengah					
	2 aturan dalam disain deadhead					
	Apakah Modulus itu					
Metoda molding	Proses molding cast steel					15
	material molding masing-masing					
	Poin kontrol masing-masing					
Metoda heat treatment	Annealing					15
	Normalizing					
	Quenching Tempering					
Finishing produk	Penghilangan pouring gate					15
	Penghilangan deadhead					
	Metoda repair dgn welding					
Metoda inspeksi	Defect permukaan					15
	Defect internal					
	Sifat bahan (Sifat mekanik, metoda inspeksi non destruction)					
Quality Control	QC 7 Tools					15
	QC Cycle					
	QC story					
Manajemen pabrik	5S					15
	Standardisasi					
	Kegiatan kaizen (perbaikan)					
Total poin nilai (Nilai max 180 poin)						180

Nama penilaian: \_\_\_\_\_

MIDC C/P Technical level evaluation (Before training)

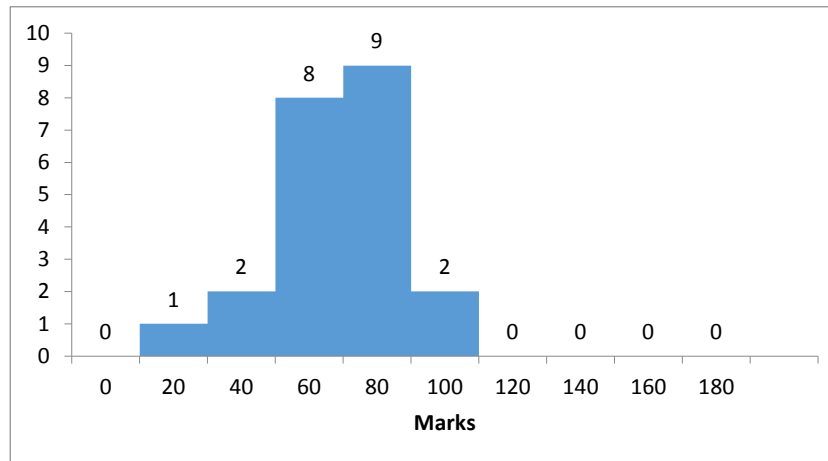
Date of Evaluation: 2016/3/16

Technique	Allocation of marks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19*	20	21	22	23	Average
Casting basics	10	2	2	2	2	2	2	4	2	6	2	2	6	4	2	2	2	2	6		4	6	6	4	3.3
Classification and use of steel castings	10	2	2	2	6	4	6	4	6	6	2	2	6	2	2	2	2	2	6		6	2	6	6	3.8
Steel casting production process	5	1	1	1	1	1	3	1	1	3	1	1	1	1	1	1	1	1	3		1	3	1	3	1.5
Characteristics of welding carbon steel	15	3	3	3	7	3	3	3	3	3	3	3	7	7	3	3	3	3	3		3	9	9	5	4.2
Control of high magnesium steel	15	3	3	3	3	5	3	3	3	3	3	3	7	7	7	3	3	3	3		3	9	3	3	3.9
Melting furnace for steel casting and smelting method	15	3	3	3	3	5	7	7	7	5	3	3	3	5	3	3	3	3	7		7	11	7	5	4.8
Casting mold design	20	8	4	4	4	6	4	8	4	8	4	4	4	4	4	4	4	12	8		6	20	12	8	6.5
Molding method	15	7	3	3	9	7	3	7	3	3	9	9	3	11	9	3	3	3	7		7	11	9	9	6.3
Heat treatment method	15	7	5	3	3	7	3	7	3	3	3	3	9	3	3	3	7	3	9		9	3	3	9	4.9
Product finishing	15	7	3	7	9	11	3	3	3	5	3	3	3	7	3	3	3	9	7		9	9	9	3	5.5
Testing method	15	3	3	3	3	5	3	5	3	7	3	3	9	3	3	3	3	3	9		3	9	9	7	4.6
Process control	15	3	3	3	3	3	3	5	3	3	3	3	3	3	3	3	3	3	3		3	3	3	3	3.1
Factory management	15	5	5	7	9	3	5	7	3	7	3	3	7	3	3	3	3	3	7		3	3	3	9	4.7
Total	180	54	40	44	62	62	48	64	44	62	42	42	68	60	46	36	40	50	78		64	98	80	74	57.2
ABC	-	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	B	C	C	-

Evaluation: A (Above150), B(90~149), C(~89)

\*Unable to conduct evaluation due to the absence of the examinee.

Max 98  
 Min 36  
 Median 57  
 Stdv 15.5



Data interval	Frequency
0	0
20	1
40	2
60	8
80	9
100	2
120	0
140	0
160	0
180	0

MIDC C/P Technical level evaluation (After training)

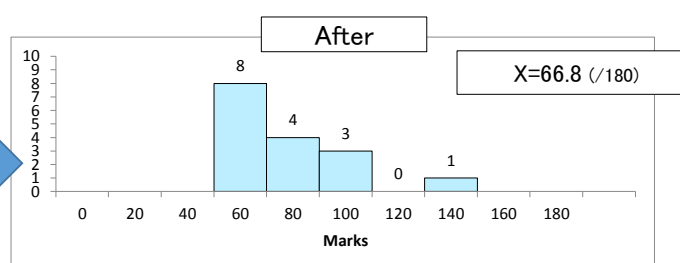
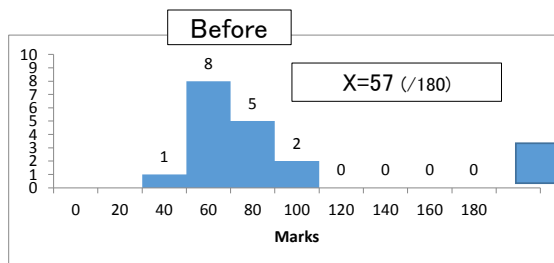
Date of Evaluation: 2017/1/27

Technique	Allocation of marks	1	2	3*	4*	5	6	7	8*	9*	10	11	12	13*	14	15	16	17	18	19*	20	21	22	23*	Average
Casting basics	10	4	4			3	2	5			3	3	6		3	3	3	3	8		6	8	6		4.4
Classification and use of steel castings	10	4	4			5	6	4			3	3	6		3	3	3	4	6		6	8	6		4.6
Steel casting production process	5	2	1			3	3	1			2	1	2		2	2	1	2	3		2	4	2		2.1
Characteristics of welding carbon steel	15	4	3			4	5	3			3	3	7		3	3	3	3	9		6	12	9		5.0
Control of high magnesium steel	15	6	3			5	3	3			3	3	9		5	3	3	3	7		4	12	3		4.7
Melting furnace for steel casting and smelting method	15	6	6			5	7	7			3	3	3		3	3	3	3	8		5	12	8		5.3
Casting mold design	20	10	4			7	4	9			4	4	4		4	4	4	12	10		6	20	12		7.4
Molding method	15	8	3			8	3	7			9	9	3		9	6	5	9	9		7	15	9		7.4
Heat treatment method	15	8	6			5	3	8			3	4	9		4	4	7	3	9		9	9	4		5.9
Product finishing	15	8	4			7	3	3			3	3	3		6	3	4	6	8		9	9	9		5.5
Testing method	15	4	3			9	3	5			4	3	9		4	3	4	4	9		5	14	9		5.8
Process control	15	3	3			4	3	5			3	3	3		3	3	3	3	3		3	6	3		3.4
Factory management	15	5	5			5	5	7			5	5	7		5	4	4	4	7		5	7	5		5.3
Total	180	72	49			70	50	67			48	47	71		54	44	47	59	96		73	136	85		66.8
ABC	-	C	C			C	C	C			C	C	C		C	C	C	C	B		C	B	C		-

Evaluation: A (Above150), B (90~149), C (~89)

\*Unable to conduct evaluation due to the absence of the examinee.

Max 136  
 Min 44  
**Median 63**  
 Stdev 23.1



Data interval	Frequency
0	
20	
40	
60	8
80	4
100	3
120	0
140	1
160	
180	



**POLMAN Bandung C/P Technical level evaluation (Before training)**

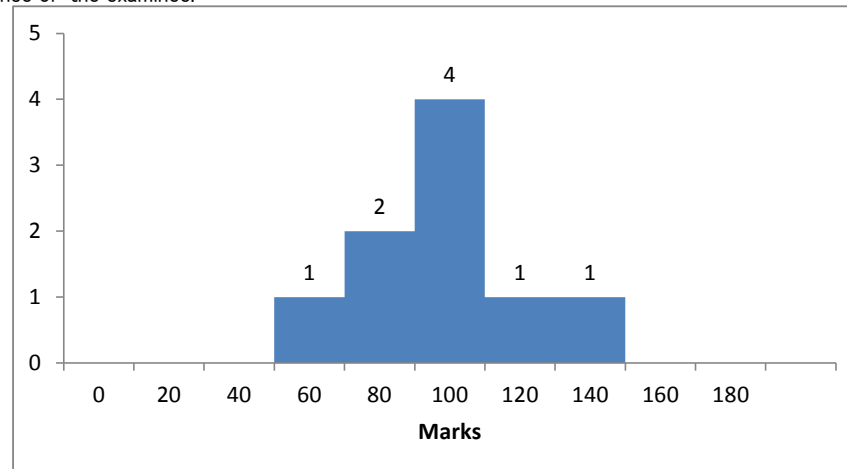
Date of Evaluation: 2014/10/21

Technique	Allocation of marks	1	2	3*	4	5	6	7	8	9	10	Average
Casting basics	10	8	6		3	10	10	2	6	8	6	6.6
Classification and use of steel castings	10	6	8		6	10	6	2	6	6	6	6.2
Steel casting production process	5	3	3		1	0	3	1	5	3	3	2.4
Characteristics of welding carbon steel	15	9	13		3	3	9	3	9	9	3	6.8
Control of high magnesium steel	15	9	15		3	3	7	3	9	9	3	6.8
Melting furnace for steel casting and smelting method	15	9	9		9	13	9	2	9	7	5	8.0
Casting mold design	20	12	12		12	12	12	8	12	9	10	11.0
Molding method	15	9	9		9	15	9	3	9	9	7	8.8
Heat treatment method	15	9	15		3	9	9	3	9	9	3	7.7
Product finishing	15	9	15		9	3	9	9	7	9	5	8.3
Testing method	15	9	15		7	9	9	3	9	9	7	8.6
Process control	15	3	3		3	15	3	3	3	3	3	4.3
Factory management	15	3	3		7	3	3	3	5	3	5	3.9
<b>Total</b>	<b>180</b>	<b>98</b>	<b>126</b>		<b>75</b>	<b>105</b>	<b>98</b>	<b>45</b>	<b>98</b>	<b>93</b>	<b>66</b>	<b>89.3</b>
<b>ABC</b>	-	B	B		C	B	B	C	B	B	C	-

Evaluation: A (Above 150), B (90~149), C (~89)

\*Unable to conduct evaluation due to the absence of the examinee.

Max 126  
 Min 45  
 Median 98  
 Stdv 22.5



Data interval	Frequency
0	0
20	0
40	0
60	1
80	2
100	4
120	1
140	1
160	0
180	0

POLMAN Bandung C/P Technical level evaluation (After training)

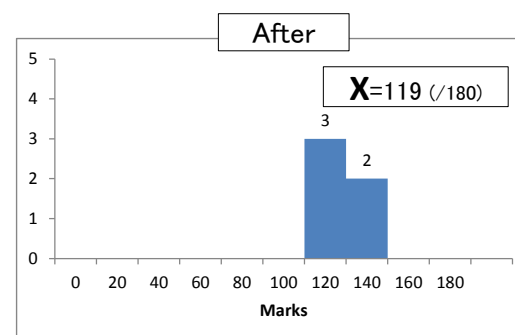
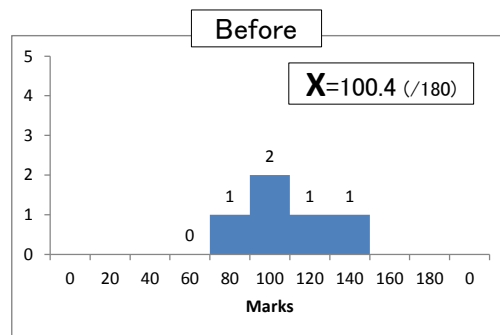
Date of Evaluation: 2017/1/27

Technique	Allocation of marks	1	2	3*	4	5	6	7*	8*	9*	10*	Average
Casting basics	10	9	8		10	10	10					9.4
Classification and use of steel castings	10	7	9		10	10	6					8.4
Steel casting production process	5	3	3		4	3	3					3.2
Characteristics of welding carbon steel	15	10	13		15	9	12					11.8
Control of high magnesium steel	15	10	15		11	6	7					9.8
Melting furnace for steel casting and smelting method	15	10	9		9	13	9					10.0
Casting mold design	20	12	12		13	12	12					12.2
Molding method	15	9	9		14	15	10					11.4
Heat treatment method	15	10	15		11	9	9					10.8
Product finishing	15	9	15		9	6	9					9.6
Testing method	15	12	12		13	11	9					11.4
Process control	15	4	4		6	9	4					5.4
Factory management	15	6	5		7	5	5					5.6
Total	180	111	129		132	118	105					119.0
ABC	-	B	B		B	B	B					-

Evaluation: A (Above 150), B (90~149), C (~89)

\*Unable to conduct evaluation due to the absence of the examinee.

Max 132  
Min 105  
Median 118  
Stdv 10.3



Data interval	Frequency
0	0
20	0
40	0
60	
80	
100	
120	3
140	2
160	0
180	0

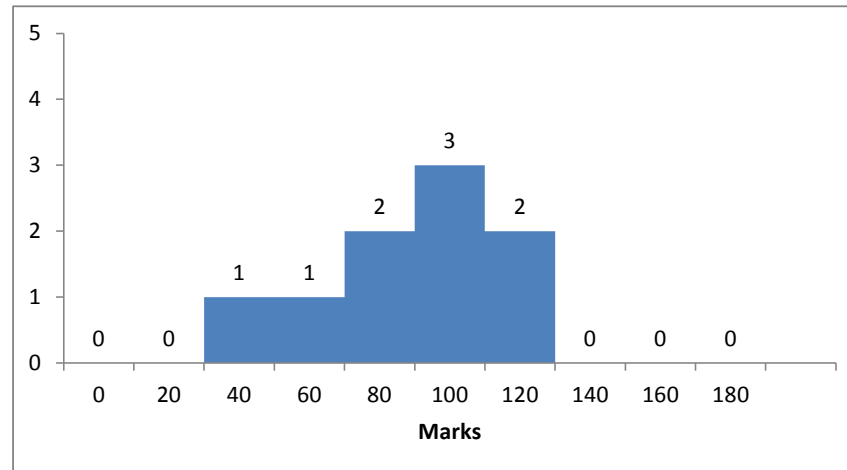
**POLMAN Ceper C/P Technical level evaluation (Before training)**

Date of Evaluation: 2016/3/16

Technique	Allocation of marks	1	2	3	4	5	6	7	8	9	Average
Casting basics	10	2	2	4	6	2	6	6	6	4	4.2
Classification and use of steel castings	10	4	6	4	10	6	6	8	10	6	6.7
Steel casting production process	5	1	1	1	1	1	3	3	5	3	2.1
Characteristics of welding carbon steel	15	3	3	3	3	3	7	9	9	7	5.2
Control of high magnesium steel	15	3	3	9	9	3	7	9	15	7	7.2
Melting furnace for steel casting and smelting method	15	3	3	7	9	7	9	11	15	5	7.7
Casting mold design	20	4	4	8	10	12	10	12	20	6	9.6
Molding method	15	3	9	15	9	9	9	9	9	9	9.0
Heat treatment method	15	3	3	15	9	9	15	13	3	3	8.1
Product finishing	15	3	3	9	9	3	9	9	9	3	6.3
Testing method	15	5	9	11	9	5	7	7	9	9	7.9
Process control	15	3	3	3	3	3	3	3	7	5	3.7
Factory management	15	3	3	3	5	3	7	3	3	9	4.3
<b>Total</b>	<b>180</b>	<b>40</b>	<b>52</b>	<b>92</b>	<b>92</b>	<b>66</b>	<b>98</b>	<b>102</b>	<b>120</b>	<b>76</b>	<b>82.0</b>
ABC	-	C	C	B	B	C	B	B	B	C	-

Evaluation: A (Above150), B (90~149), C (~89)

Max 120  
 Min 40  
 Median 92  
 Stdv 24.2



Data interval	Frequency
0	0
20	0
40	1
60	1
80	2
100	3
120	2
140	0
160	0
180	0

**POLMAN Ceper C/P Technical level evaluation (After training)**

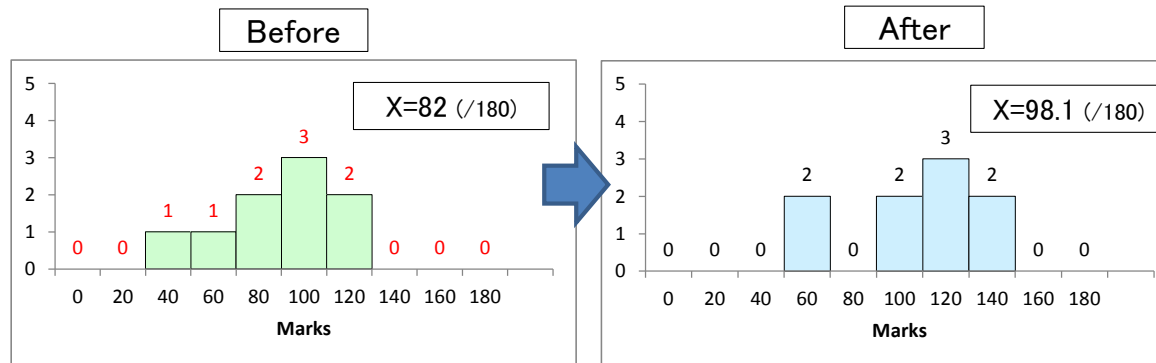
Date of Evaluation: 2017/1/30

Technique	Allocation of marks	1	2	3	4	5	6	7	8	9	Average
Casting basics	10	4	3	5	7	4	6	10	8	7	6.0
Classification and use of steel castings	10	4	6	4	10	6	7	10	10	8	7.2
Steel casting production process	5	2	1	2	3	3	3	5	5	7	3.4
Characteristics of welding carbon steel	15	5	5	5	6	7	8	14	11	12	8.1
Control of high magnesium steel	15	4	3	9	11	6	9	14	15	12	9.2
Melting furnace for steel casting and smelting method	15	4	4	7	10	8	9	11	15	8	8.4
Casting mold design	20	5	5	10	11	13	11	13	20	9	10.8
Molding method	15	5	9	15	9	11	11	13	9	9	10.1
Heat treatment method	15	5	4	15	9	10	15	14	5	6	9.2
Product finishing	15	3	4	9	9	3	9	9	9	3	6.4
Testing method	15	5	9	12	9	8	10	12	9	15	9.9
Process control	15	3	3	3	3	3	3	4	7	5	3.8
Factory management	15	3	3	4	6	5	8	5	5	10	5.4
Total	180	52	59	100	103	87	109	134	128	111	98.1
ABC	-	C	C	B	B	C	B	B	B	B	-

Evaluation: A (Above 150), B (90~149), C (~89)

\*Unable to conduct evaluation due to the absence of the examinee.

Max 134  
Min 52  
Median 103  
Stdv 26.4



Data interval	Frequency
0	0
20	0
40	0
60	2
80	0
100	2
120	3
140	2
160	0
180	0



ANNEX 6

A Manual for Extension Services on Casting

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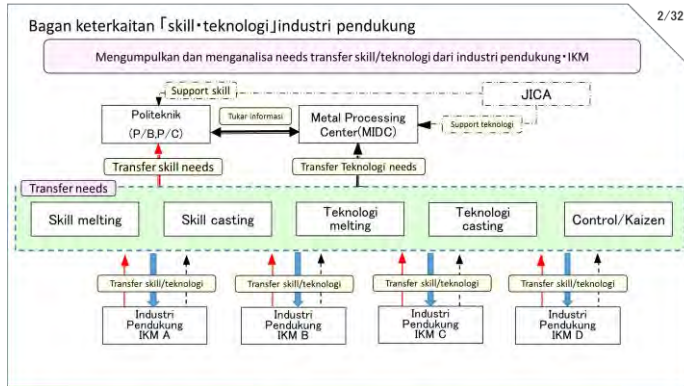


Manual pembinaan keliling

[Daftar isi]

<p>Bab 1 Ikhtisar Manual</p>	<p>1.1 1.2</p>	<p>Kerangka pembinaan keliling (service teknologi) benda steel mesin konstruksi Formulasi program pembinaan keliling</p>
<p>Bab 2 Aktualisasi transfer teknologi [Langkah menuju komersialisasi]</p>	<p>2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9</p>	<p>Memahami Teknisi pembuat dan fasilitas pembuat benda steel casting mesin konstruksi (evaluasi base line berdasarkan check sheet) Penyusunan rencana transfer teknologi dan skill berdasarkan evaluasi base line Penyusunan program transfer teknologi dan skill Manual pembuatan benda steel casting mesin konstruksi (Manual pembinaan keliling) Proses pembuatan standard dan item control dari benda steel casting mesin konstruksi Pemilihan metode molding yang paling tepat per jumlah dan berat Item Quality Assurance yang harus untuk benda steel casting mesin konstruksi Metode deteksi Inspeksi Non destructive yang paling tepat dari defect casting Reject casting dan penanganannya</p>
<p>Bab 3 Hasil aktifitas pembinaan keliling [Sampel evaluasi]</p>	<p>3.1 3.2 3.3</p>	<p>Evaluasi level teknologi Evaluasi level quality Evaluasi level Manajemen/Control</p>





1.1.1 Ikhtisar manual ini

Pada benda steel casting mesin konstruksi, diharapkan efek dari besar kaizen QC, reduce unit cost, yield produk, reject rasio setiap proses manufaktur. Ditunjukkan prosedur step kaizen tersebut menurut proses manufaktur.

1.1.2 Kerangka pembinaan keliling (service teknologi)

Politeknik (Polman Badung/Polman Ceper) bersama dengan MIDC sebagai Metal Industry Development Center menjadi pusat service teknologi, berupaya untuk meningkatkan level teknologi industri metal working pendukung.

1.1.3 Memahami needs (permasalahan) dari yang dibina

Dalam rangka pelaksanaan service teknologi, pahami dengan tepat needs (permasalahan) yang dibina, susun perencanaan dan formulasi Rencana kerja yang dapat dilaksanakan

1.2 Formulasi program pembinaan keliling



1.2.1 Pembagian tugas Transfer skill/transfer teknologi

Dilakukan pertukaran informasi secara intensive antara POLMAN (Polman Bandung/Polman Ceper) dengan MIDC, pembagian tugas utamanya : transfer skill oleh POLMAN, transfer teknologi oleh MIDC

1.2.2 Formulasi program pembinaan keliling

Team pembinaan keliling yang dibentuk atas 2-3 expert memilih C/P, memformulasikan program pembinaan keliling dalam upaya meningkatkan level teknologi dan skill dari C/P, dimana yang akan datang C/P menjadi pusat pengembangan teknologi menuju transfer teknologi dan skill.

## Bab 2

## Aktualisasi transfer teknologi

## 2.1 Memahami tenaga teknis manufaktur dan fasilitas manufaktur benda steel casting mesin konstruksi (check sheet)

※Konfirmasi level teknologi manufaktur dan teknologi manajemen⇒survei base line dari perencanaan support teknologi dan skill

No.	Proses	fasilitas	Kapasitas	tahun model	YES			NO	Komentar
					Puas(10)	Biasa(5)	perbaikan(2)	Evaluasi(0)	
1	Peleburan	Furnace peleburan casting steel							
2		Bahan refractory casting steel							
3		Ladle untuk casting steel							
4		Crane							
5	Molding	Molding cetakan self hardening							
6		Molding cetakan CO2							
7		Molding greensand							
8		Mixer							
9		Flask							
				sub total					poin penuh 90

No.	Proses	nama fasilitas	kapasitas	tahun mode	YES			NO	Komentar
					Puas(5)	Biasa(3)	Perbaikan(2)	Evaluasi(0)	
10	Pattern	Pattern dibuat sendiri							
11		Mesin perkayuan							
12		Resin molding							
13	Coating	Peralatan pencampur coating							
14		Coating alkohol type							
15	Pengeringan molding	Pengeringan Pembakaran							
16		Furnace Pengeringan							
17	bongkar	Mesin bongkar							
18		Bongkar tangan							
19	Shotblast	Shotblast							
20		Hunger blast							
21	Fetling	Gas cutting							
22		Gergaji							
23	Penghilangan padding	CAB							
24		Gerinda							
25	welding	mesin welding							

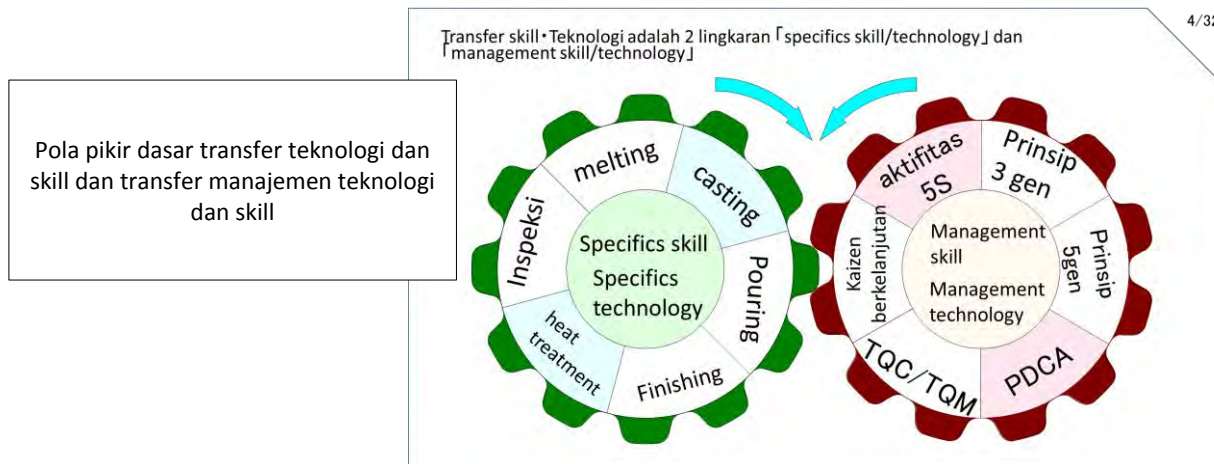
No.	Proses	nama fasilitas	kapasitas	tahun mode	YES			NO	Komentar
					Puas(5)	Biasa(3)	Perbaikan(2)	Evaluasi(0)	
26	Heattreatment	gas oven							
27		electrical oven							
28	Finishing	gerinda							
29	Inspeksi	Mesin uji Amsler							
30		Analysis equipment							
31		Alat inspeksi							
32		NDT							
33		Inspeksi dimensi							
Sub total									Poin penuh 120

No.	SDM(C/P)	Keahlian	pengalaman	umur	YES			NO	Komentar
					Puas(10)	Biasa(5)	Perbaikan(2)	Evaluasi(0)	
34	SDM(C/P)	Ahli peleburan							
35		Ahli pattern							
36		Ahli design							
37		Ahli welding/cutting							
38		Ahli Heattreatment							
39		Ahli inspeksi							
40		Ahli QC							
Sub total									Poin penuh 70
Poin evaluasi									Total poin penuh 280

## 2.2 Penyusunan rencana transfer teknologi dan skill berdasarkan evaluasi base line

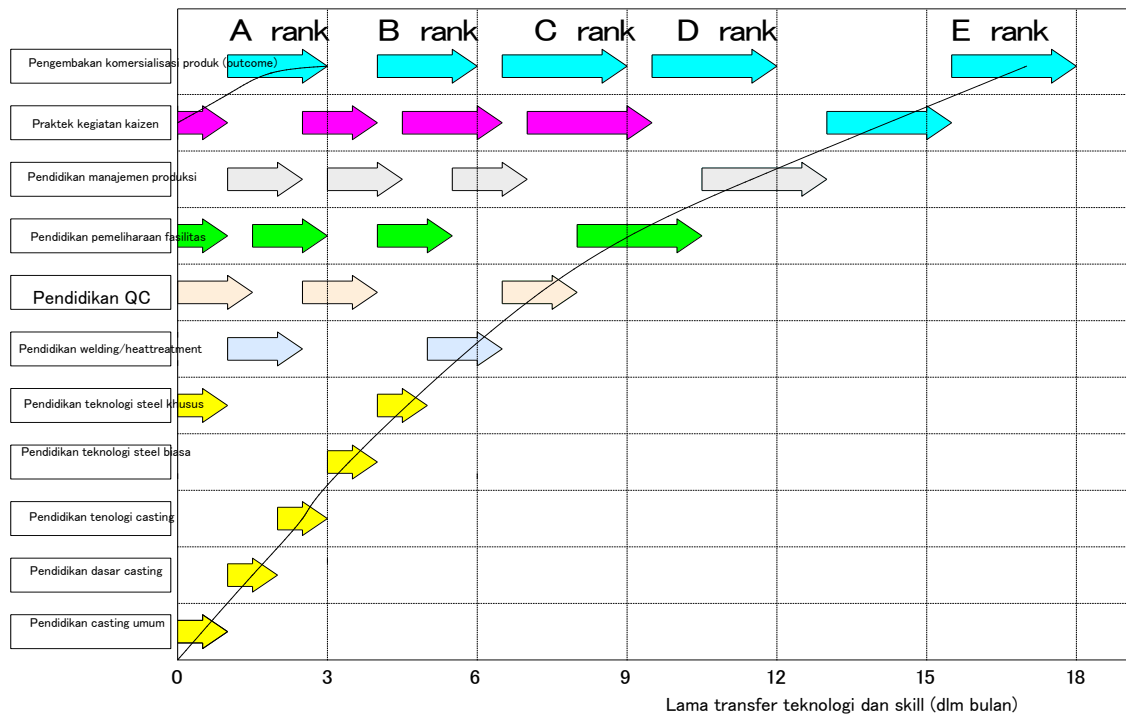
5/14

rank	Total poin evaluasi	Produk/material yang akang dikembangkan	Level rencana teknologi dan skill	Periode transfer
A	280~250	Kelompok produk derajat tinggi (Idler,Sprocket dll)/high alloy cast steel products tahan aus	Komersialisasi produk dan inovasi pabrik	3 bulan
B	249~220	Kelompok produk derajat relatif tinggi (Trackshoe, tooth dll)/alloy cast steel products	Transfer teknologi •skill tinggi	6 bulan
C	219~170	Kelompok produk umum (Boss dll)/ low alloy cast steels	Transfer teknologi dan skill umum	9 bulan
D	169~110	Kelompok barang yang sangat umum (BRKT, dll) / coran baja struktur pengelasan	Transfer teknologi, skill yang sangat umum	12 bulan
E	≤ 109	Kelompok barang yang sangat umum (BRKT, dll) / karbon baja coran baja	Transfer teknologi dan skill dasar	18 bulan

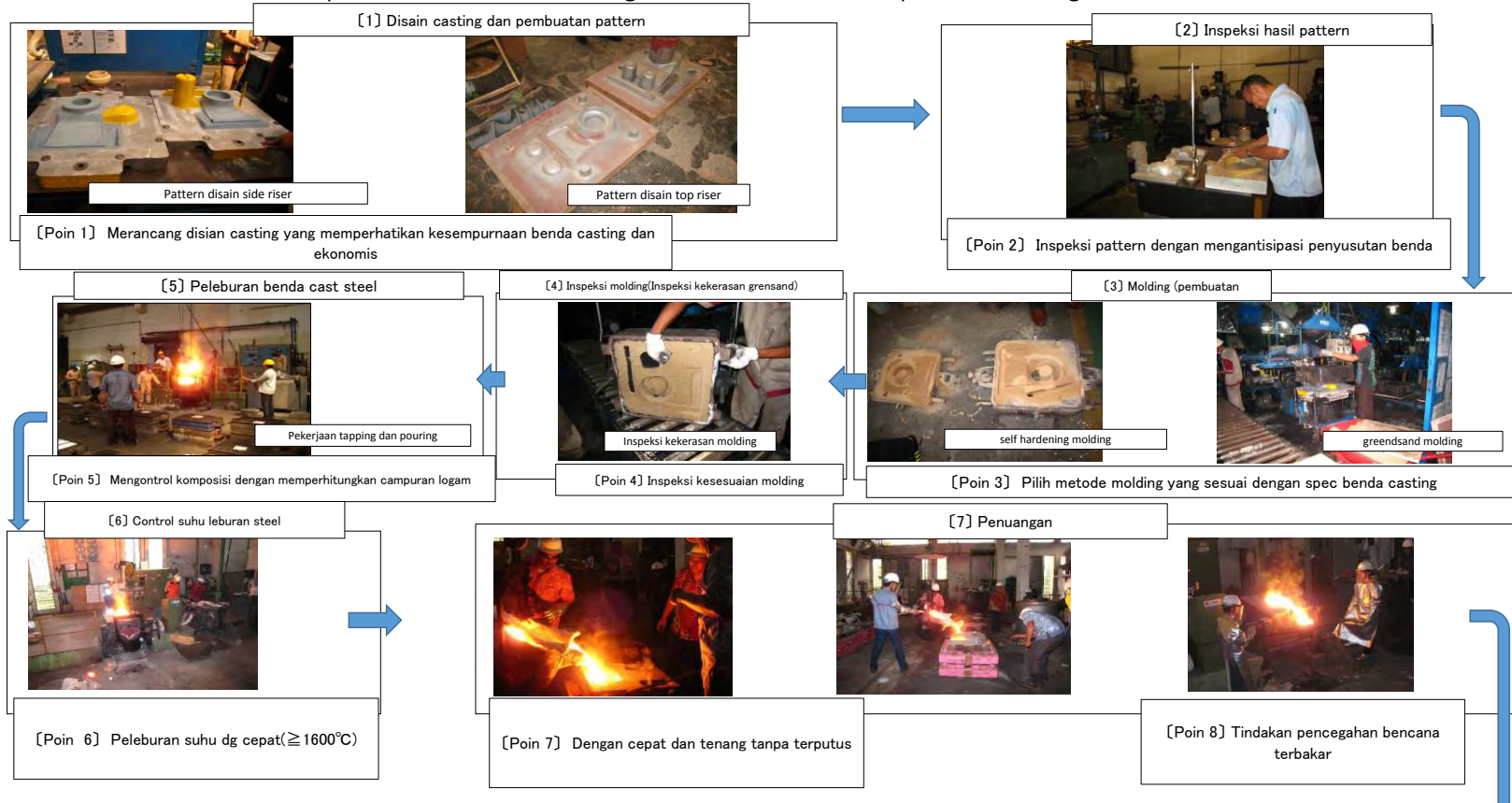


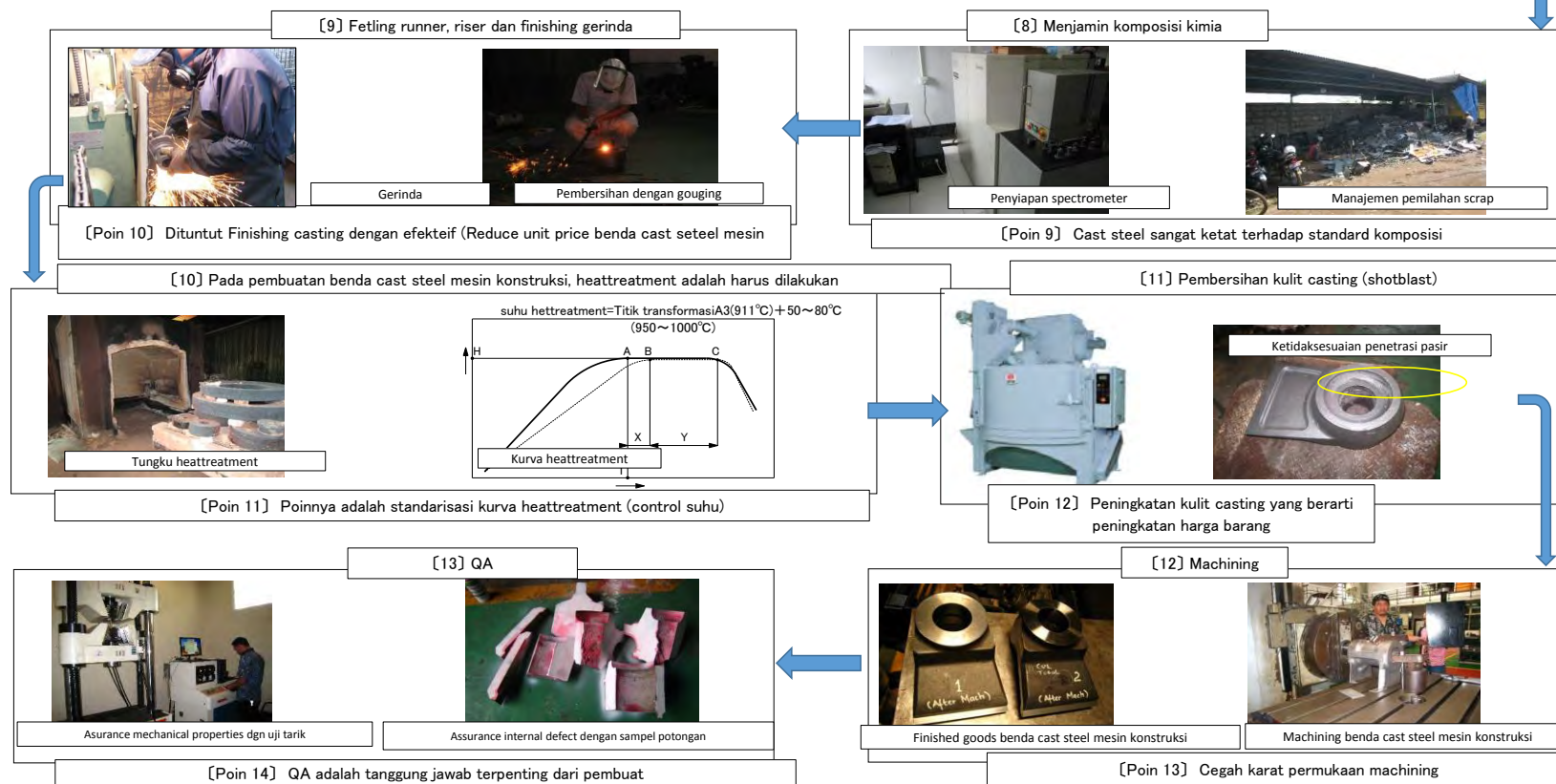
### 2.3 Penyusunan program transfer teknologi dan skill

※Untuk detail program pendidikan, refer ke bahan presentasi detail masing-masing item

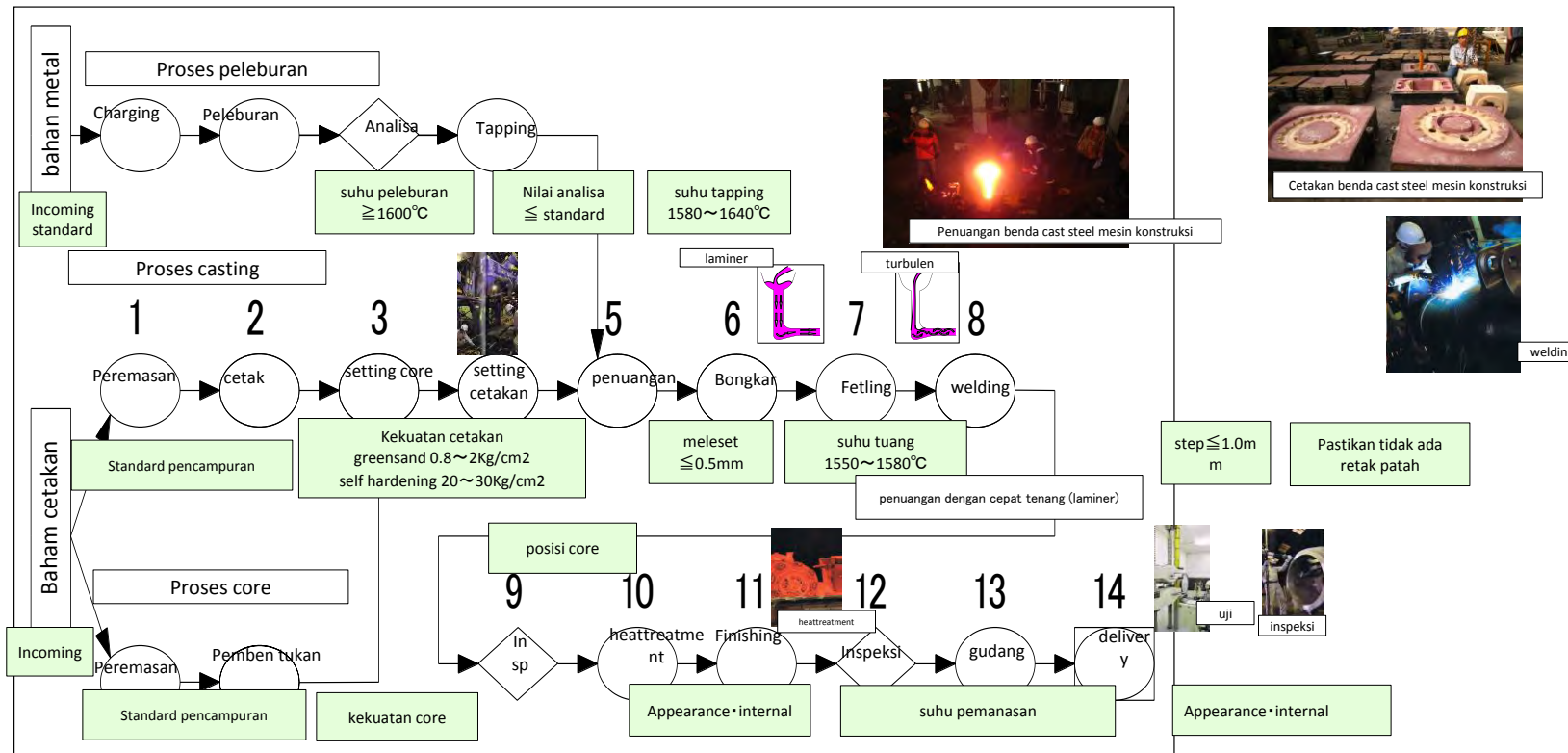


2.4 Manual pembuatan benda steel casting mesin konstruksi (Manual pembinaan keliling)





2.5 Proses pembuatan standard dan item control dari benda steel casting mesin konstruksi





2.6 Pemilihan metode molding yang paling tepat per jumlah dan berat

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Standard jumlah		Produksi spot		Produksi berkelanjutan (pcs/bulan)							
		≤ 10		≤ 10		11~500		501~1000		≥ 1000	
Pegelompokan berat		benda kecil	benda besar	benda kecil	benda besar	benda kecil	benda besar	benda kecil	benda besar	benda kecil	benda besar
		≤ 49Kg	≥ 50Kg	≤ 49Kg	≥ 50Kg	≤ 49Kg	≥ 50Kg	≤ 49Kg	≥ 50Kg	≤ 49Kg	≥ 50Kg
Greensand (main mold)	Pasir silica berbasis bentonite (mold pasir remasan)	○	×	⊙	×	⊙	×	⊙	×	⊙	×
	Pasir silica berbasis clay alam (mold pasir sungai)	○	×	○	×	○	×	×	×	×	×
Self hardening (main mold)	Mold self hardening berbasis organik	○	○	○	○	○	⊙	⊙	⊙	△	△
	Mold self hardening berbasis anorganik	○	○	○	○	△	△	△	×	×	×
CO2 mold (core)	mold gas organik	○	○	○	○	○	△	○	△	△	△
	mold gas anorganik	○	○	○	△	△	△	△	△	△	△
Shell mold (core)		×	×	×	×	△	×	○	×	⊙	×

## 2.7 Item Quality Assurance yang harus untuk benda steel casting mesin konstruksi

	Item QA	Item konfirmasi	Metoda inspeksi (peralatan yang diperlukan)
1	Material	struktur•mechanical properties	mikroskop•Tensile testing machine
2	Komposisi kimia	C, Si, Mn, P, S (5 unsur)	spectrometer
3	internal defect	shrinkage•gas defect	NDT (RT/UT)
4	dimensi	bentuk•dimensi•ketebalan	3D measuring device•scribe Inspeksi dimensi
5	appearance	crack•hot tear•inklusi pasir Gas defect	Visual test (VT), color check (PT), Magnetic flaw test(MT)

### 2.8 Metode deteksi Inspeksi Non destructive yang paling tepat dari defect casting

legenda : ⊙ paling tepat ○ tepat × tidak tepat

Jenis casting defect (posisi terjadi)	posisi utama timbul	NDT (non-destructive testing)				
		VT	PT	MT	UT	RT
		Visual Testing	Penetrant Testing	Magnetic Particle Testing	Ultrasonic Testing	Radiographic Testing
Inklusi pasir (appearance)	permukaan upper mold casting	⊙	○	○	×	×
Gas defect (appearance)	permukaan upper mold/permukaan core	⊙	○	○	×	×
Crack (appearance)	bagian perubahan ketebalan bagian R	○	⊙	⊙	×	×
shrinkage lembut (appearance)	permukaan machining	×	⊙	⊙	×	×
Shrinkage (appearance)	internal defect	×	×	×	⊙	⊙

## 2.9 Reject casting dan penanganannya

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Legenda ; ⊙ item penanganan utama ○ item penanganan biasa △ item penanganan yg mengikuti

fenomena reject	Penanganan (item konfirmasi)												
	control komposisi	disain casting	disain runner	cleaning leburan	suhu tuang	kecepatan tuang	penuangan terputus	kekuatan cetakan	kekuatan core	ventilasi gas	asembling mold	pembong-karan	bentuk ingate
1 Shrinkage		⊙	⊙		○					△			
2 Inklusi pasir		○	⊙										
3 Inklusi slag		○	○	⊙			○						
4 penetrasi		○			⊙		○		△				
5 pinhole		△								⊙			
6 blow hole		○				△				⊙			
7 scab			△					⊙	○				
8 misrun					○	○	⊙						
9 cold shut			△		○	○	⊙						
10 mismatch											○		⊙
11 dent												⊙	
12 termakan			○									⊙	
13 core patah									⊙				
14 dimensi NG								○	△				⊙
15 material NG	⊙												

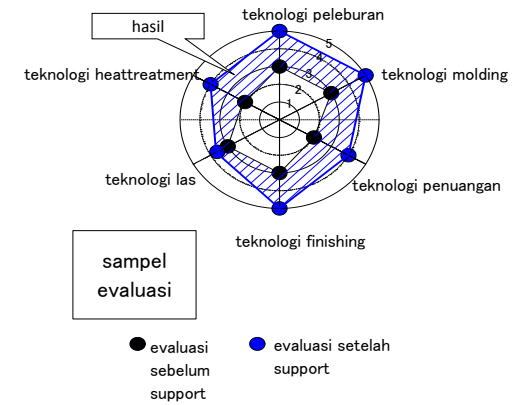
**BAB 3**

**Hasil aktifitas pembinaan keliling**

[evaluasi] 5 sangat baik 4 baik 3 pertahankan 2 kurang 1 perlu perbaikan

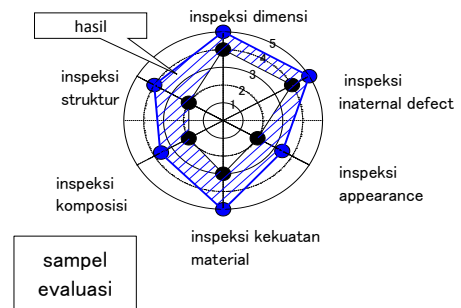
**3.1 Evaluasi level teknologi**

Item evaluasi	standard evaluasi	5	4	3	2	1
teknologi peleburan	control komposisi • suhu					
teknologi molding	kesesuaian pattern/cetakan					
teknologi penuangan	Ada tidak reject penuangan					
teknologi finishing	ada/tidak kesesuaian kulit casting dan dimensi					
teknologi las	ada tidak defect las					
teknologi heattreatment	control suhu dan waktu					



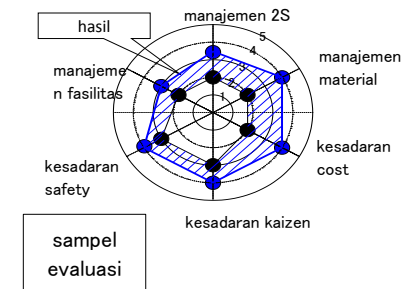
**3.2 Evaluasi level Quality**

Item evaluasi	standard evaluasi	5	4	3	2	1
inspeksi dimensi	standard dimensi					
inspeksi internal defect	dalam $\phi$ 3mm max defect 3 titik					
inspeksi appearance	Pastikan tidak ada inklusi pasir • slag					
inspeksi kekuatan material	kekuatan material sesuai dengan standard					
inspeksi komposisi	standard komposisi					
inspeksi struktur	standard struktur					



**3.3 Evaluasi level manajemen**

Item evaluasi	standard evaluasi	5	4	3	2	1
Manajemen 2S	ringkas rapih					
manajemen material	manajemen identifikasi					
kesadaran cost	penghilangan yg sia-sia					
kesadaran kaizen	terobosan					
kesadaran safety	pencegahan bencana					
manajemen fasilitas	ada tidak rusak mendadak					



PROYEK PENGUATAN KEMAMPUAN PENGOLAHAN LOGAM INDUSTRI PENDUKUNG ALAT KONSTRUKSI

# Manual Pembinaan Keliling

[Transfer Teknologi Manufaktur Produk steel casting]

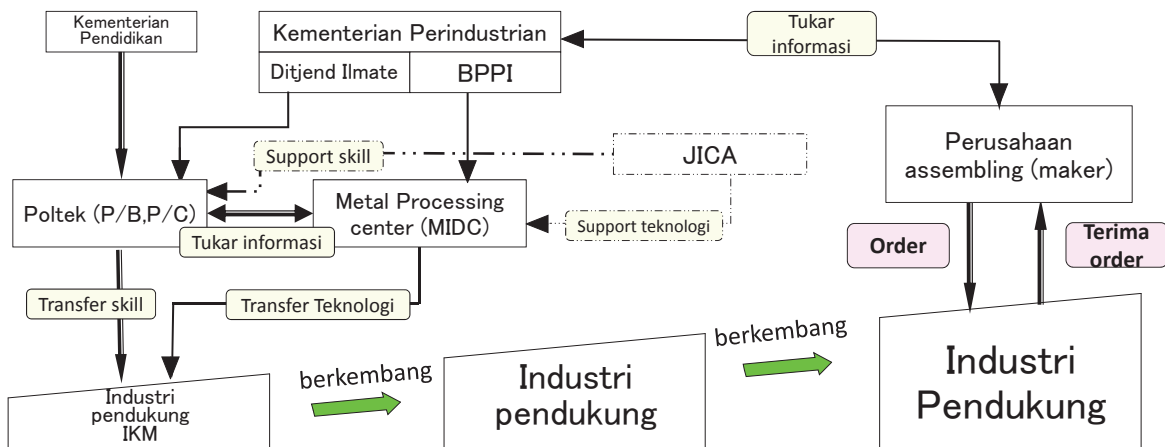
JICA Team (Castings)

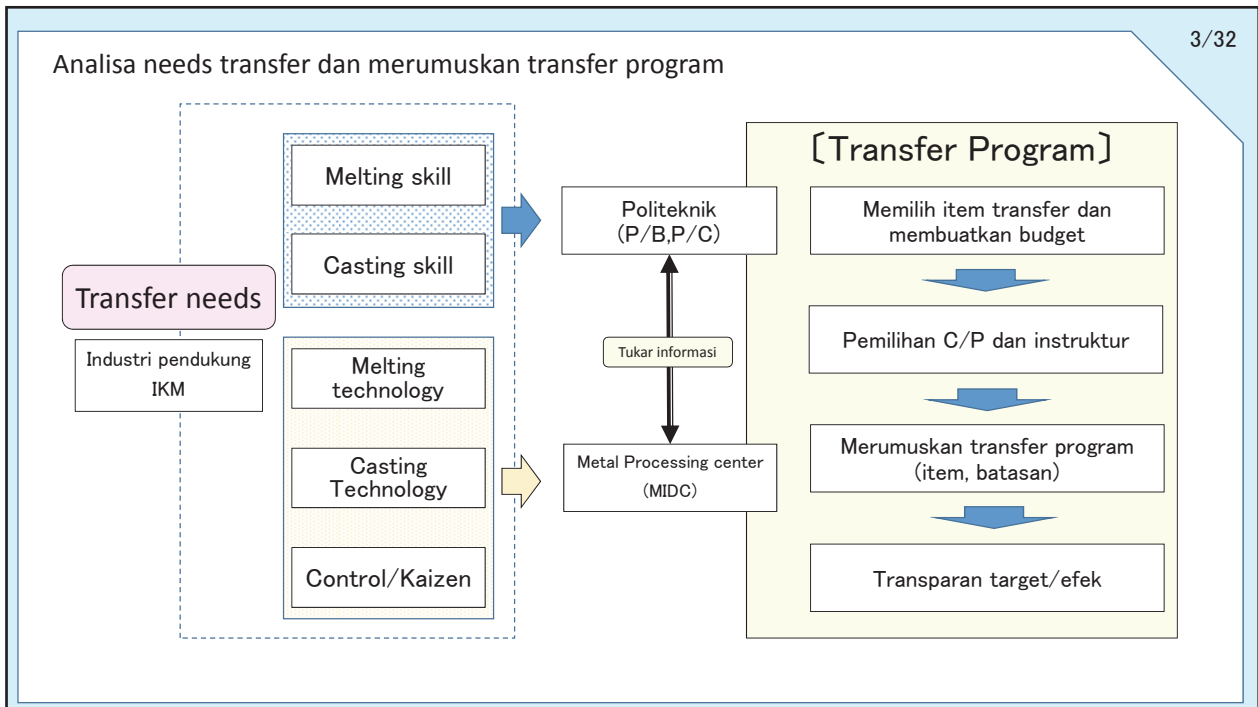
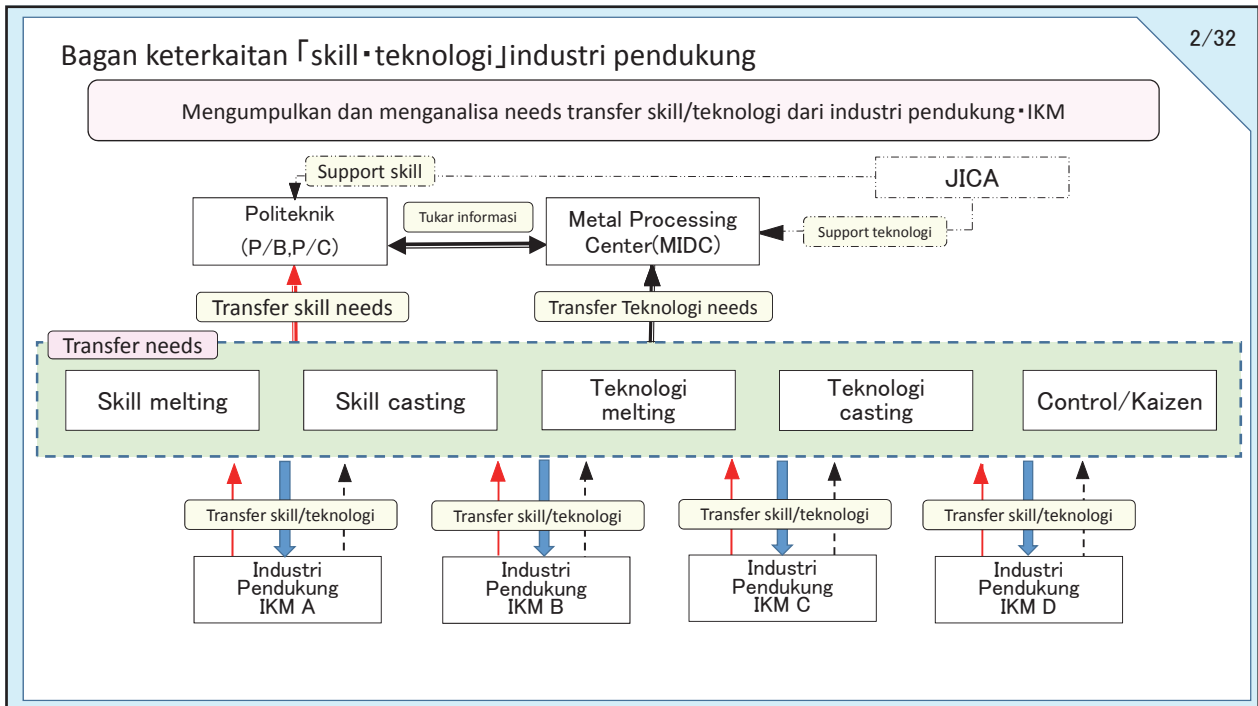
Ikuo Ichino Nobuharu Arai

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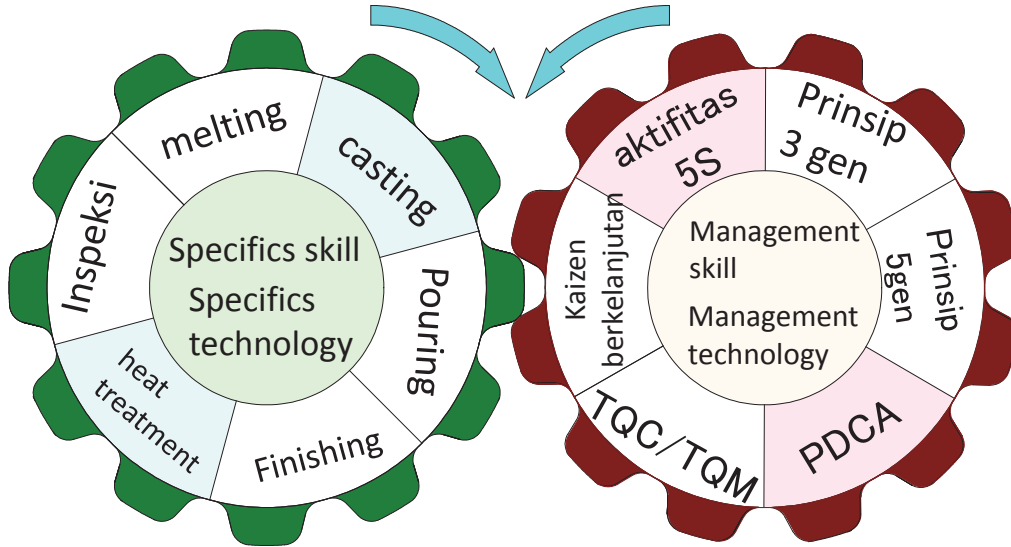
## Bagan keterkaitan transfer teknologi manufaktur benda steel casting

Kutipan 「Proyek penguatan kemampuan proses metal industri pendukung alat konstruksi Indonesia-usulan perbaikan aktifitas」k



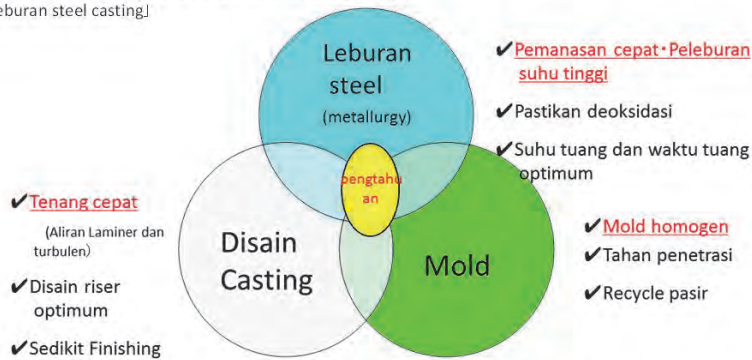


Transfer skill • Teknologi adalah 2 lingkaran 「specifics skill/technology」 dan 「management skill/technology」



Manufaktur benda casting adalah penyatuan specifics skill/specifics technology

Detail ref. 「Peleburan steel casting」



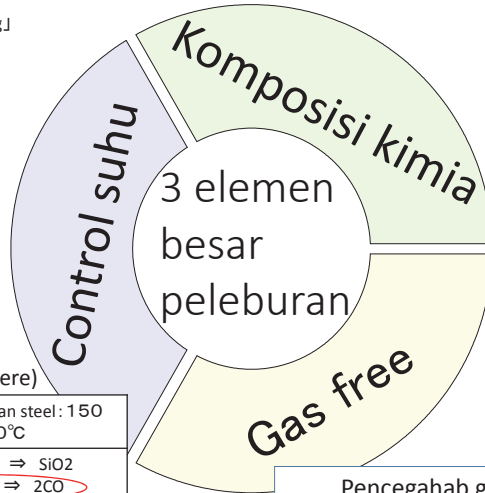
**3 faktor untuk membuat benda casting yang berkualitas tinggi**

- Pembuatan coran [3 faktor]** →
1. Membuat secara ekonomis as cast yg sempurna (menaikkan profit)
  2. Perhatikan 3 faktor Leburan steel (metallurgy) • Disain casting • Molding (Manfaatkan QC proses chart)
  3. Minimalisir pekerjaan Finishing (tingkatkan produktifitas)



### 3 elemen besar peleburan

Detail ref [Peleburan steel casting]



Control komposisi berdasarkan pemahaman yield alloy

unsur名	yield%
C	100
Si	85~90
Mn	90~100
Cr	99
Ni	100
Mo	100
Cu	100
P	100
Nb	98
V	98
Ti	40~90

Pencegahan oksidasi dengan peleburan suhu tinggi

(Promotion of a reducing atmosphere)

Suhu leburan steel: sekitar 1400°C	Suhu leburan steel: 1500°C
1. Si+O2 ⇒ SiO2	1. Si+O2 ⇒ SiO2
2. 2Mn+O2 ⇒ 2MnO	2. 2C+O2 ⇒ 2CO
3. 2C+O2 ⇒ 2CO	3. 2Mn+O2 ⇒ 2MnO
4. 4Cr+3O2 ⇒ 2Cr2O3	4. 4Cr+3O2 ⇒ 2Cr2O3
5. 4P+5O2 ⇒ 2P2O5	5. 4P+5O2 ⇒ 2P2O5

Pencegahab gas defect dikarenakan oksidasi leburan steel (gas N, H, O)

### Karakteristik leburan steel

Dalam Karakteristik leburan steel, penting mempelajari dinamika fluida

Detail ref. [karakteristik logam cair]

**1. Prinsip Bernoulli**  
(hukum kekekalan energi)  
Total tekanan (statik + dinamik) adalah selalu sama

Total tekanan

Tek. statik

Tek. dinamik

**2. Teorema Torricelli**  
(Teorema yang berkaitan dengan kecepatan alir benda cair)

$V = \sqrt{2gh}$

**3. Hukum kontinuiti**  
(Hukum yang berkaitan dengan jumlah aliran benda cair)

$\rho_1 V_1 S_1 = \rho_2 V_2 S_2$

**4. Hukum Pascal**  
(Hukum yang berkaitan dengan tekanan benda cair)

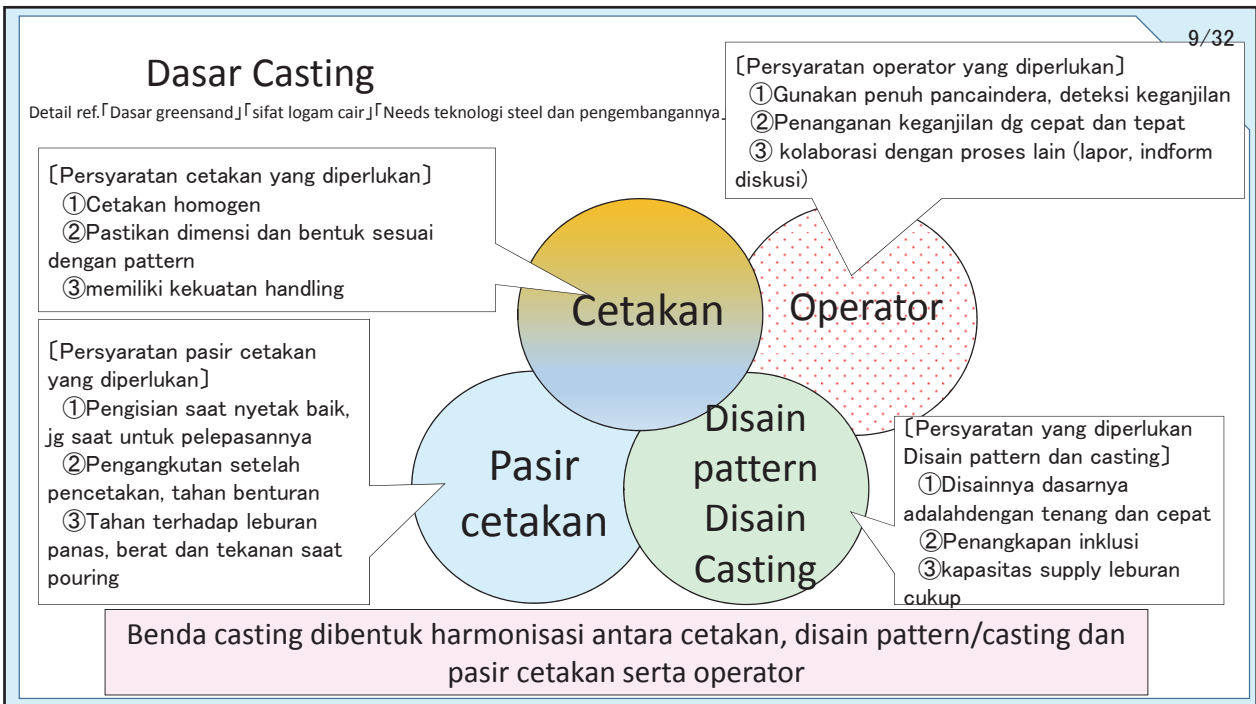
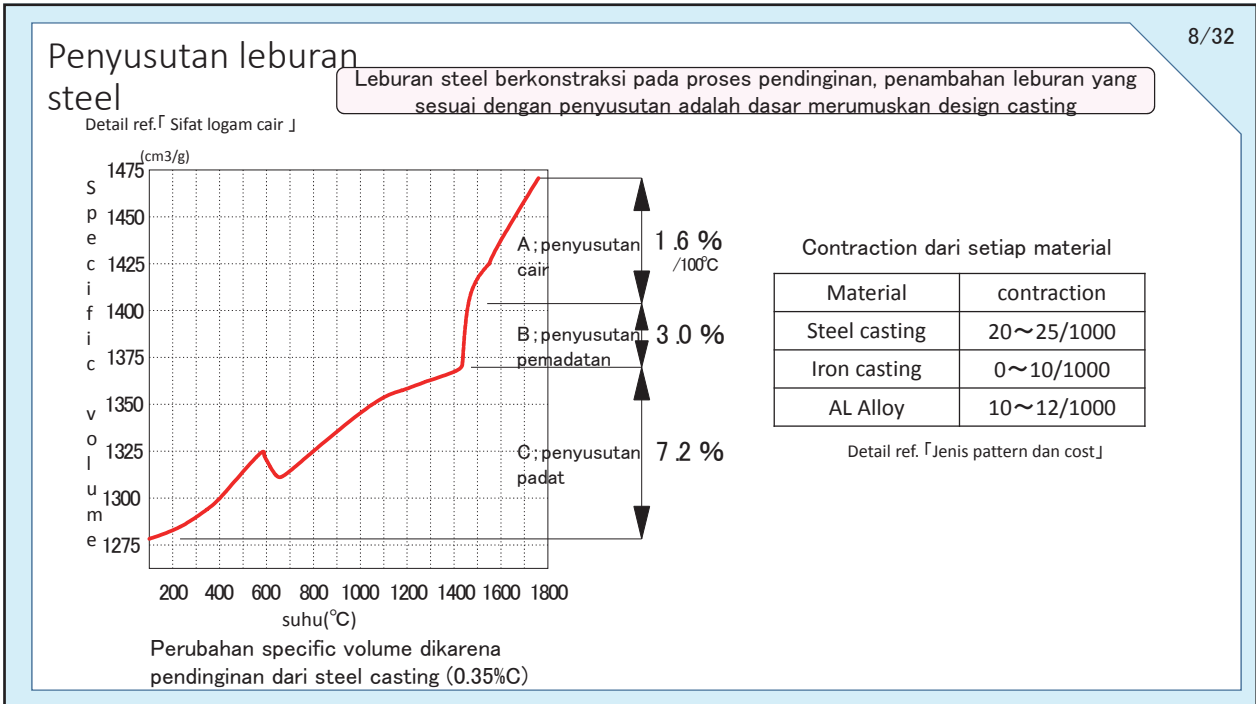
Besar tekanan pada piston berbanding lurus dengan luas

**5. Aliran laminar dan turbulen**  
(perkiraan berdasarkan bilangan Reynolds)  
• Jika bilangan Reynold kecil, menjadi laminar  
• semakin kecepatan alir lambat, density kecil, viskositas besar menjadi laminar

**6. Hukum Stokes**  
(Hukum yang berkaitan dengan pengembangan benda asing dalam cairan)

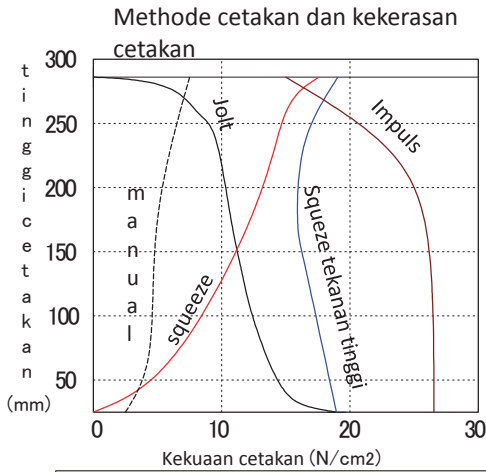
$$V = \sqrt{\frac{4(\rho_s - \rho_w)gd}{3\rho_w Cd}}$$

V: kecepatan  
f: resistance  
m: masa  
 $\rho_s$ : density partikel  
 $\rho_w$ : density leburan steel  
d: diameter partikel  
b: daya angkat  
Cd: koefisien resistance



# Dasar cetakan

Detail ref. 「Mass produksi dan methode pencetakan」 「Dasar greensand」



## Jumlah produksi dan metode cetakan

jumlah	Spot produksi		Produksi berkelanjutan (pcs/bulan)							
	≤ 10	≤ 10	≤ 10	11~500	501~1000	≥ 1000	≤ 10	11~500	501~1000	≥ 1000
Berdasarkan berat	Ke cil	Be sar	Ke cil	Be sar	Ke cil	Be sar	Ke cil	Be sar	Ke cil	Be sar
greensand	○	×	○	×	○	×	○	×	○	×
CO2	○	○	○	○	△	△	×	×	×	×
Self hardening	○	○	○	○	○	△	×	×	×	×
Shell	×	×	×	×	△	×	○	×	○	×

[Berdasarkan berat kecil; ~200kg besar; ≥200 kg

Kemajuan teknologi cetakan adah sejarah mengejar homogenisasi

Pelaksanaan pencetakan dengan titik berat ekonomi

## Perencanaan design casting

Perencanaan design casting adalah membandingkan waktu pematatan masing-masing bagian dengan modulusnya (koefesien pematatan)

Detail ref. 「Latihan disain riser steel casting (1) (2)」 「sifat logam cair」

Modulus adlah perbandingan volume benda casting (V) dengan luas permukaan pendinginan (S) Modulus(Mc)=V/S

Rumus mudah modulus beberapa bentuk

① Plate  $a \geq 5d$

$$Mc = \frac{d}{2}$$

② batang

$$Mc = \frac{a \times b}{2(a+b)}$$

③

$$Mc = \frac{a \times b}{2(a+b)}$$

④

$$Mc = \frac{a \times b}{2(a+b)}$$

⑤

$$Mc = \frac{a \times b}{2(a+b)-c}$$

⑥

$$Mc = \frac{a \times b}{2(a+b-c)}$$

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## Design casting tidak timbul shrinkage dibagian dalam benda casting-1

Detail ref. 「Latihan design riser steel casting (1)(2)」

Hubungan konstanta pemadatan dari riser (Mf) dengan produk (Mc)

$$M_f \geq 1.2 \times M_c$$

Mf ; Konstanta pemadatan Riser

Mc ; Konstanta pemadatan bagian produk casting

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## Design casting tidak timbul shrinkage dibagian dalam benda casting -2

Detail ref. 「Latihan design riser steel casting (1)(2)」

Hubungan waktu pemadatan bagian produk dan Riser

$$T_f \geq 1.44 \times T_c$$

Tf ; Waktu pemadatan riser

Tc ; Waktu pemadatan bagian produk casting

$$T_c = k \left( \frac{V_c}{S_c} \right)^2 = k(M_c)$$

$$T_f = k \left( \frac{V_f}{S_f} \right)^2 = k(M_f)^2$$

$$\frac{T_f}{T_c} = \frac{k(M_f)^2}{k(M_c)^2} \geq \frac{(1.2 \times M_f)^2}{(M_c)^2} \geq 1.44$$

Vc; Volume Sc; luas permukaan pelepas panas

## Pemanfaatan chiller agar ekonomis

Detail ref. 「Latihan design riser steel casting (1)(2)」

Rumus ukuran chiller R.Wlodawer

$$W_{\text{chiller}} = 7.5 V_o \frac{M_o - M_r}{M_o} \quad (1)$$

$W_{\text{chiller}}$ ; Berat chiller(gr)

$A_{\text{chiller}}$ ; Luas permukaan yang bersentuhan (cm<sup>2</sup>)

$$A_{\text{chiller}} = \frac{V_o(M_o - M_r)}{2M_o \cdot M_r} \quad (2) \dots \text{lower mold}$$

$V_o$ ; Luas bagian produk yang harus didinginkan (cm<sup>2</sup>)

$$A_{\text{chiller}} = \frac{V_o(M_o - M_r)}{M_o \cdot M_r} \quad (3) \dots \text{upper mold}$$

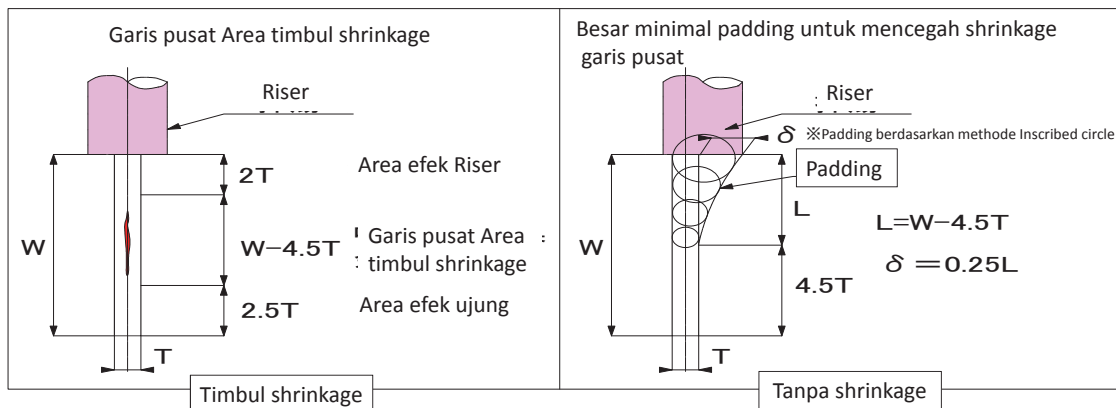
$M_o$ ; konstanta pemadatan bagian produk yang harus didinginkan (cm)

$M_r$ ; konstanta pemadatan setelah pendinginan oleh chiller (cm)

## Method Heuvers (Inscribed circle method) efektif untuk memaksimalkan efek riser

Detail Ref. 「Penanganan Reject steel casting」

Steel casting biasa

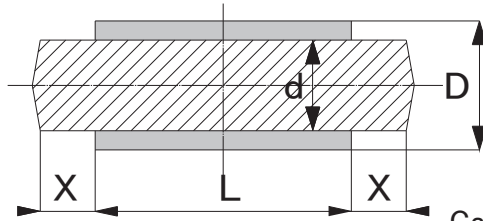


## Dasar design core print

Detail ref. [Jenis pattern dan cost]

- Tujuan core print : ①Menetapkan posisi core ②menstabilkan core ③ ventilasi untuk gas yg dihasilkan
- Design core print : 「(Teori Archimedes) Volume benda yang masuk sebagian atau keseluruhan, sama dengan gaya angkat yang diterima seberat cairan yang dipindahkan = teori desain core print」

Design core print samping (contoh)



X; Panjang core print      Sf; safetyfactor 3~6  
 $\gamma_1$  Density leburan(6.9; FC)  $\sigma_c$ ; mampu tekan greensand  
 $\gamma_2$  Density pasir(1.6)

$$\text{Gaya angkat} = (\gamma_1 - \gamma_2) \times \pi / 4 d^2 L \quad \dots(1)$$

$$\text{Gaya topang core print} = 2 \times d \cdot \sigma_c / Sf \quad \dots(2)$$

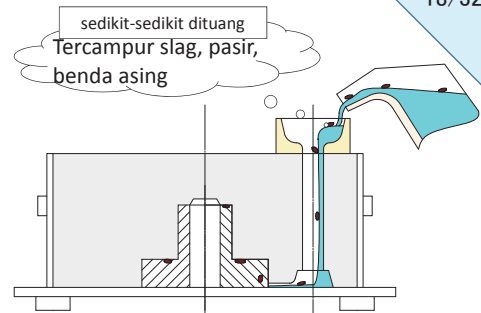
**Gaya topang core print  $\geq$  gaya angkat**

$$2d \times \sigma_c / Sf \geq (\gamma_1 - \gamma_2) \cdot \pi / 4 d^2 L \quad \dots (3)$$

$$X \geq \frac{(\gamma_1 - \gamma_2) \times \pi / 4 d^2 L}{2 \times d \cdot \sigma_c / Sf} = \frac{(\gamma_1 - \gamma_2) \times \pi d L S f}{2 \sigma_c 4} = \frac{(\gamma_1 - \gamma_2) \times \pi d L S f}{8 \sigma_c}$$

## Dasar pekerjaan penuangan

- (1) Cairan dituang dengan 「tenang • cepat」
- (2) Sprue cup selalu kondisi penuh saat penuangan
- (3) Hindari luka bakar dan bencana



## Yang harus diketahui penuang

1. Apakah ladle cukup kering
2. Apakah suhu tuang sesuai
3. Apakah selalu difikirkan bentuk dan berat barang produk
4. Apakah slag sudah cukup dibersihkan
5. Apakah komunikasi dengan operator crane berjalan baik



# Dasar Finishing (repair welding)

Detail ref. 「Repair welding benda steel casting」 「sikap dasar penanganan reject • penanganan defect inklusi pasir dan gas defect」

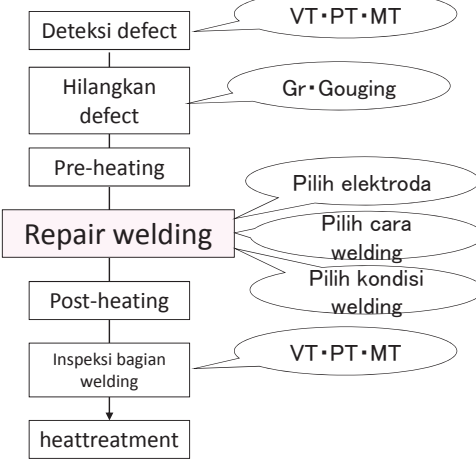
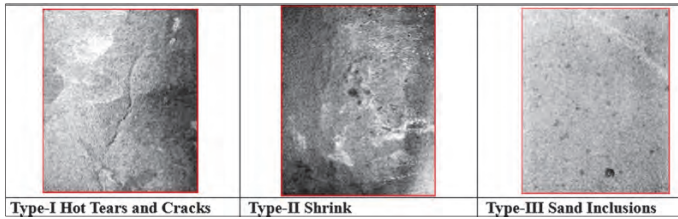
[Prose repair welding benda steel casting]

[item urutan proses welding]

- ① (sebelum treatment) hilangkan dengan sempurna bagian defect
- ② Lakukan pre-heat • post-heat
- ③ QA dari bagian welding



[Pastikan menggunakan pelindung mata]



# Dasar Finishing(Finishing gerinda)

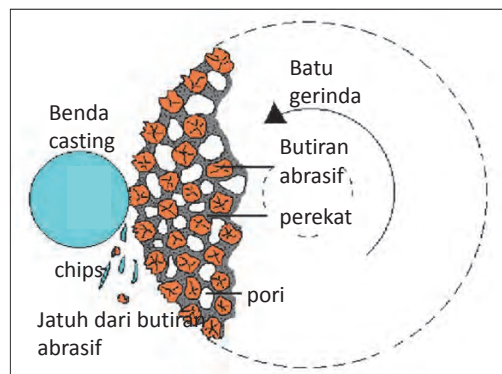
Detail ref. 「Finishing menggunakan batu gerinda」 「Safety dan 5S pabrik casting」

[Item urutan pekerjaan finishing gerinda]

- ① Melakukan pemutaran kosong sebelum kerja(mencegah lepas batu gerinda)
- ② Sikap kerja benar dan menggunakan alat pelindung
- ③ Lindungi mata(mencegah chips terbang)

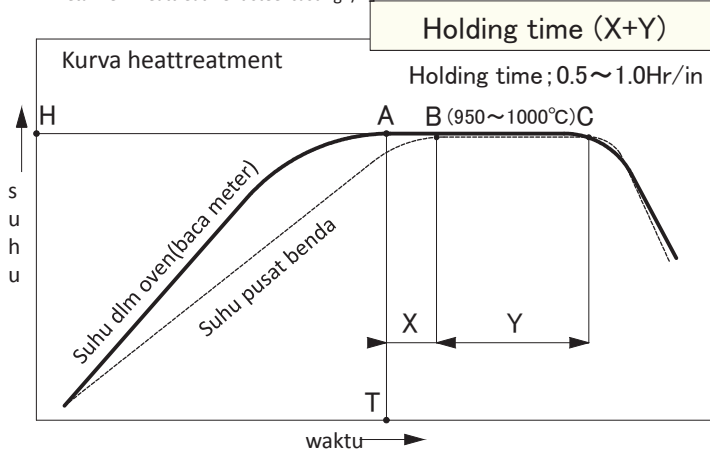


## Gambar model gerinda

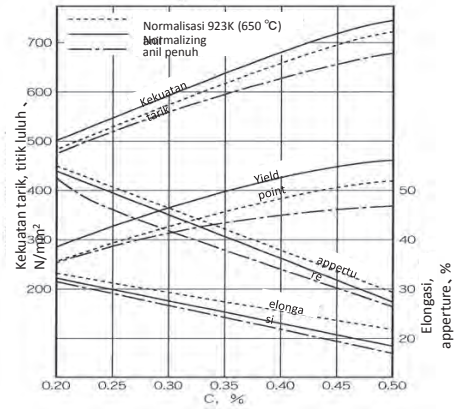


# Dasar Heattreatment

Detail ref. 「Heattreatment steel casting 1/2」



## Pengaruh heattreatment terhadap mechanical properties



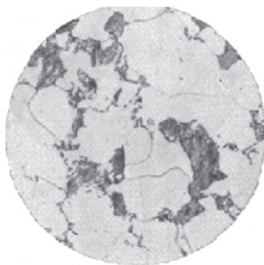
Suhu heattreatment yg sesuai (H)

$$H = A3 \text{ transformation point } (911^\circ\text{C}) + 50 \sim 80^\circ\text{C} \\ (950 \sim 1000^\circ\text{C})$$

# Struktur heattreatment

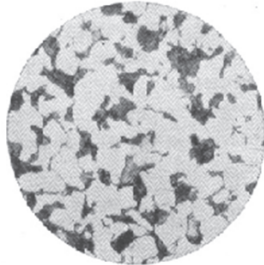
Detail ref. 「Heattreatment dari steel casting 1/2」

Ferrite+Pearlite (struktur kasar)



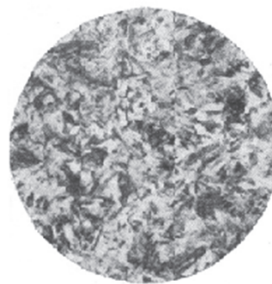
Annealing (900°C\*2H)

Ferrite + pearlite (struktur halus)



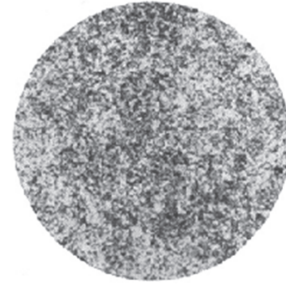
Normalizing (900°C\*2H)

Martensitic structure



Quenching (870°C\*2H; oil quenching)

Sorbite structure



Tempering (600°C)

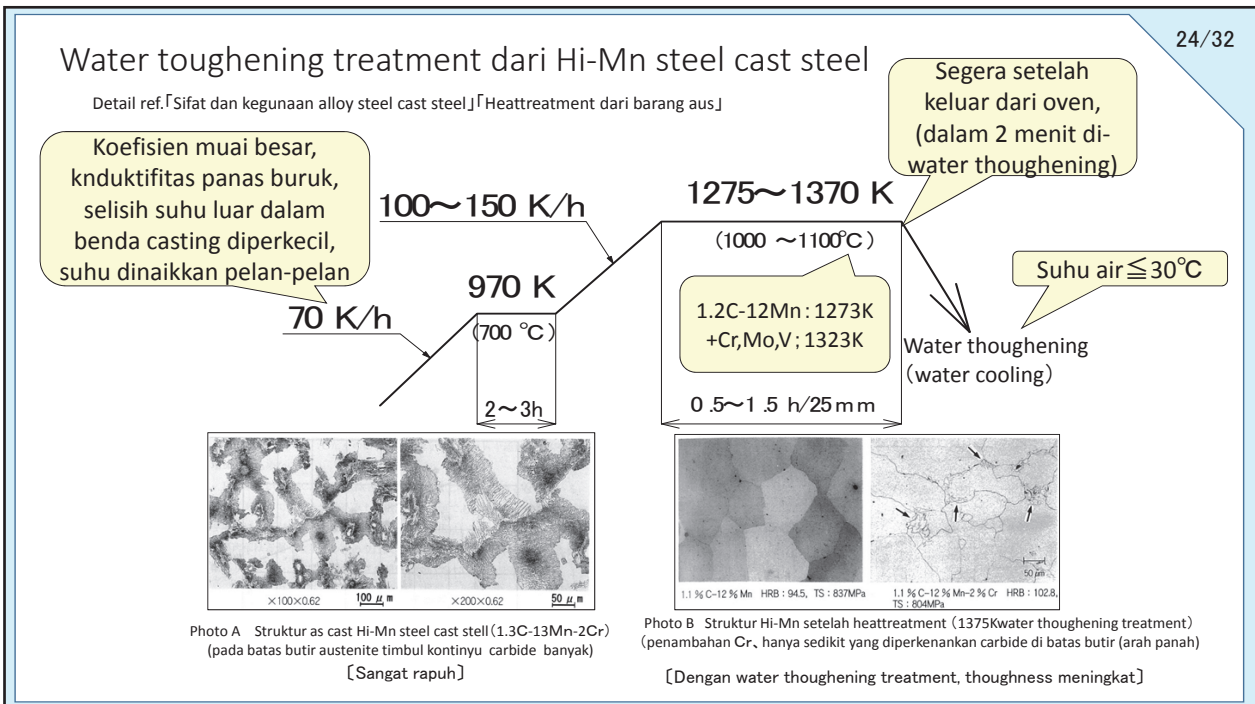


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Heattreatment control (contoh)

Detail ref. 「Heattreatment dari steel casting 1/2」

Proses	Item control	Target control	Remark
Diffusion annealing	suhu	950°C	
Pre-heat	suhu	300~500°C	C% ≥ 0.30, Mencegah crack ketika riser cutting untuk benda casting besar
Riser cutting	Pencegahan crack		Oxygen acetylene / propane gas
Full Annealing Normalizing Quenching	Suhu pemanasan	50~100°C/Hr	Secara ekonomis dapat juga pemanasan mendadak
	Suhu pemanasan max	A3 transformation point + 50~80°C (950~1000°C)	
	Holding time	60min/in	Quenching, 30min/in
	Kecepatan pendinginan	30~60°C/Hr	Sampai dengan 400°C pendinginan oven, setelahnya pendinginan
Pendinginan udara (Normalizing)		Pendinginan udara atau dikipas lembut	
	Pendinginan mendadak (quenching)	Water, oil, spray, air blast	
Tempering	Suhu pemanasan	50~100°C/Hr	Lakukan berkelanjutan Normalizing, quenching untuk menghilangkan stress, pengaturan kekerasan,
	Suhu pemanasan max	600~650°C	
	Holding time	60min/in	
Repair	EW pre-heat	150°C keatas	Adalah suatu keharusan pre-heat, untuk repair defect besar
Annealing suhu rendah	Suhu pemanasan	550~650°C	Menghilangkan stress dalam



### Item Quality Assurance dari benda cast steel

Detail ref. [Penanganan Reject dan QA]

	Item QA	Item konfirmasi	Metoda deteksi
1	Material	struktur • mechanical properties	mikroskop • Tensile testing machine
2	Komposisi kimia	C,Si,Mn,P,S (5 unsur)	spectrometer
3	Internal defect	shrinkage • gas defect	Non destrucyive test(RT/UT) cutting
4	Dimensi	bentuk • panjang • ketebalan	3D measuring device • scribe Inspeksi dimensi
5	Appearance	crack • hot tear • inklusi pasir Gas defect dll	Visual test (VT), color check (PT), Magnetic flaw test(MT)

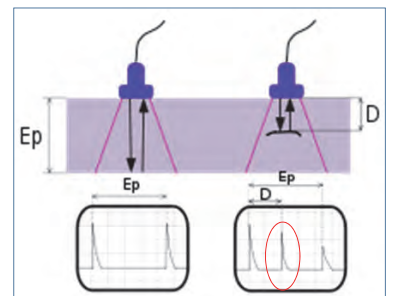
### Deteksi Defect appearance • internal

Detail ref. [Repair welding untuk benda cast steel]

Jenis defect	Bagian timbul yg utama	Metoda deteksi				
		VT	PT	MT	UT	RT
Inklusi pasir (appearance)	Seluruh permukaan benda casting	⊙	○	○	×	×
Gas defect (appearance)	Permukaan upper mold permukaan core	⊙	○	○	×	×
crack (appearance)	Bagian perubahan ketebalan bagian R	○	⊙	⊙	×	×
Shrinkage lembut (appearance)	Permukaan machining	×	⊙	⊙	×	×
shringkage (internal)	Internal defect	×	×	×	⊙	⊙



PT: Penetrant Testing



UT: Ultrasonic Testing

⊙metode paling efektif ○metode deteksi efektif × tidak dapat deteksi

VT: Visual Testing PT: Penetrant Testing MT: Magnetic Particle Testing UT: Ultrasonic Testing RT: Radiographic Testing

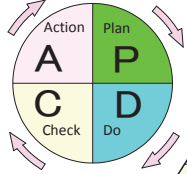
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## Dasar control pabrik

Detail ref. 「Safety dan 5S pabrik casting」 「Mekanisme pabrik yang menguntungkan1」 「Dasar aktifitas kaizen bisnis」

Dasarnya adalah membuat seluruh karyawan memiliki keinginan ber-kaizen, mengembangkan dengan giat aktifitas 5S

Kaizen berulang



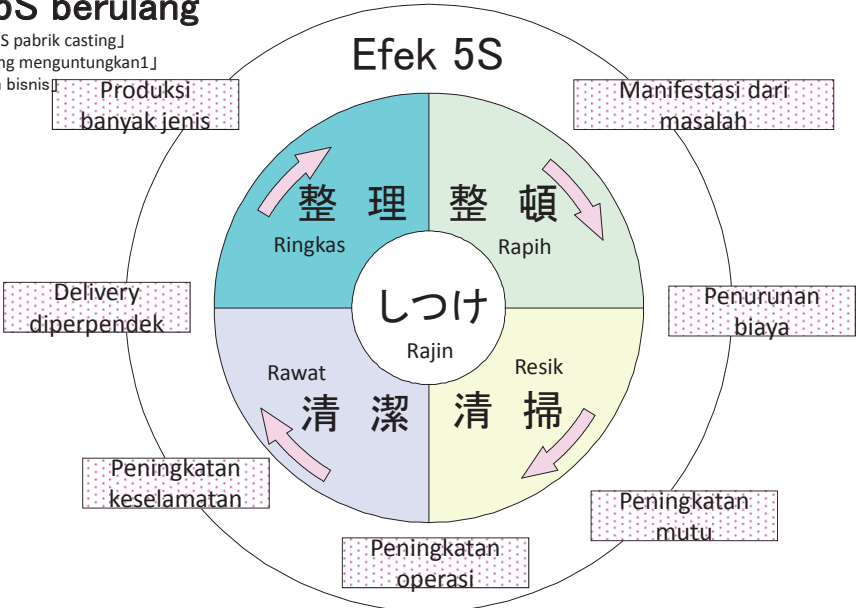


28/32

## Aktifitas 5S berulang

Detail ref. 「Safety dan 5S pabrik casting」 「Mekanisme pabrik yang menguntungkan1」 「Dasar aktifitas kaizen bisnis」

### Efek 5S



29/32

## Penyelesaian masalah dengan Prinsip 3 gen(Prinsip 5 gen)

Detail ref. 「Pemusnahan reject dan QA」

Sikap menelusuri yang sebenarnya dari kejadian/benda(reject • permasalahan)

30/32

## Visualisasi permasalahan dan skala prioritas menggunakan QC 7 tools

Detail ref. 「QC circle activity dan QC7 tools」

sumber : Imazato QC7 tools hidekazu system P13

[Permasalahan ditemukan]  
Grafik • checksheet • stratifikasi

① Grafik

profit

bulan

② checksheet

x
x x
x x x x
x x
x

③ stratifikasi

[Menyelidiki penyebab]  
Diagram Pareto • Cause and effect diagram • histogram

④ Diagram Pareto

J S Y B K A S

⑤ Cause and effect diagram

⑥ Histogram

[konfirmasi effect]  
Scatter diagram (graph control chart)

⑦ Scatter diagram

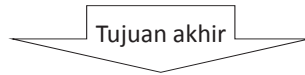
Profit

Jumlah tamu toko

# Penghilangn reject dan QA

Detail ref.「Penghilangan reject dan QA」

1. Penghilangan reject adalah berkumpulnya secara totalitas teknologi casting  
 [ Pemahaman tentang teknologi dan keterampilan, seperti melting, penelitian dan pembuatan inti, cor finish dan inspeksi ]
2. Untuk menyelidiki penyebab sebenarnya fenomena reject, manfaatkan prinsip 3 gen (5 gen), dan diselesaikan oleh semua orang
3. Aktifitas penghilangan reject , adalah dengan memanfaatkan QC 7 tools, sebarakan Kegiatan dengan rasional dan efisien penyebaran

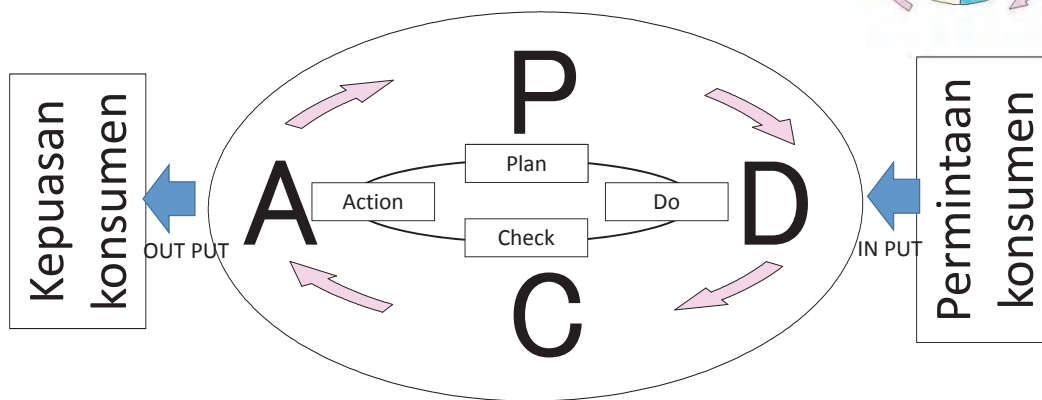
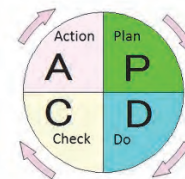


Peningkatan kepuasan konsumen (Penghilangan reject dan pencegahan pengaliran reject)

# Peningkatan kepuasan konsumen

Detail ref.「Penghilangan reject dan QA」

Quality Management System(QMS) ; Kaizen berkelanjutan  
 QMS(Quality Management System)



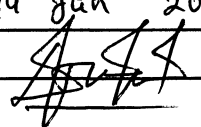
ANNEX 7

Quality Evaluation Sheet on Target Castings

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**JICA PROJECT TEAM**

date 19 Jan 2017  
 HINABI 

Tabel evaluasi quality target casting

Evaluasi  $\Delta$ : Quality perlu lebih ditingkatkan  $\circ$ ; Sebagian tidak sesuai, secara umum sesuai  $\odot$ ; sesuai

Pembuat benda trial	Target Casting	Material	Item evaluasi quality							Evaluasi total ( $\Delta$ $\circ$ $\odot$ )	Komentar
			komposisi kimia	sifat mekanis	dimensi	appearance	machining	Dokumen			
Polman Bandung	1 BRKT(Komatsu)	SCSiMn2B	$\circ$	$\circ$	$\Delta$	$\circ$	$\Delta$	$\circ$	$\circ$		

- Note:
1. Need to be Reuse pattern for N5 Dimension. <It Point>
  2. Machining jig are Necessary
  3. As general casting <as cast in Ot>
  4. Not yet check about porosity  
 <from appearance mostly porosity on Cope Area>



PT.SUMITOMO.S.H.I. CONSTRUCTION MACHINERY INDONESIA

Evaluasi Quality Target Cating

Evaluasi; Δ; Perlu lebih ditingkatkan kualitas ○; Sebagian ada yang tidak sesuai tetapi secara umum ◎; sesuai

Pembuat tria	Target Casting	Bahan	Item evaluasi						Total evaluasi (Δ ○ ◎)	Komentar
			komposisi kimia	Mechanical properties	dimensi	appearance	machining	dokumen pendukung		
MIDC	1 BRKT(Sumitomo)	SCW480	○	○	Δ	Δ	Δ	◎	Δ	Porosity burr pin hole
	2 BOSS(S)	SCW480	○	○	Δ	Δ	Δ	◎	Δ	Porosity burr
	3 BOSS(L)	SCW480	○	○	Δ	Δ	Δ	◎	Δ	Porosity Burr
	4 SPROCKET (S)	SCMnCr48-M1 (JIS) (setara SCMnCr2B)	○	○	Δ	Δ	Δ	◎	Δ	Porosity Pin hole
Polman Bandung	5 SPROCKET (L)	SCMn3B	○	○	Δ	Δ	Δ	◎	Δ	
CV. KARYA HIDUP SENTOSA	6 BOSS(S)	SCW480	○	○	◎	◎	◎	◎	◎	
	7 BRKT(Sumitomo)	SCW480	○	○	Δ	Δ	Δ	◎	Δ	
PT Baja Kurnia	8 BOSS(L)	SCW480	○	○	Δ	Δ	Δ	◎	Δ	Porosity, burr

※Perhatian) Untuk Sprocket, dikarenakan tidak tersedianya fasilitas heattreatment (quenching/HF quenching), untuk saat ini barang diserahkan dalam bentuk as cast.

*[Signature]*  
Kabul p.

A7-2

## ANNEX 8

### Overviews of the Pre-training and the Training in Japan on Casting for Top Management in the Third Year

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## Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery

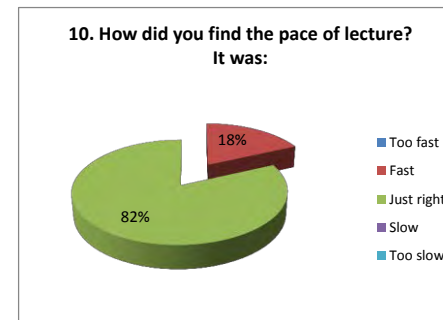
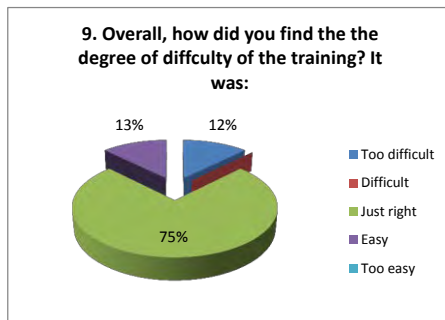
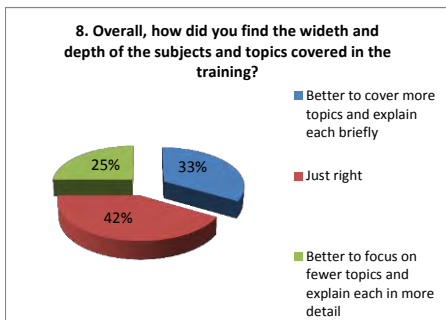
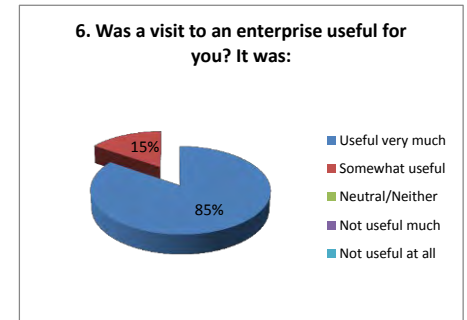
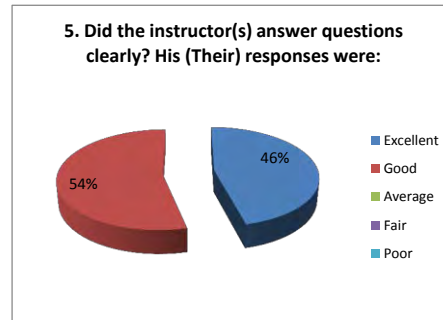
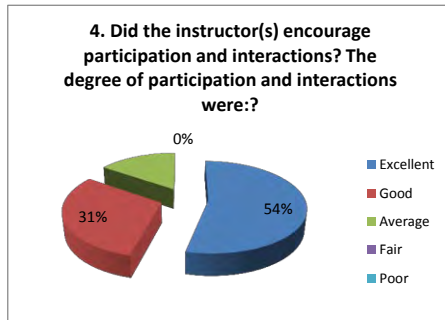
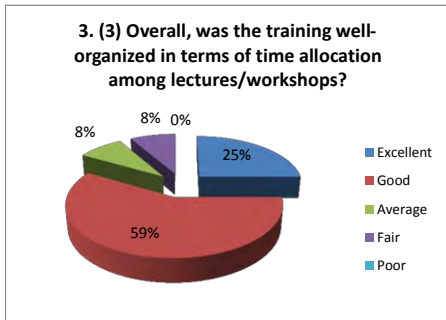
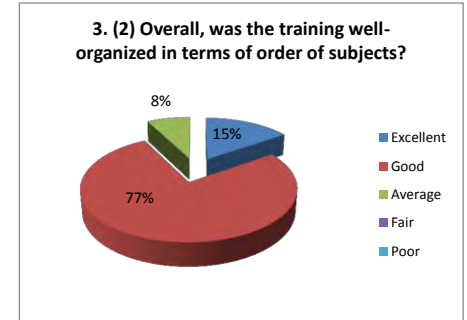
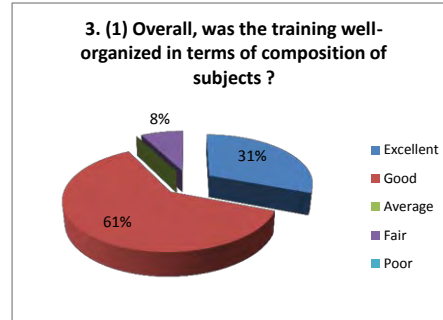
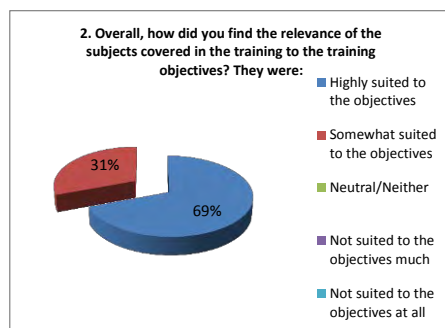


### Schedule Pelatihan Top Management dan Pengajar

#### (1) Pelatihan Pengecoran Indonesia (Pre-Training)

	Hari		Waktu	Isi Pelatihan	Pengajar
1	1-Aug	Senin	8:00 ~ 8:30	Pendaftaran	
			8:30 ~ 9:20	Pembukaan • Orientasi	JICA Team
			9:20 ~ 9:40	Istirahat	
			9:40 ~ 11:00	Kapasitas Manajemen (Terhadap Customer)	N. ARAI
			11:00 ~ 11:30	Pengumuman	
			11:30 ~ 12:30	Istirahat	
			12:30 ~ 13:50	Jenis dan guna casting	N. ARAI
			13:50 ~ 14:00	Istirahat	
			14:00 ~ 15:20	Sifat logam lebur	Dagus Resmana Djuanda
			15:20 ~ 15:30	Pengumuman	
2	2-Aug	Selasa	8:30 ~ 9:50	Kebutuhan teknologi Steel casting dan pengembangannya	N. ARAI
			9:50 ~ 10:00		
			10:00 ~ 11:20	Struktur pemdatan dan karakteristik casting	N. ARAI
			11:20 ~ 11:30	Pengumuman	
			11:30 ~ 12:30	Istirahat	
			12:30 ~ 13:50	Cast steel Proses	N. ARAI
			13:50 ~ 14:00	Istirahat	
			14:00 ~ 15:20	Heat treatment dan struktur Cast steel	N. ARAI
			14:00 ~ 15:20	Pengumuman	
3	3-Aug	Rabu	8:30 ~ 9:50	Cast steel Disain casting	Husen Taufiq
			9:50 ~ 10:00	Istirahat	
			10:00 ~ 11:20	Realisasi Teknologi peleburan baja cor	N. ARAI
			11:20 ~ 11:30	Pengumuman	
			11:30 ~ 12:30	Istirahat	
			12:30 ~ 13:50	Aktual Teknologi Molding baja	N. ARAI
			13:50 ~ 14:00	Istirahat	
			14:00 ~ 15:20	Cost struktur dari casting	N. ARAI
			14:00 ~ 15:20	Pengumuman	
4	4-Aug	Kamis	~	P.T. Komatsu Indonesia	
5	5-Aug	Jumat	8:30 ~ 9:50	Safety dan 5S casting Factory	N. ARAI
			9:50 ~ 10:00	Istirahat	
			10:00 ~ 11:20	Teknik perbaikan Kualitas	N. ARAI
			11:20 ~ 11:30	Pengumuman	
			11:30 ~ 13:00	Istirahat	
			13:00 ~ 14:20	Penanganan Reject dan Quality Assurance	N. ARAI
			14:20 ~ 14:30	Istirahat	
			14:30 ~ 15:50	Teknik Perbaikan Proses	N. ARAI
			15:50 ~ 16:00	Pengumuman	

Training for Top Management (Casting) (1 - 5 August, 2016) Feedback



**7. Please give us any comments and/or suggestions on the visit to the enterprise.**

Interesting and useful (3)  
More time desired (2)  
Better to visit an enterprise which is closer  
Very good (2)  
Useful, but operation rate was low  
Want to visit both a small enterprise and a large one to compare them  
Improvement needed

**11. Please name the subject or topic which you found the most valuable in the training.**

Steelcasting design  
Design, steel casting  
Process improvement  
Management, Needs and development of steel casting, Property of structure  
Property of  
Process improvement, Quality improvement  
Safety and 5S, Countermeasure for defects  
Case Study  
Topics related to steel casting melting, general information on Japan

**12. Please name, if any, subjects or topics which you need more explanation.**

Steel casting design  
Quality management, Production process of steel casting  
Calculation in the melting process  
Melting of steel casting (with actual cases and simulations)  
Heat treatment  
IE  
Process improvement  
Technology on casting with sand mold  
Stages and calculation of casting design, Calculation for detailed composition for steel casting

**13. Please name, if any, subjects or topics which you think should have been covered in the training.**

Defect inspection technology and good quality casting specifications  
Casting machinery  
Spout design for investment casting  
Countermeasure to reduce defects in the melting process

**14. Please name, if any, subjects or topics which you think may be deleted from the training.**

**16. Please give us any comments and/or suggestions.**

Pre-training is useful for the preparation for the Training in Japan  
Hope you continue training  
Met expectation. Cover fewer topics and explain more in details  
Interesting and useful. Hope you continue to hold training  
Hope you hold training more often. Disseminate training information to make more enterprises and people get to know and take interested in the training/  
Useful. Appreciate if more cases and problems in Japan are covered  
Very good for gaining knowledge  
Want follow-up after the training

Project on Enhancement of  
Metalworking Capacity for Supporting  
Industries of Construction Machinery  
in Indonesia

Completion Report on Training in Japan  
(Casting)  
(The 3rd)

September 2016

UNICO INTERNATIONAL CORPORATION  
Japan Development Service Co., Ltd.

## 1. Report on Casting Technology Training

### 1.1 Course Outline

(1) Course's title: Training on Casting Technology (with Focus on Steel Casting)

(2) Training period

August 21, 2016 (Sun) (Participants arrived in Japan) - September 3, 2016 (Sat)  
(Participants returned to Indonesia) - 14 days

(3) Number of participants and classification by organization

This training course was conducted for staff in the metalworking organizations relating to the "Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia" and personnel of related enterprises in top management positions, totaling 13<sup>1</sup> persons.

(The list of participants is shown in 2. Appendix 2.1)

Table 1 Classification of Participants in the Training Course by Organization

Ministry of Industry (MOI)	1
Metal Industry Development Center (MIDC)	2
Politeknik Manufaktur Negeri Bandung (POLMAN Bandung)	2
Politeknik Manufaktur Negeri Ceper (POLMAN Ceper)	3
Private companies	5
Total	13

Source: JICA Project Team

### 1.2 Training Outline

(1) Training design concept

The training course for top management is planned to be conducted for three times, once in each of the three consecutive years from 2014, and this course constitutes the third one. As in

<sup>1</sup> This training course was conducted simultaneously with the Training on Production Management, as a part of the "Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia." The original project plan expected 15 participants in the casting technology course and 5 in the production management course based on the Record of Discussions (R/D) of the Ministry of Industry (MOI) and Japan International Cooperation Agency (JICA). However, since the MOI requested to increase the number of participants in the latter, the project reduced that of this course to 13 while increasing that of the production management course to seven.



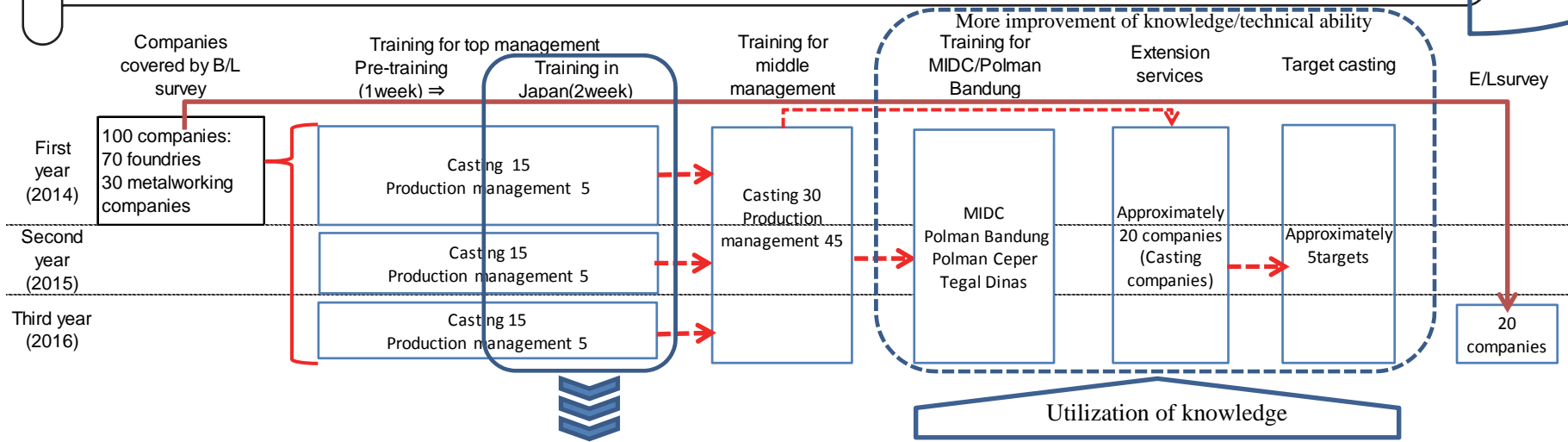
the last two courses, it was implemented as a package combined with pre-training in Indonesia, which was held on August 1-5.

As for the objective and course items, the training course was designed to promote further understanding of casting technology (with focus on steel casting) on the basis of what participants learned in the pre-training course, and learn how Japanese casting enterprises run factories as well as how support institutions help enterprises under the industry-government-academia partnership. As knowledge relating to production management is essential to reliable production of high quality casting products, some lectures and factory visits have covered production management.

Fig.1 shows the project goal, outcome and their connection to major project activities in the "Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia." The trainees are expected to develop target castings and provide on-site guidance to enterprises with fellow middle management course trainees in order to achieve the project goal: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.

Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia  
 Project goal: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations  
 Outcome: (1) Technical service providing capacity of targeted metalworking organizations for foundries on casting (in particular, steel casting) including production management is improved. (2) Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved. (3) An action plan for sustainable development of service providing capability on metalworking for supporting industries or construction machinery is drafted.

Achievement/Realization



**Training on Casting Technology (with Focus on Steel Casting)**

Training goal: To learn and understand casting technology (in particular cast steel) required for staff in the metalworking organizations and top management of private enterprises in related industry

Training items: (1) To learn casting (with focus on cast steel) technology (2) To understand trends relating to the Japanese construction machinery industry and manufacturing in general (3) To review examples of support systems by Japanese technical support organizations (4) To review examples of working of Japanese certification system relating to casting skills (5) To visit small- and medium-sized foundries in Japan including steel casting to learn their practice for the purpose of applying it to the participants' organizations and enterprises

Source: JICA Project Team

Fig.1 Overall Conceptual Design of the Training Course on Casting

## (2) Training schedule and course outline

Table 2 shows the training schedule. More detailed timetable is shown in Appendix 2.2 “Detailed Training Plan (Actual Version).” The field tour to a local foundry scheduled on August 30 was canceled due to a typhoon.

Table 2 Training Schedule and Course Outline

Date	Time	Type	Content	Venue
21-Aug	~		Arrival	
22-Aug	10:00 ~ 12:30		Briefing	TIC: Main Building SR403
	13:30 ~ 14:50	Lecture	Systems to make workshops profitable (1)	
	15:00 ~ 16:30	Lecture	Systems to make workshops profitable (2)	
23-Aug	9:00 ~ 10:20	Lecture	Casting process	TIC: Main Building SR406
	10:30 ~ 12:00	Lecture	Types and costs of patterns	
	13:00 ~ 14:20	Lecture	Properties and uses of alloy steel casting	
	14:30 ~ 16:00	Lecture	Casting design techniques for steel castings	
24-Aug	10:00 ~ 12:00	Field tour	Field tour to a foundry	Nippon Chuzo Co., Ltd.
	13:00 ~ 14:20	Lecture	Practical melting techniques for steel casting	
	14:30 ~ 16:00	Lecture	Practical molding techniques for steel casting	
25-Aug	10:20 ~		Move to Morioka	Iwate Univ. Dept of Sci. and Eng. Common Building for Research and Study Room 208
	14:30 ~ 16:00	Lecture	Iwate meister system: origins and results	
26-Aug	9:00 ~ 10:20	Lecture	Examples: guidance for local foundries by Research	ditto
	10:30 ~ 12:00	Field tour	Field tour to Research Center for Casting Technology	
	13:00 ~ 14:20	Lecture	Examples: management of small- and mid-sized iron f	
	14:30 ~ 16:00	Lecture	Properties and uses of carbon steel casting	
27-Aug	9:00 ~ 12:00	Lecture	Technology-driven management (manufacturing technology strat	ditto
	12:45 ~		Move to Sendai	
28-Aug			Self-education and report preparation	
29-Aug	7:00 ~		Move to Kitakami	Iwate Iron Co., Ltd. Oshu Casting Technology Exchange Center Mizusawa Chuzosho Co., Ltd.
	9:00 ~ 10:30	Field tour	Field tour to a foundry	
	11:30 ~ 13:00	Lecture	Industry-government-academia partnership underway	
	14:00 ~ 16:00	Field tour	Field tour to a foundry	
	16:10 ~		Move to Akita	
30-Aug	10:20 ~ 12:00	Field tour	Field tour to a foundry (canceled due to a typhoon)	Hokko Metal Co., Ltd.
	13:30 ~ 15:00	Field tour	Field tour to a foundry (canceled due to a typhoon)	Tohoku Kikai Seisakusho Co., Ltd.
	15:10 ~		Move to Fukushima	
31-Aug	9:00 ~ 9:15	Field tour	Overview of Fukushima Steel Works Co., Ltd.	Fukushima Steel Works Co., Ltd.
	9:20 ~ 10:40	Lecture	Defects and countermeasures of steel casting	
	10:50 ~ 12:00	Lecture	Heat treatment techniques for steel casting	
	13:00 ~ 15:00	Field tour	Field tour to a foundry	
	15:10 ~ 16:00	Field tour	Q & A	
	16:10 ~		Move to Tokyo	
1-Sep	9:00 ~ 10:20	Lecture	Formulation of business plans and production plans	TIC:SR201 [with traing No J1621900]
	10:30 ~ 12:00	Lecture	Process Management (Waste Elimination, Toyota Produ	
	13:00 ~ 14:30	Lecture	Self-education and report preparation	
2-Sep	10:30 ~ 12:00	Lecture	Casting technology trend in Japan	TIC: Annex Room A
	13:30 ~ 16:30		Wrap-up Meeting (Presentation/Evauation)	TIC: Annex Room A+B
3-Sep	~		Departure	

Source: JICA Project Team

## (3) Training curriculum

Table 3 presents a general outline of the training curriculum that has been planned according to the training goals and items.

Table 3 General Outline of the Training Curriculum

Training goal	Training item	Training programs
To learn and understand casting technology (with focus on steel casting) required for staff of technical support organizations and management of private enterprises.	1) To learn casting technology (with focus on steel casting)	<ul style="list-style-type: none"> <li>a. Systems to make workshops profitable (1) (2)</li> <li>b. Casting Process</li> <li>c. Types and costs of patterns</li> <li>d. Property and use of alloyed steel castings</li> <li>e. Casting design techniques for steel casting</li> <li>f. Practical melting techniques for steel casting</li> <li>g. Practical molding techniques for steel casting</li> <li>h. Property and use of carbon steel casting</li> <li>i. Defects and countermeasures of steel casting</li> <li>j. Heat treatment of steel casting</li> <li>k. Formulation of business plans and production plans</li> <li>l. Process management (Waste Elimination, Toyota Production System, Total Quality Management)</li> </ul>
	2) To understand trends relating to the Japanese construction machinery industry and manufacturing in general	<ul style="list-style-type: none"> <li>m. Technology-driven management (manufacturing technology strategy, management strategy)</li> <li>n. Casting technology trend in Japan</li> </ul>
	3) To learn examples of support systems by Japanese technical support organizations	<ul style="list-style-type: none"> <li>o. Example: guidance for local foundries by Research Center for Casting Technology of Iwate University</li> <li>p. Field tour to Research Center for Casting Technology of Iwate University</li> <li>q. Industry-government-academia partnership in practice</li> </ul>
	4) To learn examples of Japanese certification system relating to casting skills	<ul style="list-style-type: none"> <li>r. Iwate meister system: origins and results</li> </ul>

Training goal	Training item	Training programs
	5) To visit metal working companies in Japan including steel casting to learn their practice for the purpose of applying it to the participants' organizations and enterprises	s. Field tour to a foundry (Nippon Chuzo Co., Ltd.) t. Example: management of small-and mid-sized foundry u. Field tour to a foundry (Iwate Iron Co., Ltd.) v. Field tour to a foundry (Mizusawa Chuzosho Co., Ltd.) w. Field tour to a foundry (Hokko Metal Co., Ltd.) -Canceled x. Field tour to a foundry (Tohoku Kikai Seisakusho Co., Ltd.) -Canceled y. Field tour to a foundry (Fukushima Steel Works Co., Ltd.)

Source: JICA Project Team

General outlines of individual training programs are as follows.

- 1) To learn casting technology (with focus on steel casting)
  - a. Systems to make workshops profitable (1) (2) (lecture)
 

Lecturer: Mr. Ikuo Ichino (Senior consultant, Japan Development Service, Co., Ltd.)

Outline: A general outline of systems to make foundries profitable and their basic concepts (break-event point, basics of production activity, quality control and environmental management, concept and elimination of wastes, factory unit cost management, and cost reduction techniques)
  - b. Practical melting techniques for steel casting (lecture)
 

Lecturer: Mr. Ikuo Ichino (Senior consultant, Japan Development Service, Co., Ltd.)

Outline: Production of cast steel in Japan and major issues, standard cast steel production process, types, structures and uses of melting furnaces, and defects attributable to melting process
  - c. Types and costs of patterns (lecture)
 

Lecturer: Mr. Ikuo Ichino (Senior consultant, Japan Development Service, Co., Ltd.)

Outline: Types and characteristics of patterns, processes and key points in design of patterns, price estimation for pattern-making costs, and trend of pattern-making
  - d. Properties and uses of alloy steel casting (lecture)
 

Lecturer: Mr. Ikuo Ichino (Senior consultant, Japan Development Service, Co., Ltd.)

Outline: Types, characteristics and uses of alloy steel casting

- e. Casting design techniques for steel castings (lecture)  
Lecturer: Mr. Ikuo Ichino (Senior consultant, Japan Development Service, Co., Ltd.)  
Outline: Casting design procedures, and defect prevention measures using simulation analysis
  
- f. Practical melting techniques for steel casting (lecture)  
Lecturer: Mr. Naotoshi Kurusu (Director, Nippon Chuzo Co., Ltd.)  
Outline: Types, structures and uses of melting furnaces, and defects attributable to melting process
  
- g. Practical molding techniques for steel casting (lecture)  
Lecturer: Mr. Naotoshi Kurusu (Director, Nippon Chuzo Co., Ltd.)  
Outline: Types of molding processes, their key points, types of casting sand, production processes and examples of use
  
- h. Properties and uses of carbon steel casting (lecture)  
Lecturer: Mr. Sadato Hiratsuka (Professor, Department of Science and Engineering of Iwate University)  
Outline: Chemical components of carbon cast steel, impacts of constituent elements, properties and uses of carbon steel casting
  
- i. Defects and countermeasures of steel casting (lecture)  
Lecturer: Mr. Kazuhiro Sato (Director, Fukushima Steel Works Co., Ltd.)  
Outline: Quality improvement measures for steel castings (burn-in, foreign materials biting, scab, shrinkage cavity, gas and measures against defect by cracking)
  
- j. Heat treatment techniques for steel casting (lecture)  
Lecturer: Mr. Kazuhiro Sato (Director, Fukushima Steel Works Co., Ltd.)  
Outline: Types of heat treatment methods and processes
  
- k. Formulation of business plans and production plans (lecture)  
Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)  
Outline: Policy management, target management, and day-to-day management, key points in standardization and defect reduction, and incorporation of quality in the production process
  
- l. Process Management (Waste Elimination, Toyota Production System, Total Quality Management) (lecture)  
Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)  
Outline: Process management based on the Toyota Production System including Kanban method and Kaizen activities

- 2) To understand trends relating to the Japanese construction machinery industry and manufacturing in general
- m. Technology-driven management (manufacturing technology strategy, management strategy) (lecture)  
Lecturer: Mr. Masayoshi Watanabe (Guest professor, Department of Science and Engineering of Iwate University)  
Outline: Japan's development strategies and strength of Japanese style mono-zukuri (manufacturing) (mass production, human resources and uniformity), and importance of role of the machine parts industry as the basis of manufacturing
  - n. Casting technology trend in Japan (lecture)  
Lecturer: Mr. Yoshihiro Kakuta (Managing director, Japan Foundry Society, Inc.)  
Outline: History of Japan's casting industry, steel casting technology, industry trends, need for upgrading of technological capability and future schemes for securing and strengthening of human resources
- 3) To learn examples of support systems by Japanese technical support organizations
- o. Example: guidance for local foundries by Research Center for Casting Technology of Iwate University (lecture)  
Lecturer: Mr. Hiroshi Horie (Guest professor, Department of Science and Engineering of Iwate University)  
Outline: Role and activity record of Research Center for Casting Technology, and cases of local and international contributions by the center
  - p. Field tour to Research Center for Casting Technology of Iwate University (field tour)  
Outline: Field tour with focus on learning the current state of research and development systems and equipment relating to dies/molds, casting, and complex devices, together with industry-academia joint research facilities and equipment that serve as a core of R&D and human resource development relating to mono-zukuri technology, and actual working of industry-academia collaboration
  - q. Industry-government-academia partnership underway (lecture)  
Lecturer: Mr. Yoshiyuki Shoubuzawa (Specially appointed professor, Department of Science and Engineering of Iwate University)  
Outline: Ongoing collaborations by Iwate University, Iwate Industry Promotion Center, Iwate Prefecture Industrial Technology Center, and companies in Iwate Prefecture, issues facing the foundry industry in Iwate, collaboration by Mizusawa Casting Study Group (under the Mizusawa Foundry Industry Cooperative), Iwate University, and Iwate Prefecture Industrial Technology Center, and the outcomes of related technical development initiatives in response to the needs of companies in the prefecture

- 4) To learn examples of working of Japanese certification system relating to casting skills
- r. Iwate meister system: origins and results (lecture) -canceled; course materials have been distributed  
Lecturer: Mr. Sadahito Hiratsuka (Professor, Department of Science and Engineering of Iwate University)  
Outline: The Iwate meister fostering project designed to train “human resources for 21st century manufacturing” who work for local enterprises and are capable of contributing to local development, and an education curriculum for molding and foundry engineering in the graduate school of Iwate University, which is expected to serve as a place of human resource development of the project, and the meister accreditation system
- 5) To visit metal working companies and construction machinery companies in Japan including steel casting to learn their practice for the purpose of applying it to the participants’ organizations and enterprises
- s. Field tour to a foundry (Nippon Chuzo Co., Ltd.) (field tour)  
Outline: Field tour to observe and study production systems for cast steel products by a large scale company in Japan
- t. Example: management of small- and mid-sized iron foundries (lecture)  
Lecturer: Mr. Kenzo Maeda (President, Shibata Seisakusho)  
Outline: General outline of Shibata Seisakusho, the company’s guiding precepts as casting specialist organization, the company’s management strategy based onSWOT analysis
- u. Field tour to a foundry (Iwate Iron Co., Ltd.) (field tour)  
Outline: Field tour to observe and study production systems and technologies for cast steel products and aluminum castings of all sizes
- v. Field tour to a foundry (Mizusawa Chuzosho Co., Ltd.) (field tour)  
Outline: Field tour to study integrated production systems operated by a small foundry in Japan, from casting to machining and coating
- w. Field tour to a foundry (Hokko Metal Co., Ltd.) (field tour) -canceled; course materials have been distributed  
Outline: Field tour to study production systems for cast iron products operated by a small foundry in Japan
- x. Field tour to a foundry (Tohoku Kikai Seisakusho Co., Ltd.) (field tour) -canceled; course materials have been distributed  
Outline: Field tour to study production systems for cast iron products operated by a



small foundry in Japan

- y. Field tour to a foundry (Fukushima Steel Works Co., Ltd.) (field tour)

Outline: Field tour to observe production systems for cast steel products and the Anzen Do-jo for safety education by a large scale company in Japan

### 1.3 Reviewing of the Training Course

#### (1) Lectures

Since the participants were dispatched from various organizations including government organization, research institution, educational institutions and private companies. Accordingly, their role in casting industry in Indonesia is different and therefore topics of lectures which they were interested in were varied. In response to the needs of each participant, lectures covered a wide range of contents.

Besides, as the levels of knowledge were not equally high among participants, lecturers carefully explained basic knowledge related to questions asked by participants. As a result, some trainees commented that “a lecture was well explained and was helpful to understand,” while other trainees stated that “I expected to have lectures of higher level” in the feedback.

#### (2) Discussion, practical training, workshop, and presentation

Trainees performed presentation on the topics below in the wrap-up meeting held in the afternoon of September 2, the final day of the training course. For this presentation, the trainees separated into three groups: (Group 1) Trainees from MOI and MIDC, (Group 2) Trainees from Polman Bandung and Polman Ceper, (Group 3) Trainees from private companies.

- 1) Valuable or impressive items, learning experiences
- 2) Possible application of learnings in activities of their organizations and workplaces (draft plan)

Group 1 proposed a draft plan composed of awareness raising of personnel about importance of quality and standardization, joint research and development combined with financial support, and improvement of the quality control system by installation of equipment for nondestructive product testing. Group 2 listed implementation of 5S and safety management in laboratories, knowledge sharing with private enterprises on what they have learned in this training program, and provision of technical advice for small and medium sized enterprises. Group 3 proposed taking measures to encourage private company’s personnel to voluntarily wear protective equipment and thereby eradicate industrial accidents: implementation of safety education in collaboration with government and educational institutions, and setting standards for protective equipment.

### (3) Field tour

The training program included field tours of small/medium and large sized foundry companies. To make field tours became a more fruitful learning opportunity for the trainees, the lecturer who specialized in casting technology advised them in advance about points to pay attention to and items which should be questioned upon. However, since two field tours had to be canceled due to the typhoon, it appeared that some trainees wanted to have further opportunities to visit local foundries. Also, although it is natural for the Japanese enterprises to protect business secrets, the number of opportunities when the trainees could take photos of manufacturing sites decreased comparing with the last year and the year before last, which was disappointing for some trainees.

While many manufacturing companies in Indonesia tend to underestimate safety education and safety measures, a field tour to the Anzen Do-jo at Fukushima Steel Works Co., Ltd. became a remarkable opportunity to make them recognize the importance. On the other, there was a comment from a trainee that implementation of 5S, which has been covered in lectures held before the field tours, was not sufficiently implemented in some field tour sites.

### (4) Training period, arrangement of lecture and field tour sessions, and course content

As previously mentioned, the training course was implemented as a package combined with the five-day pre-training course in Indonesia. The course content was designed with the same goals and items as last year, with a primary aim to present an overall view of casting technology with emphasis on cast steel, together with basic concepts of quality control that those in top management positions need to understand, while covering key information on a support system for companies, which can be useful for staff members of support organizations.

This training course started with a lecture in Tokyo. After a field tour to a foundry in Kawasaki, an activity base was moved to Morioka, followed by a lecture in Iwate University and foundry field tours in the Tohoku region. Then, an activity base was returned to Tokyo for lectures and wrap-up. Frequency of travelling lowered comparing with last year and the year before last, although the schedule still included frequent travelling<sup>2</sup>: no one complained about the itinerary.

Even though it is difficult to always satisfy the trainees consisting of staff from metal processing support organizations, staff from educational institutions and managers in private companies, the training program was designed with a balance to meet the diverse needs of the trainees. For instance, a lecture of the industry-government-academia partnership showed a case study of a company supported in the partnership and its

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<sup>2</sup> Trainees participated in this course did not commented that “frequency of travel has been a problem.” However, there were some trainees who felt that traveling has been a burden among the Training on Production Management course which travelled together in same schedule.

accomplishment. Also, lecturers encouraged trainees from support institutions to consider what kind of support they could offer to improve business opportunities and to reduce threats for private companies of private enterprises.

(5) Course materials, facilities and equipment

As carried out last year and the year before last, text materials for the training course were all translated to Indonesian and distributed to the trainees on the first day, while text materials which lecturers permitted them to use back in Indonesia were summarized in CD-R and distributed to them on the last day of the training.

Lectures were held mainly in JICA Tokyo and the Department of Science and Engineering of Iwate University including the Research Center for Casting Technology, while some lectures took place in meeting rooms of companies visited in field tours. In both cases, lectures were delivered in an environment which trainees could concentrate on them. In foundries, the Panaguide (wireless audio transmitter/receivers) was supplied for each trainee as noise level was high inside foundries. Also a helmet was distributed to each trainee as a safety measure during field tours in foundries.

#### 1.4 General Profiles of Participants

(1) Qualification requirements

Since this training program is primarily designed for those in top management positions, it was requested to the project's main counterpart - the Ministry of Industry - to recruit and select companies' supervisor-class personnel in charge of business management and production, as well as from those engaged in the "Project to strengthen metalworking capability of supporting industries of construction machinery in Indonesia," while meeting the following qualification requirements:

- 1) Recommendation by the Indonesian government;
- 2) Person who is expected to manage a company or organization in the future (top management);
- 3) Good health condition; and
- 4) Not in military service.

Since these personnel are generally in a difficult position to be absent from their workplaces for a two-week period, some participants in the previous years were not those engaged in management and supervision. This time, the JICA Team was involved with the MOI's section process from the initial stage, and as a result, all the selected participants were top management personnel this year.

(2) Motivation for participation and attitude during training

Motivation of the participants has been high and there has been active participation as many participants were keen to learn and raised their hand to ask questions. Even some participants asked about requirements and procedures for applying for the postgraduate course in the Department of Science and Engineering of Iwate University, which suggested their strong interest in a study opportunity in Japan.

## 1.5 Future Application of Training Results

(1) Training results

As previously mentioned, it is difficult to meet diverse needs of the trainees with different backgrounds. Nevertheless, as estimated from the results of questionnaire surveys and comments heard from participants during the training, it is adequate to assume that the participants have returned to Indonesia with sufficient knowledge expected to learn and understand. Therefore, it is reasonable to judge that training course's objectives have been accomplished.

(2) Expected applications of training results

This training course is designed as a package combined with a training program for middle management in Indonesia, on-site guidance at enterprises and development of a target casting, as shown in Figure 1. Participants of the training course consist of those from private companies which previously dispatched trainees for the middle management training program, those from private companies which were receiving on-site guidance, and those from supporting organizations to provide on-site guidance for enterprises as OJT.

Participants of this training course, past training courses and the future training course are expected to share and apply their knowledge in their organizations/companies as a leader of management and quality/productivity improvement activities or expected to apply in on-site guidance activities for quality improvement and cost reduction.

## 1.6 Training Environment

Lectures under the training program were conducted at JICA's Tokyo International Center, Iwate University, and meeting rooms of companies visited for field tours. As continued from last year, all the facilities and equipment were provided in good conditions to ensure effective and efficient training.

## 1.7 Special Notes

None

## 2. Appendices

### 2.1 List of the participants

No.	Name	Organization	Position
1.	Mr. Mahaputra	MIDC	Head of Quality Control, Casting and Heat Treatment Division
2.	Ms. Greida Frista	MIDC	Manager, Chemical Composition Laboratory, Foundry Division
3.	Mr. Yusuf Umardani	Polman Ceper	Assistant Director, Foundry Division
4.	Mr. Tri Daryanto	Polman Ceper	Head of Academic Section, Foundry Division
5.	Ms. Lutiaytmi	Polman Ceper	Engineering Manager, Material Testing And Casting
6.	Mr. Achmad Sambas	Polman Bandung	Head of Foundry Study Program, Foundry Department
7.	Mr. Kus Hanaldi	Polman Bandung	Instructor, Foundry Production, Foundry Department
8.	Mr. Herman	PT. Karya Paduyasa	Director of Production
9.	Mr. David Indra Zusuka	PT. Atmaja Jaya	CEO
10.	Mr. Sriyono	PT. Baja Kurnia	Manager of Production
11.	Mr. Abdul Kapi	CV. Karya Hidup Sentosa	Foundry Assistant Manager
12.	Mr. Raimon	BPPI, MOI	Head of Sub-Division, Center for Research and Development of Industrial Technology and Intellectual Property (CRDIT&IP)
13.	Mr. Y. Ismanta	PT. Hitachi Construction Machinery Indonesia	Senior Assistant Manager, Production

Source: JICA project team

## 2.2 Detailed Training Plan (Actual)

Please refer to the page 4 of this report.

## 2.3 Evaluation (Feedback from the Trainees)

**Contrastive Table between the Trainees and the numbers tied to them.**

No.	Name	Organization
1.	Mr. Mahaputra	MIDC (Metal Industry Development Center)
2.	Ms. Greida Frista	MIDC (Metal Industry Development Center)
3.	Mr. Yusuf Umardani	Polman Ceper (Polyteknik Manufaktur Negeri Ceper)
4.	Mr. Tri Daryanto	Polman Ceper (Polyteknik Manufaktur Negeri Ceper)
5.	Ms. Lutiyaatmi	Polman Ceper (Polyteknik Manufaktur Negeri Ceper)
6.	Mr. Achmad Sambas	Polman Bandung (Polyteknik Manufaktur Negeri Bandung)
7.	Mr. Kus Hanaldi	Polman Bandung (Polyteknik Manufaktur Negeri Bandung)
8.	Mr. Herman	PT. Karya Paduyasa
9.	Mr. David Indra Zusuka	PT. Atmaja Jaya
10.	Mr. Sriyono	PT. Baja Kurnia
11.	Mr. Abdul Kapi	CV. Karya Hidup Sentosa
12.	Mr. Raimon	BPPI, MOI (Badan Penelitian dan Pengembangan Industri)
13.	Mr. Y. Ismanta	PT. Hitachi Construction Machinery Indonesia (HCMI)

**BAGIAN I Hasil pelatihan****Tujuan program**

**Memahami teknik pengecoran/casting (khususnya baja cor/steel casting) yang diperlukan selaku pegawai lembaga dukungan teknik atau manajer perusahaan.**

Q1. Apakah Anda telah mencapai Tujuan Program?

← Telah mencapai		Tidak mencapai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>6</b>	<b>6</b>		

**No answer 1**

Q2. Komentar dan saran (terutama jika tingkat penilaian Anda 1 atau 2).

**3. I would like to advise Indonesian casting enterprises on what I have learnt.**  
**4. This program is so useful that I hope JICA continues it.**

Q3. Jawablah pertanyaan di bawah ini mengenai "mata pelajaran".

(1) Mata pelajaran yang sangat berguna

⟨Mata pelajaran⟩

**1.3.10. Measures to improve quality of castings.**  
**2. Casting technology.**



- 4.8. Visits to enterprises.  
 5. Casting and inspection.  
 6.  
 (1) Management to make a factory profitable.  
 (2) Iwate meister system.  
 (3) Industry-government-academia collaboration.  
 (4) Quality control of steel castings.  
 7. Melting technology of steel castings.  
 9. Heat treatment.  
 11. Technical management.  
 12. Industry-government-academia collaboration.

〈Alasan〉

1. Learnt defects, inspection, and how to prevent defects.
2. Relevant to my work in MIDC.
3. Useful to solve existing problems.
4. I learnt casting technology.
5. Applicable to work in the school which I teach as well as enterprises in which I'm involved.
6. I found it useful and would like to apply.
7. I got a wider view.
8. I learnt what I can apply right away at my enterprise.
9. It is the most important process in cast iron production.
10. I learnt steel casting process and measures to prevent defects.
11. It is likely to become necessary production technology in the future.
12. Indonesia plans to form it.

(2) Mata pelajaran yang tidak perlu

〈Mata pelajaran〉

9. Visits to enterprises which seldom disclose technical know-how.
10. 11. Pattern types and cost structure of patterns.

〈Alasan〉

9. We cannot make full use of the opportunities to visit them unless they share key technical know-how or allow us to take photos.
10. Too general. I had already learnt in other training.
11. Cost structures differ from enterprise to enterprise.

(3) Mata pelajaran yang tidak diberikan, tetapi perlu dimasukkan

〈Mata pelajaran〉

1. New QC 7 tools.
3. Casting with Styrofoam and casting in vacuo.

4. Practice of casting design with software.
5. Discipline.
8. Comparative study of Japanese
9. How Japanese learn discipline.
11. Safety and health management in casting factories.
12. Safety and health management, environmental management.
13. Welding technology.

〈Alasan〉

1. To deepen understanding on causal analysis.
3. New technology to us.
4. Directly applicable.
5. Important for Indonesia.
9. Apparently simple but difficult in practice.
11. 12. Lots of workplace injuries in Indonesian casting factories.
13. Would like to learn how to weld two items with different properties.

#### Tujuan Modul 1

Diutamakan kemahiran teknik baja cor/steel casting di Jepang dan mengetahui mekanisme dukungan dari lembaga dukungan teknik serta sistem sertifikasi keterampilan.

Q1. Apakah Anda telah mencapai Tujuan Modul 1?

← Telah mencapai		Tidak mencapai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>3</b>	<b>9</b>		

No answer 1

Q2. Komentar dan saran (terutama jika tingkat penilaian Anda 1 atau 2)

#### Module Output 2

Meninjau UKM pengecoran besi cor/cast iron casting (termasuk perusahaan baja cor), memahir perkembangan umum tentang monozukuri (manufaktur) agar dapat dimanfaatkan perbaikan perusahaan Anda atau perusahaan yang Anda membimbing.

Q1. Apakah Anda telah mencapai Tujuan Modul 2?

← Telah mencapai		Tidak mencapai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>5</b>	<b>6</b>	<b>1</b>	

No answer 1

2. Komentar dan saran (terutama jika tingkat penilaian Anda 1 atau 2)

1. **Learnt how Japanese small and medium-sized casting enterprises operate.**
9. **Too many business secrets on technical know-how.**

Q3. Jawablah pertanyaan di bawah ini mengenai "mata pelajaran" dari seluruh Tujuan Modul.

(1) Mata pelajaran yang sangat berguna

〈Mata pelajaran〉

1. **Industry-government-academia collaboration**
2. **6. 9. Heat treatment**
3. **10. How to improve quality of steel castings**
4. **Visits to enterprises**
6. **Defect cause analysis of casting products**
7. **Melting technology in steel casting production**
8. **Comparative study at enterprises**

〈Alasan〉

1. **Learnt merits of the collaboration among academy, industry, and government.**
2. **Relevant to MIDC's facilities.**
3. **New area to us. Have a lot of problems in production.**
4. **Knowledge on casting.**
6. **Useful.**
7. **Got a wider view.**
8. **Directly applicable at my enterprise.**
9. **It is the most important process in steel casting production.**
10. **Learnt the process of steel casting production and how to prevent defects.**
11. **Learnt how to improve quality of steel casting products.**

(2) Mata pelajaran yang tidak perlu

〈Mata pelajaran〉

10. **Pattern types and cost structures of patterns.**
11. **Property and usage of carbon steel casting.**

〈Alasan〉

10. **Too general and not new.**
11. **Too broad in scope**

(3) Mata pelajaran yang tidak diberikan, tetapi perlu dimasukkan

〈Mata pelajaran〉 科目

3. **Casting with Styrofoam and casting in vacuo.**
4. **Visits to enterprises producing traditional casting artifacts.**
11. **5S in casting enterprises.**

<b>12. Safety and health management and environmental management.</b>
(Alasan)
<b>3. New technology.</b>
<b>4. To learn development of the casting industry.</b>
<b>11. Workplace organization and environmental control in casting enterprises.</b>
<b>12. To reduce workplace injuries in casting factories</b>

### **BAGIAN II Rancangan Pelatihan**

Q1. Apakah Anda merasa rancangan pelatihan ini sesuai bagi Anda atau organisasi Anda untuk mencapai Tujuan Program?

(✕rancangan pelatihan: susunan dan keseimbangan pada pelatihan)

← Sesuai		Tidak sesuai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>9</b>	<b>4</b>		

Q2. Apakah lama pelatihan telah sesuai?

Lama	Sesuai	Singkat
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>9</b>	<b>3</b>

**No answer 1**

Q3. Apakah menurut Anda jumlah peserta pelatihan ini telah sesuai?

Terlalu banyak	Sesuai	Terlalu sedikit
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>13</b>	

Q4. Apakah Anda telah dapat belajar dari pengalaman peserta lain di pelatihan ini?

← Dapat		Tidak dapat →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>7</b>	<b>5</b>		<b>1</b>

Q5. Apakah ada banyak kesempatan untuk memperoleh pengalaman secara langsung pada kunjungan ke lapangan dan praktik?

← Ada cukup banyak		Hanya sedikit →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>7</b>	<b>5</b>	<b>1</b>	

Q6. Did you have enough opportunities to participate actively in the course, such as discussions and workshops?

← Ada cukup banyak		Hanya sedikit →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>7</b>	<b>5</b>	<b>1</b>	

Q7. Apakah kuliah bermutu tinggi dan dapat dimengerti dengan baik?

← Puas		Tidak puas →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>7</b>	<b>6</b>		

Q8. Apakah Anda puas dengan buku teks dan materi yang digunakan dalam pelatihan ini?

← Puas		Tidak puas →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>7</b>	<b>5</b>		

**No answer 1**

Q9. Apakah menurut Anda pengetahuan dan pengalaman di Jepang yang telah diperoleh melalui pelatihan ini akan berguna?

<input type="checkbox"/> A	Ya, dapat digunakan secara langsung pada pekerjaan.
<b>8</b>	
<input type="checkbox"/> B	Tidak dapat digunakan langsung, tetapi dapat diadaptasikan pada pekerjaan.
<b>4</b>	
<input type="checkbox"/> C	Tidak dapat digunakan langsung atau diadaptasikan, tetapi dapat menjadi referensi bagi saya.
<input type="checkbox"/> D	Tidak, sama sekali tidak berguna

**No answer 1**

Q10. Apakah Anda telah mendapat fasilitasi yang sesuai (misalnya saran untuk memahami kuliah lebih baik, saran untuk penyusunan Action Plan, dll.) untuk mencapai tujuan Anda ?

← Puas		Tidak puas →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1

Q11. Apakah Anda puas dengan penerjemahan lisan dan layanan pengelolaan pelatihan (koordinasi dan persiapan yang dilakukan oleh koordinator pelatihan?)

	← Puas				Tidak puas →
■Penerjemahan lisan	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
	<b>9</b>	<b>3</b>			There're no Interpretation
■Koordinasi	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	
	<b>10</b>	<b>2</b>			

**No answer 1**

Q12. Apakah Anda telah dapat memahami masyarakat dan budaya Jepang selama tinggal di Jepang?

← Dapat		Tidak dapat→	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>3</b>	<b>8</b>	<b>1</b>	

**No answer 1**

Q13. Tandailah tingkat kepuasan Anda terhadap hal-hal di bawah ini terkait fasilitas penginapan.  
(※ Jika Anda tidak tinggal di JICA Center atau Hotel, tandailah dengan X.)

	←Puas		Tidak puas →		X
■Fasilitas di JICA Center	<input type="checkbox"/> 4 <b>10</b>	<input type="checkbox"/> 3 <b>3</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Makanan di JICA Center	<input type="checkbox"/> 4 <b>10</b>	<input type="checkbox"/> 3 <b>3</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Layanan di JICA Center	<input type="checkbox"/> 4 <b>9</b>	<input type="checkbox"/> 3 <b>4</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Fasilitas di Hotel	<input type="checkbox"/> 4 <b>11</b>	<input type="checkbox"/> 3 <b>2</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Layanan di Hotel	<input type="checkbox"/> 4 <b>8</b>	<input type="checkbox"/> 3 <b>5</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>

Q14. Tulislah komentar atau saran untuk perbaikan terkait pertanyaan no. 1 - 13 di atas

1. **About Q12: Appreciate if we could have time to exchange views with the Japanese and to learn Japanese and Japanese life style.**
2. **Coordinators need to learn technical terms more.**
5. **Starting time is late. Not much time for training in the morning. Morning sessions start sometime between 7 and 8 a.m. in Indonesia.**
6. **I'm happy about having received the training. I could widen knowledge as well as network.**
8. **My enterprise is about to start producing casting products, so comparing my enterprise with ones in Japan is useful.**
9. **I wanted Japanese enterprises to disclose technical know-how, because the training period was limited.**
11. **Would like to visit more enterprises.**
13. **Wanted time for discussion for report preparation and high speed Wifi service.**

### **BAGIAN III Hal yang Ditemukan dan Dipelajari di Jepang**

#### **1- 4.( Penting ):"Pengetahuan yang diperoleh di Jepang dan penggunaanya"**

Q1. Di antara pengetahuan yang Anda peroleh melalui pelatihan ini, pilihlah pengetahuan yang berguna (metode, layanan, organisasi, sistem, konsep), teknik dan keahlian yang dapat diadopsi atau diadaptasikan untuk menyelesaikan masalah-masalah di negara Anda.

- 1. People in casting enterprises in japan are disciplined and have a sense of professional pride and responsibility.**
- 2. Organization, system.**
- 3. Methods, system.**
- 5. In Japan where everything is automated, less labor force is necessary. Jobs are done in an efficient and effective manner.**
- 6. Methods (technology), operation, system.**
- 7. Casting technology.**
- 8. System in workplace.**
- 9. Discipline. Culture which is hard in Indonesia to follow.**
- 10. 5S and production process of steel casting.**
- 11. Concept, how work is done, 5S and safety and health management.**
- 13. Corporate culture to value all workers highly.**

Q2. Jelaskanlah mengapa pengetahuan tersebut berguna.

- 1. Useful to change my stance for job.**
- 2. Regulations and systems in Indonesia need to be changed.**
- 3. Basis of good operation/management.**
- 5. Cannot apply everything, but serve as good examples.**
- 6. Can earn more profits by reducing waste.**
- 7. Directly applicable in my workplace.**
- 8. Systems applied in work are effective.**
- 10. One of the highest priority issues.**
- 11. To make factories clean and safe.**
- 13. Applying it increases productivity.**

Q3. Jelaskanlah bagaimana itu diadopsi atau diadaptasikan ke dalam organisasi atau negara Anda. Selain itu, jelaskan pula jika ada masalah untuk mengadopsi atau mengadaptasikannya.

- 1. 5. I start doing by myself, and then expand it to the workplace and the whole enterprise.**
- 2. I would like to make Indonesian manufacturers competitive against counterparts in advanced countries. However, frequent policy cahges and unreliable commitment of the Indonesian government make it difficult to apply something new.**
- 3. We can apply technology and others. Yet they need to be adjusted to make them suitable in the**

Indonesian context.

6. I report to the boss, and propose introducing them if he likes them.
7. I can teach students
8. I would like to introduce more efficient systems in my enterprise, but a bottleneck is that casting is still a new area in my enterprise.
10. I would like to apply right operating processes consistently to make applying them culture.
11. I introduce them step by step.

Q4. Tandailah aspek Jepang atau karakteristik orang Jepang yang mengesankan Anda selama tinggal di Jepang.

<input type="checkbox"/>	Baik hati 10	<input type="checkbox"/>	Sangat detail 10
<input type="checkbox"/>	Tepat waktu 12	<input type="checkbox"/>	Sejarah dan budayanya bagus 8
<input type="checkbox"/>	Patuh terhadap peraturan 12	<input type="checkbox"/>	Makanannya enak 3
<input type="checkbox"/>	Giat bekerja 10	<input type="checkbox"/>	Bersih dan indah 12
<input type="checkbox"/>	Sopan 13	<input type="checkbox"/>	Keamanan terjaga 10
<input type="checkbox"/>	Pendiam 3	<input type="checkbox"/>	Terlalu macet
<input type="checkbox"/>	Bekerja berlebihan 1	<input type="checkbox"/>	Alamnya kaya
<input type="checkbox"/>	Lain-lain		

Episode peristiwa yang dialami terkait aspek dan karakteristik tersebut.

(1)

1. Workers in factories are disciplined and work hard.
2. I saw Japanese at a shrine (or temple). I felt sacred atmosphere.
3. Activities are conducted as scheduled.
5. 13. Good and polite service.
6. Someone helped me to pay at a cash register of a store.
7. 10. People make queues and wait in an orderly fashion at platforms of train stations.
8. Disciplined
9. Start and finish on time
11. Traffic is in order.

(2)

1. Sales staff is polite.
2. I have a good impression to Morioka. An elderly lady kindly gave me some food. The food did not



**suit my taste, but her kindness made me happy.**

- 3. I'm impressed with smooth transportation.**
- 5. People show respect to the others.**
- 6. People guided me at stations.**
- 7. Clean (office, accommodation and road).**
- 8. Punctual.**
- 9. 11. People say hello in a friendly but polite manner.**
- 10. I always got right answers or help when I asked something.**
- 13. Kind.**

(3)

- 1. Trains and buses run on time, no trash is on the road and air is clean. People respect each other.**
- 3. People have high work ethics.**
- 5. It is safe and comfortable in rural areas.**
- 2. 6. A professor of Iwate University kindly handed over bottled water to each one of the participants, which never happens in Indonesia.**
- 10. Cars wait until pedestrians finish crossing the road even if the signal light turns green.**
- 11. Standards are put in place.**
- 13. People respond quickly when they find problems.**

5. (Optional): "Esai mengenai Pengalaman di Jepang"

Tuliskan esai mengenai pengalaman di Jepang yang sangat mengesankan Anda sebagai pesan terhadap masyarakat di negara Anda dan masyarakat Jepang. Ada kemungkinan esai dikirim ke kantor JICA di Jepang atau negara lain untuk digunakan dalam kehumasan.

- 1. The Japanese are polite (respect each other), kind (help those in need), and on time. It impressed me that Shinkansen runs without delay.**
- 2.**
  - (1) Japanese professors are not too proud (kind and not bossy). They do something by themselves when they can instead of making someone else do it.**
  - (2) The coordinators did not know technical terms but I saw them trying to learn them from the training participants. I had a good impression from their attitude.**
  - (3) Scenery which I saw when moving from Akita to Sendai by Shinkansen was beautiful.**
  - (4) Farm land in Japan is well-organized.**
  - (5) The Japanese, even those working at shopping malls and hotels, do not speak English well, so I had to express myself with gestures.**
- 3. Hope Indonesia and Japan keep good relation. Labor and natural resources are in short in Japan, but we have plenty in Indonesia.**
- 5.**
  - (1) It is cleaner and more comfortable in local regions like Akita, Iwate, and Fukushima than in**

**Tokyo.**

**(2) Discipline, politeness and attention to safety permeate the society.**

**(3) Coordinators managed the training program well.**

**(4) Visiting a lot of towns was a good experience, but it was too busy as well.**

**6. The Japanese, especially JICA, helped us a lot. They keep towns well-organized and follow rules. People queue in an orderly fashion and follow traffic signals.**

**6. In the JICA center, I saw people from different countries being in one place for the first time. They talk and know each other. There is no discrimination although their race, skin colors, languages, and culture are different. This follows Islamic teaching.**

**7. The Japanese are disciplined, punctual and respect the others.**

**9. I am impressed with Japanese culture, especially discipline. Whatever we do, discipline is the most important.**

**10. I found the training well planned and well managed.**

**11. Everything is much more coordinated than in Indonesia. Technology is applied everywhere. Language and food (almost no halal food), and praying (no place for praying) were problems for me. Moving from hotel to hotel made me tired. I'm sorry that we were not able to visit enterprises in Akita (couldn't change schedule according to weather conditions (typhoon)?)**

**13.**

**(1) People stand in line when waiting for public transportation and do not ignore traffic signals. Drivers let pedestrians cross the street.**

**(2) No traffic jams, no air pollution.**

**(3) Many people do not speak English.**

**※Jawaban Anda akan digunakan oleh JICA untuk peningkatan program. Terima kasih atas kerjasama Anda.**



ANNEX 9

A Evaluation on Production Management Technical Level of  
a Targeted Metalworking Organization

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## Tabel penilaian level CP pada Manajemen Produksi

Nama target yg dinilai: \_\_\_\_\_

Tanggal penilaian: \_\_\_\_\_

Item	Isi	Level			Poin nilai	
		I (Poin nilai 1)	II (Poin nilai 3)	III (Poin nilai 5)	Per isi	Nilai item
		Tdk tahu, atau Pernah dengar saja	Memahami isinya dengan benar	Dipraktekkan sendiri, diajarkan ke orang lain		
Genba kaizen (perbaikan lapangan)(5S)	Arti 5S					15
	Cara menjalankannya					
	Cara membiasakannya					
Genba kaizen (perbaikan lapangan)(Kegiatan tim kecil)	QC Cyrclle					15
	QC story					
	QC presentation					
Perbaikan kualitas (QC)	Kualitas produk					15
	QC 7 Tools					
	Pengurangan produk NG (defect)					
Perbaikan proses (IE)	7 Muda (mubazir)					20
	Proses tanpa muda (mubazir)					
	Bottle neck					
	Lead Time					
Maintenance mesin (TPM)	Persentasi operasi					15
	Maintenance mandiri (self maintenance)					
	Maintenance pencegahan (preventive maintenance)					
Management System Kaizen	Kebutuhan pelanggan, Kepuasan pelanggan					15
	Quality Assurance					
	Sistem kontrol/ manajemen					
Perbaikan sistem produksi (Sistem produksi Toyota)	Visual Control					20
	Kanban System					
	Andon					
	JIDOU-ka					
Perbaikan sistem produksi (Kontrol)	Cost					15
	Pembelian. Pengadaan/ Purchasing					
	Stok					
Perbaikan manajemen	Value-Added					20
	Pengukuran produktifitas					
	Cost produksi					
	Profitability					
Total poin nilai (Nilai max 150 poin)						150

Nama penilai: \_\_\_\_\_

### Technical level of target metalworking organization on Production Management (MIDC)

~ Scores by self-rating (at the beginning of the project) ~

Technique	5S	QCC	QC	IE	TPM	Mgt System	Toyota System	Prod. System	Management	Total
C/P staff	(15)	(15)	(15)	(20)	(15)	(15)	(20)	(15)	(20)	(150)
Agus Budiaman	3	3	9	8	9	9	6	9	12	68/150
Agus Hermawan	9	3	3	4	7	3	8	3	4	44/150
Purbaja Adi Putra	7	5	11	4	15	9	16	9	8	84/150
Hafid	13	13	15	12	9	9	12	15	20	118/150
Helmi Hariyadi	15	15	15	12	15	13	12	9	12	118/150
Mirantie Dwiharsanti	9	9	13	12	3	11	8	9	12	86/150
Rizalul Kalam	5	9	3	4	3	5	4	5	12	50/150
Gugum Gumilar	5	7	7	8	9	9	8	9	12	74/150
Rita Normalia	7	3	3	4	7	9	4	3	4	44/150
Rurut Amiru	5	3	5	4	3	5	4	9	8	46/150
Ave.	7.8	7.0	8.4	7.2	8.0	8.2	8.2	8.0	10.4	73.2/150

#### (Evaluation)

1. The technical level of the whole targets was approximately on level II (Have a good understanding) .
2. Individually, their technical levels ranged from 44 to 118 points (Scoring scale: 30 - 150).

### Technical level of target metalworking organization on Production Management (MIDC)

~ Scores rated by JICA Expert (at the end of the project) ~

Technique	5S	QCC	QC	IE	TPM	Mgt System	Toyota System	Prod. System	Management	Total
C/P staff	(15)	(15)	(15)	(20)	(15)	(15)	(20)	(15)	(20)	(150)
Agus Budiaman	15	10	15	10	10	10	10	10	20	110/150
Agus Hermawan	15	10	5	5	10	10	15	0	15	85/150
Purbaja Adi Putra	(Moved to Casting C/P)									/150
Hafid*										/150
Helmi Hariyadi	5	5	10	0	5	0	5	0	0	30/150
Mirantie Dwiharsanti	10	15	5	10	15	10	5	10	5	85/150
Rizalul Kalam*										/150
Gugum Gumilar	10	0	15	20	5	0	10	0	20	85/150
Rita Normalia	(Left MIDC)									/150
Rurut Amiru	10	10	5	10	0	0	5	5	5	50/150
Ave.	10.8	8.3	9.2	9.2	7.5	5	8.3	4.2	10.8	73.3/150

\*Unable to conduct level check due to the absence of the examinee.

#### (Evaluation)

More than half of the C/P staffs were found to have improved their technical levels, in comparison to the scores rated at the beginning of the project.





ANNEX 10  
A Manual for Extension Services on  
Production Management

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# Manual kunjungan bimbingan industry pengerjaan logam (Manajemen Produksi)

Dibuat : Nov 2016

JICA Expert Nishida Taisuke

## Pendahuluan

- Kunjungan bimbingan berbeda dengan istilah consulting pada umumnya, karena jumlah kunjungan ke perusahaan terbatas hanya beberapa kali, diperkirakan hanya kurang dari 10 kali, sehingga memang sering tidak akan terlihat hasilnya.

Catatan) Kunjungan saat Consulting itu 15 kali atau lebih, dan dituntut adanya hasil improvement nyata pada bimbingan tsb.

### Langkah kunjungan bimbingan

Langkah	Isi	Jumlah hari yang diperlukan
1	Meeting dengan top management, serta observasi pabrik	Setengah hari
2	Pengenalan Teknologi manajemen produksi	2 -3 hari
3	Pengumpulan masalah dan penetapan tema	Setengah hari
4	Diskusi mengenai data yang telah dikumpulkan	1 hari
5	Mempersempit masalah	1 hari
6	Penusulan ide penanganan	1-2 hari
7	Pembuatan action plan	1 hari
8	Diskusi mengenai hasil pelaksanaan	1 hari

#### 1. Meeting dengan top management , serta observasi pabrik

##### 1 – 1. Meeting dengan top management

1) Menjelaskan secara garis besar tentang 5S, QC 7 tools, IE serta QC Circle, untuk menyampaikan arti kegiatan Kaizen (improvement).

2) Mendengarkan penjelasan dari Top Management tentang masalah yang dihadapi perusahaan.

Catatan : Melalui meeting ini, dilakukan pengamatan komitmen top management.

##### 1 – 2. Observasi pabrik

1) Mengamati kondisi 5S, bila diperlukan diusulkan untuk melakukan 5S.

2) Memahami process flow.

3) Mengamati kondisi WIP dan Gudang.

4) Mengamati kondisi pengoperasian fasilitas (apakah banyak fasilitas yang nganggur dll).

5) Mengamati mesin dan fasilitas utama dan memahami fungsinya.

## 2. Pengenalan Teknologi Manajemen Produksi

Pada industri pengolahan logam di Indonesia, pengetahuan tentang teknologi manajemen produksi hampir tidak diketahui, bahkan oleh pihak teknis, sehingga saat melakukan kunjungan bimbingan ke perusahaan, harus dimulai dari memperkenalkan teknologi manajemen dasar.

Teknologi utamanya bisa dilihat dibawah ini, mengenai penjelasannya disampaikan dalam lampiran di bagian halaman akhir.

( Teknologi manajemen dasar )

1. 5S dan cara menjalankannya
2. QC Circle dan cara menjalankannya
3. QC 7 Tools dan cara memakainya
4. IE dan cara memakainya

## 3. Pengumpulan masalah dan penetapan tema

- Kondisi Ringkas-Rapi pada lokasi Pabrik dan Gudang penyimpanan

Bila ada kondisi dimana mesin, fasilitas dan Tools hanya berserakan di pabrik dan Gudang, tidak ditempatkan ditempat semestinya, atau tempat penyimpanannya tidak ditentukan, Maka bimbingan dilakukan dengan tema 5S.

- Produk defect dan produk repair

Menanyakan persentase defect, bila lebih dari 5%, maka tema kaizen kualitas diangkat, memperkenalkan QC 7 Tools,

dan melaksanakan kegiatan kaizen berdasarkan QC Story.

- No Good pada line produksi dan kondisi kerja.

Bila fasilitas line produksi ditempatkan secara berantakan, maka dilakukan rekomendasi untuk melakukan bimbingan memperbaiki layout agar penempatan fasilitas mendukung arah proses yang satu arah, dan WIP mengalir dalam jarak minimal.

(Hanya sampai memberikan advice, namun bias juga menjadi tema bimbingan)

Pastikan apakah barang (WIP) diantara proses pada line produksi dapat mengalir (berpindah) dengan lancar,

WIP tidak menumpuk diantara proses. Bila ada masalah, pakai IE dasar atau tema Heijunka untuk melakukan bimbingan kegiatan Kaizen.

## Prioritas pada tema

Urutan prioritas ditentukan seperti dibawah ini.

1. Bila ada tempat kerja yang sulit, bila kesadaran pekerja tentang kaizen masih rendah, maka prioritas tema adalah QCC dan 5S
2. Bila dilakukan kegiatan kaizen, efek ekonominya paling tinggi.
3. Bila tidak kaizen dapat dilakukan tanpa memerlukan level teknologi yang tinggi, maka kaizen merupakan tema prioritas.

## 4. Metoda bimbingan pada lingkungan kerja dan Gudang penyimpanan

- Presentasi mengenai 5S dan QC-Circle(QCC).
- Menjelaskan 5S terutama 2S nya dijelaskan secara rinci. Didalamnya juga dijelaskan agar dapat melakukan pengontrolan inventory dengan memakai computer. Dimana dilakukan list up material, WIP, Produk, Sparepart dan Tools yang dibagi berdasarkan kategorinya, ditulis volumenya dan address penempatannya.
- QCC, dilakukan secara keseluruhan perusahaan dan dikelola secara terorganisir yang dilakukan secara kontiniu .
- Kegiatan QCC bukan hanya 5S saja, namun juga kaizen secara keseluruhan yang dicoba secara berurutan, dan penting adanya top manajemen yang menjadi contoh dan teladan.
- Dengan kegiatan ini, seluruh pekerja dapat berpendapat dengan bebas, bekerja dengan senang dan akhirnya merubah mentalitas pekerja.

## 5. Metoda bimbingan kaizen kualitas pada produk

(Penurunan produk defect dan produk repair)

- Melakukan proses data QC secara statistic , sedikitnya data 100 buah dikumpulkan , selama paling tidak 3 bulan.
- Frekwensi terjadinya produk defect dan repair dinyatakan pada Pareto Diagram, dan dilakukan kegiatan kaizen untuk mengatasi defect prioritas 1 - 3
- Mendata dan mengklasifikasikan penyebab terjadinya produk defect dan repair dengan memakai fish bone.

### 5—2. Sambungan

- Penyebab produk defect dan repair yang memungkinkan, kemudian dianalisa penyebabnya dengan Whu-Why analysis untuk memperjelas mekanisme terjadinya secara logis.
- Bila penyebab utama sudah diketahui, dibuat rencana penanganan. Bila produk defect dan repair terjadi akibat Human Error , maka dibuat penanganan dengan metoda Poka-yoke. Bila disebabkan akibat masalah teknologi, maka ditangani secara saintifik pada mekanisme terjadinya.
- Membuat Action Plan derdasarkan 5W1H (Lihat halaman berikut)
- Mencoba tindakan penanganan secara nyata.
- Bila hasilnya OK, dibuat SOP dan Manual nya.



### Contoh action Plan

Apa masalahnya ? (What)	Mengapa bermasalah? (Why)	Metoda penanganannya ? (How)	Kapan dilaksanakan ? (When)				Siapa penanggungjawab pelaksanaannya ? (Who)
			1/4	2/4	3/4	4/4	
Masalah-1	Kemungkinan penyebab -1	Usulan penanganan	-----				
	Kemungkinan penyebab -2	Usulan penanganan		-----			
Masalah-2	Kemungkinan penyebab -1	Usulan penanganan			-----		
	Kemungkinan penyebab -2	Usulan penanganan				-----	

## 6. Metoda pembinaan kaizen pada produktifitas

### ( Penurunan waktu lead time produksi )

- Pembuat grafik alur proses produksi.
- Mengukur waktu yang diperlukan dalam memproduksi 1 produk.
- Menetapkan apakah ada nilai tambah pada tiap proses.  
 Proses yang tidak memiliki nilai tambah seperti inspeksi, penyimpanan dll sebisa mungkin dihilangkan,
  - Mereview metoda dan lingkungan kerja untuk menghilangkan Muri, Muda, Mura.
 Apabila ada proses yang tidak memberikan nilai tambah, seperti penyimpanan dan inspeksi, sebisa mungkin dikurangi.
  - Untuk proses yang bersifat bottle neck, dilakukan pengumpulan ide untuk melakukan usaha perbaikan dari sudut pandang E (Eliminate), S (Simplify), C (Combine) dan R (Rearrange).

## 6 – 2. Sambungan

- Cara mencari penyebab dan membuat rencana penanganan, sama dengan pendekatan dan action plan pada 5 dan 5-2.

## 7. Memastikan hasilnya dengan cara membandingkan sebelum dan sesudah Kaizen

- Bila rencana kaizen telah dilaksanakan, bandingkan kondisi sebelum dan sesudah Kaizen.
- Untuk 5S, mutlak dilakukan pembandingan dengan foto. Meskipun bersifat subjektif, sebisa mungkin lakukan penilaian dengan angka karena hal ini efektif.
  - Untuk penurunan produk defect, tunjukkan berapa keuntungan yang didapat perusahaan, berapa kerugian yang dapat diturunkan. Metoda penampilan seperti ini memberikan impact yang baik.
  - Untuk peningkatan produktifitas, tampilkan hasilnya seperti berapa jumlah produksi yang bertambah per satuan waktu, berapa jumlah produk per pekerja dll. Tampilan seperti ini mudah dimengerti.

## Lampiran dokumen

Dokumen-1. **5S** dan cara menjalankannya

Dokumen-2. **QC Circle** dan cara menjalankannya

Dokumen-3. **QC 7 Tools** dan cara pemakaiannya.

Dokumen-4. **IE** dan cara pemakaiannya

**【Materi -1. 5 S dan Cara Menjalankannya】**

## 10 step pelaksanaan 5 S di tempat kerja

### Activities

Kick off Meeting 5K

1. 5S & QCC introduction/deployment

2. Photos

3. Identification of Problems

4. Evaluation (before)

5. Countermeasure Setup

6. Action Plan

7. Check-sheet Making

8. Implementation

(Video & Photos)

9. Check & Evaluation (after)

10. Manual Making

## Identifikasi Barang Tak perlu: Tag merah

Red

Tidak perlu → Disingkirkan/ dibuang

Grey

Tahan → Diputuskan perlu atau tidaknya, nanti

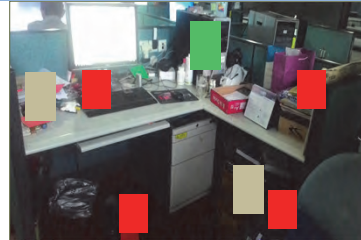
Green

Perlu → Disimpan

**1S : Seiri - Rangkas**

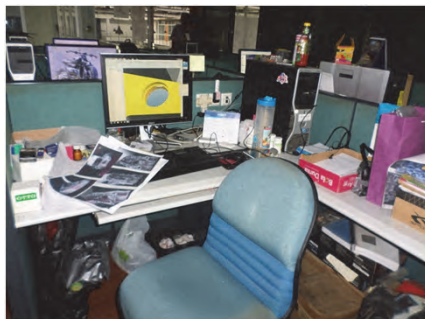
**Pemasangan tag warna (di kantor)**

Tagging by sticker (red/grey/green)



**2S : Seiton - Rapi**

**Sebelum**



**Sesudah**



**Hasil 2S**

## Hasil 2S Daftar item



No.	Item	Unit	Qty	Unit Price	Total Price
1	Server Rack	1	1	1000000	1000000
2	Server Cabinet	1	1	500000	500000
3	Server Power Supply	1	1	200000	200000
4	Server Cooling Fan	1	1	100000	100000
5	Server Network Card	1	1	50000	50000
6	Server Hard Drive	1	1	150000	150000
7	Server Memory Module	1	1	300000	300000
8	Server Operating System	1	1	100000	100000
9	Server Backup Software	1	1	50000	50000
10	Server Monitoring Software	1	1	50000	50000
11	Server Security Software	1	1	50000	50000
12	Server Backup Hardware	1	1	100000	100000
13	Server Network Switch	1	1	200000	200000
14	Server Network Cable	1	1	50000	50000
15	Server Network Patch Panel	1	1	50000	50000
16	Server Network Router	1	1	100000	100000
17	Server Network Firewall	1	1	150000	150000
18	Server Network IDS/IPS	1	1	100000	100000
19	Server Network NIDS	1	1	50000	50000
20	Server Network NIPS	1	1	50000	50000
21	Server Network NIDS/IPS	1	1	100000	100000
22	Server Network NIDS/IPS/IPS	1	1	150000	150000
23	Server Network NIDS/IPS/IPS/IPS	1	1	200000	200000
24	Server Network NIDS/IPS/IPS/IPS/IPS	1	1	250000	250000
25	Server Network NIDS/IPS/IPS/IPS/IPS/IPS	1	1	300000	300000
26	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	350000	350000
27	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	400000	400000
28	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	450000	450000
29	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	500000	500000
30	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	550000	550000
31	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	600000	600000
32	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	650000	650000
33	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	700000	700000
34	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	750000	750000
35	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	800000	800000
36	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	850000	850000
37	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	900000	900000
38	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	950000	950000
39	Server Network NIDS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS/IPS	1	1	1000000	1000000
40	Server Network NIDS/IPS	1	1	1050000	1050000
41	Server Network NIDS/IPS	1	1	1100000	1100000
42	Server Network NIDS/IPS	1	1	1150000	1150000
43	Server Network NIDS/IPS	1	1	1200000	1200000
44	Server Network NIDS/IPS	1	1	1250000	1250000
45	Server Network NIDS/IPS	1	1	1300000	1300000
46	Server Network NIDS/IPS	1	1	1350000	1350000
47	Server Network NIDS/IPS	1	1	1400000	1400000
48	Server Network NIDS/IPS	1	1	1450000	1450000
49	Server Network NIDS/IPS	1	1	1500000	1500000
50	Server Network NIDS/IPS	1	1	1550000	1550000

21

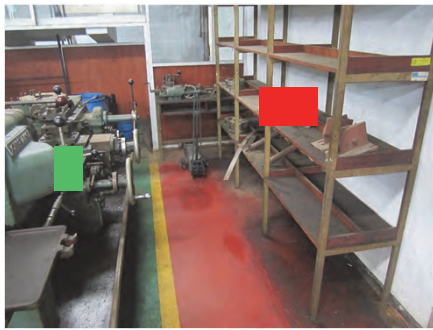
## Manfaat

No.	Aspek Kuantitatif	Sebelum	Sesudah	Benefit
1	Efisiensi waktu pencarian dokumen/tools	15 menit	2 menit	90%
2	Bertambahnya akses ruang gerak dan efisiensi ruang kerja	20%	70%	50%
3	Menurunnya resiko kerusakan dan kehilangan barang/dokumen/tools	60%	20%	40%

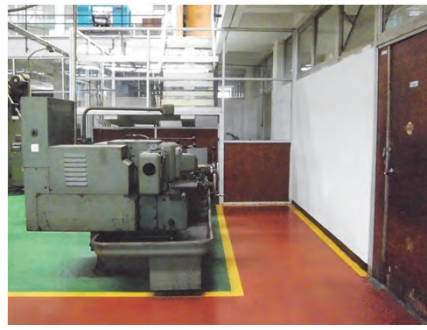
22

**Studi kasus 5S  
Shop Pemesinan (Machinery Shop)**

**Sebelum**



**Sesudah**



**Hasil 1S**

23

**Studi kasus 5S  
Shop Pemesinan (Machinery Shop)**

**Sebelum**



**Sesudah**



**Replace**

**Hasil 1S**

24

## Peralatan

Sebelum



Sesudah



Diset sesuai 2S

25

**【Dokumen-2. QC Circle dan cara menjalankannya】**



## Apakah QC Circle itu?

Quality Control Circles



## Apakah QC Circle itu?

Quality Control Circles

### QCC

bersifat sukarela dan merupakan kegiatan kaizen regular oleh kelompok kecil yang terdiri dari beberapa operator (4-10 anggota) di bawah satu foreman di bengkel yang sama sebagai bagian dari kegiatan di seluruh perusahaan

### QCC

terus melakukan pengembangan diri dan pengembangan bersama sebagai bagian dari kegiatan QC di seluruh perusahaan

## **Latar belakang kelahirannya**

**Dr. Kaoru Ishikawa**  
Pengembang QCC

Pekerja yang terlibat di garis depan workshop memainkan peran penting terhadap kualitas produk

## **Tujuan**

Memperbaiki dan meningkatkan kualitas kerja melalui:

- Saling Komunikasi
- Peningkatan Moral
- Bottom Up
- Peningkatan keterampilan
- Tantangan
- Perhatian & Kesadaran

### **Efektivitas QCC**

- Masalah yang menyebabkan 3 *Mu* di pekerjaan ditemukan dalam pertemuan rutin
- Diskusi kelompok menciptakan suasana yang ramah dan komunikasi timbal balik yang berguna untuk perusahaan dan belajar dari satu sama lain dalam pekerjaan sehari-hari.
- Operator tidak menyembunyikan dan jujur memberitahu kesalahan mereka sendiri.
- Aktivitas 5S dilaksanakan dari akar bawah

### **Ekspektasi lainnya**

- Operator menikmati pekerjaannya
- Operator bekerja secara positif dan meningkatkan kapasitas dgn pengembangan diri.

### **Saling melakukan pengembangan**

Karena kegiatan QCC adalah kegiatan kelompok, anggota dapat belajar dari satu sama lain dengan saling stimulasi

## Promosi QCC di seluruh perusahaan

---

### Jaringan QCC di seluruh perusahaan



### **Peran Komite QCC**

- (A) Pendaftaran QCC
- (B) Penyelenggara Training yang efektif
- (C) Kompetisi hasil QCC di konferensi
- (D) Penghargaan pengakuan (Recognition Award)

### **Langkah pada aktivitas QCC**

1. Pengorganisasian dan pendaftaran QCC
2. Pelaksanaan rapat (perencanaan dan penyelenggaraan)
3. Pelaksanaan Patroli (perencanaan dan penyelenggaraan) oleh Top Management
4. Pelaksanaan Konvensi (perencanaan dan penyelenggaraan) , misal Kompetisi QC
5. Evaluasi dan Penghargaan pada hasil

**(A) Sample Form pendaftaran QCC**

**QC Circle Registration Form**

Branch/Department: \_\_\_\_\_ Phone no. \_\_\_\_\_  
Division/Area: \_\_\_\_\_ Group: \_\_\_\_\_ Head: \_\_\_\_\_  
QC Name: \_\_\_\_\_ Date Organized: \_\_\_\_\_  
Frequency of Meetings: \_\_\_\_\_  
QC Leader: \_\_\_\_\_  
Asst. Leader: \_\_\_\_\_  
Members: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Facilitator: \_\_\_\_\_

**(B) Training**

- Pelatihan memainkan peran penting dalam memastikan efektivitas program QCC
- Para anggota QCC harus dilengkapi dengan keterampilan dan teknik untuk melaksanakan proyek QCC
- Mereka perlu memahami peran masing-masing dalam melaksanakan kegiatan QCC agar berhasil

## **(C) Kompetisi QCC di perusahaan**

### **Tujuan untuk konferensi**

- 1- Mengembangkan rasa percaya diri melalui pelaporan pengalaman diri dalam QCC, dan belajar dari komentar dan saran orang lain.
- 2- Berbagi kesenangan dan kebanggaan dalam melaporkan pencapaian usaha bersama dalam kelompok
- 3- Berbagi pengalaman dengan QCC lainnya dalam kelompok yang berbeda, mendengarkan presentasi mereka dan menerapkan apa yang telah dipelajari pada aktivitas QCC setelah kembali.

## **Persiapan**

1. Memilah dan memahami poin untuk berbicara dalam presentasi
2. Pertimbangkan membuat laporan yang mudah dipahami pendengar

3. Pastikan untuk menyertakan poin yang memerlukan upaya khusus dan dijelaskan bagaimana mengatasinya.
4. Gunakan sebanyak mungkin diagram dan grafik, agar lebih mudah dipahami.
5. Persiapkan cukup waktu untuk presentasi inti termasuk sebanyak mungkin pengalaman sulit.



## Cerita QCC di Kompetisi

- |   |          |
|---|----------|
| A. Pengenalan kelompok dan anggota  | (1min.)  |
| B. Garis besar pekerjaan regular  | (1min.)  |
| C. Nama tema dan alasan pemilihannya  | (1min.)  |
| D. Identifikasi masalah   | (1min.)  |
| E. Prosedur KAIZEN dgn pengenalan pendapat anggota, pendapat supervisor, kesalahan, kesulitan hingga pemecahannya | (10min.) |
| F. Efektivitas dan pencegahan kejadian terulang   | (1min.)  |
| G. Evaluasi & kaji ulang  | (1min.)  |

### **【Dokumen-3. QC 7 Tools dan cara pemakaiannya】**

#### QC 7 tools

1. Check Sheet
2. Pareto Diagram
3. Histogram
4. Stratification
5. Cause and Effect Diagram(Fish bone)
6. Scatter Diagram
7. Control Chart

catatan: Analisa data pada kualitas yang terukur

## 1. Check Sheet

### 1. Record Check Sheet

Ini dipakai untuk menghitung jumlah produk, defect dll

### 2. Inspection Check Sheet

Dipakai untuk menginspeksi item penting seperti kondisi operasional, keamanan

contoh.

- a. Check Sheet related to equipment
- b. Check Sheet related to operations
- c. Check Sheet related to startup & finish

**Contoh: Data Record Check-Sheet**

Thickness range	Counts				Total
Above 30.61					0
30.51 ~ 30.60	/				1
30.41 ~ 30.50	//				2
30.31 ~ 30.40	////	////			6
30.21 ~ 30.30	////	////			10
30.11 ~ 30.20	////	////	///		13
30.01 ~ 30.10	////	////	////	///	18
29.91 ~ 30.00	////	////	////		15
29.81 ~ 29.90	////	////			10
29.71 ~ 29.80	////	////	/		11
29.61 ~ 29.70	////	//			7
29.51 ~ 29.60	////				5
29.41 ~ 29.50	//				2
below 29.40					0
<b>Total</b>					<b>100</b>
<b>Comments:</b>	Check per.	Inspector	Editor	Date: ///	

**Defect Count Recording by Check sheet with categories**

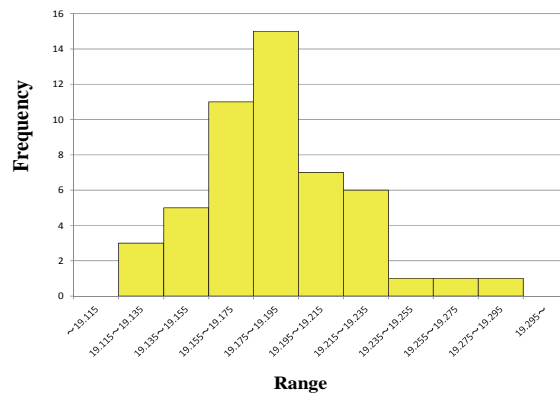
Defect Type	Insufficient Solder	Cold Solder	Solder Bridge	Blow Holes	Excessive Solder
Frequency	XXXXX XX	XX	XXX	XXXXX XXXXX XXXXX	XX
Total count	7	2	3	14	2

**Source of Defects by Check sheet with stratification**

		Machine 1	Machine 2
Operator A	Morning	X	X
	Afternoon	XX	XXXXX X
Operator B	Morning	X	XX
	Afternoon	XX	XXXXX XXXX

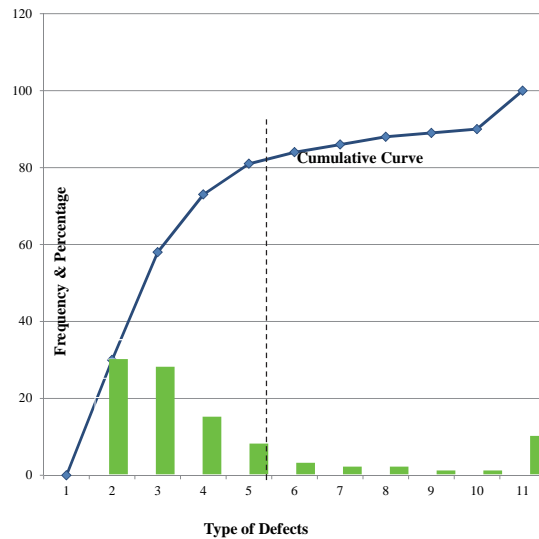
**2. Histogram**

**Histogram Diagram**



### 3. Pareto Diagram

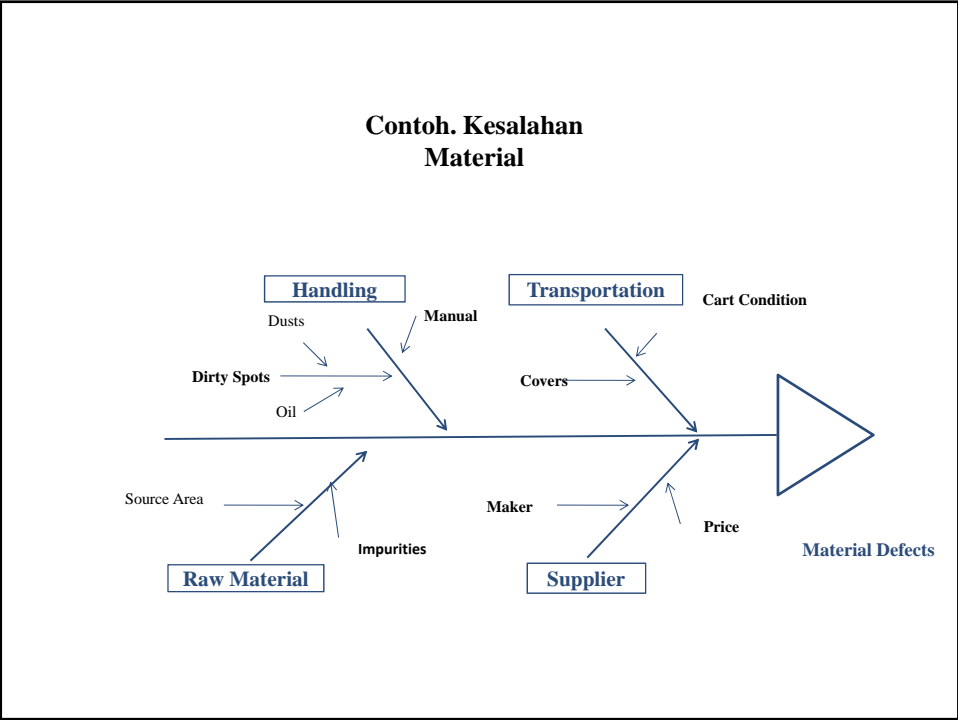
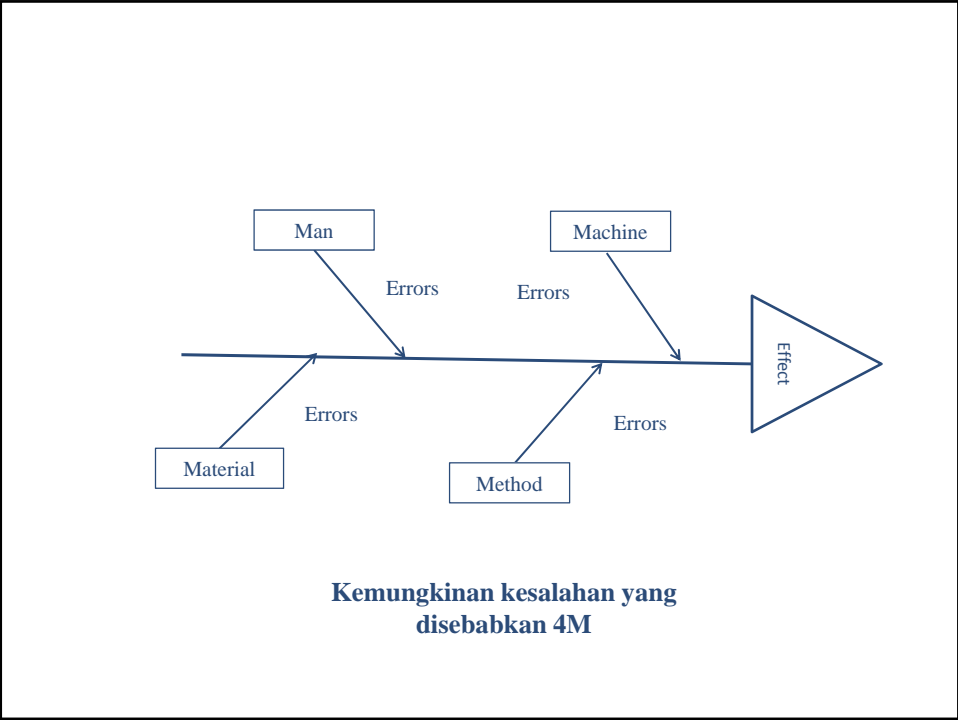
Beberapa item dipilih sebagai target agar mencapai perbaikan lebih besar dari 70% ~90%



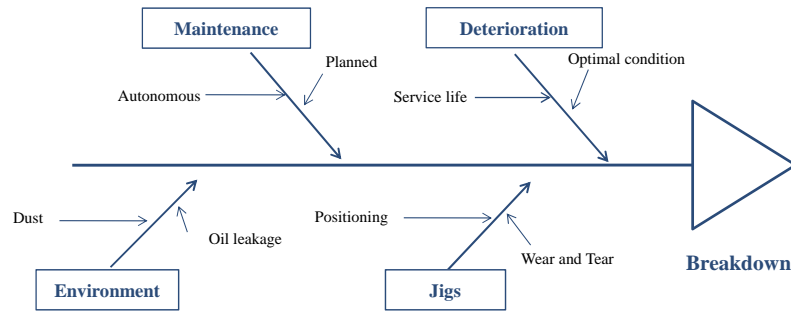
### 4. Diagram sebab akibat (Cause & Effect Diagram) (Fish Bone)

~ Prosedur ~

- Diskusikan item yang berpotensi menjadi penyebab dan klasifikasikan sesuai 4 M
- Pilih item dengan kemungkinan terbesar dan diskusikan secara detail.
- Identifikasikan beberapa item sebagai akar penyebab.

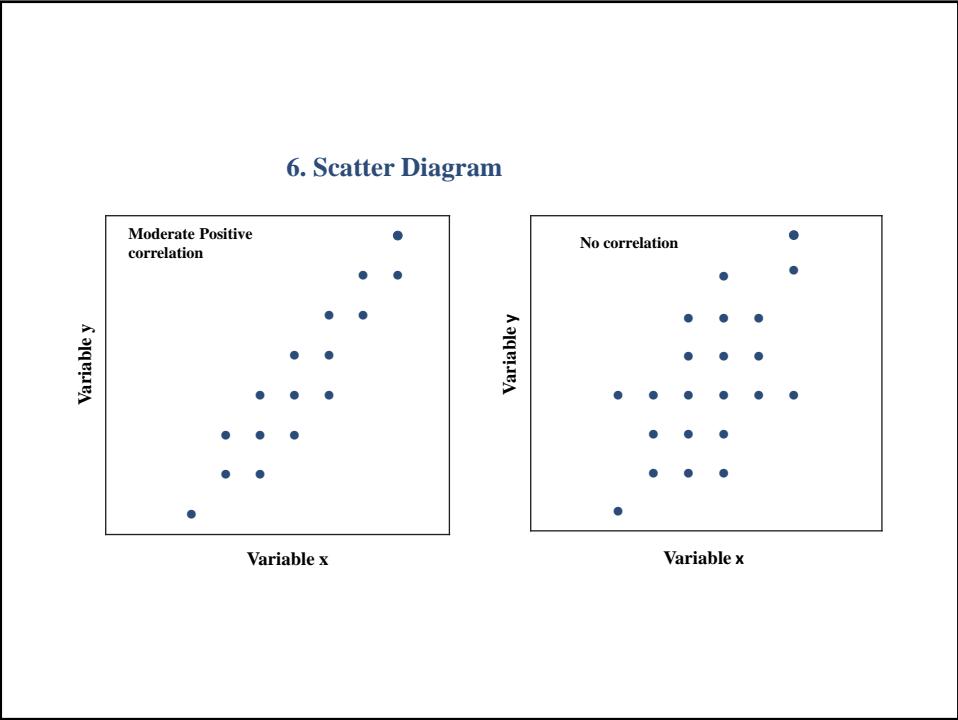
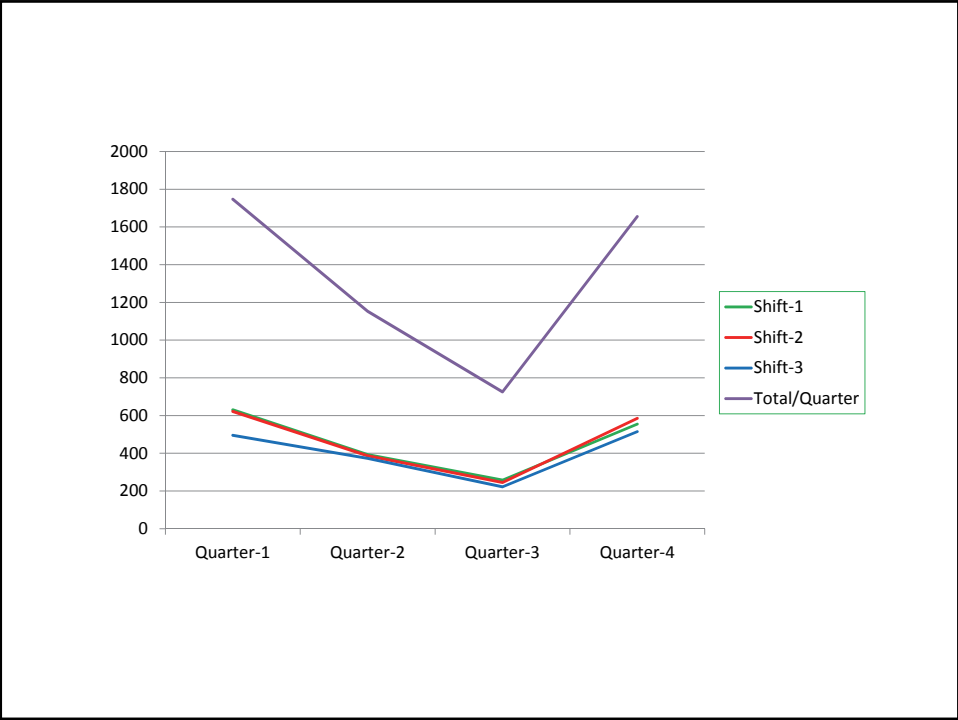


### Example. Machine Errors

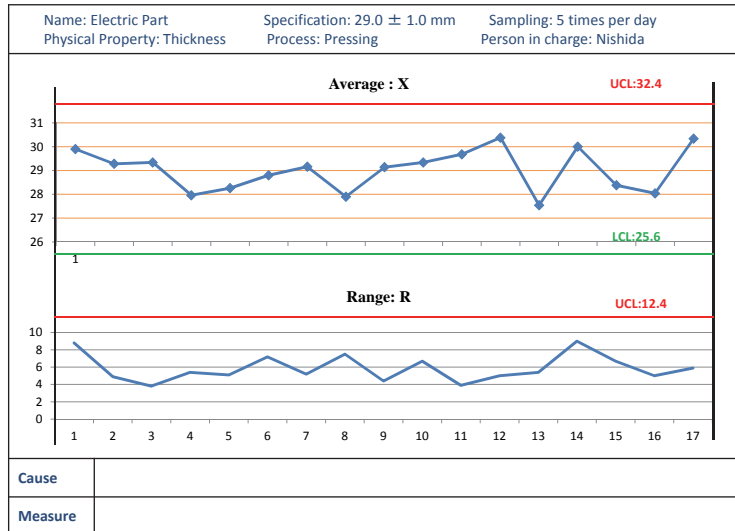


### 5. Stratification

	Shift-1	Shift-2	Shift-3	Total/Quarter
Quarter-1	630	622	495	1747
Quarter-2	393	387	373	1153
Quarter-3	258	245	222	725
Quarter-4	555	585	515	1655



### 7. Control Chart



**【Dokumen-4. IE dan cara pemakaiannya】**



### **Process Analysis**

Process Analysis adalah alat untuk mengklarifikasi alur material dan operasional saat produk dibuat di proses dan oleh pekerja.

### **Tujuan:**

Menemukan bottle-neck, atau proses yang memiliki banyak WIP

### **Tujuan: Mengurangi Muda-A & B**

#### **Muda-A: Related Materials**

1. Over Production
2. Defects
3. Inventory

#### **Muda-B: Related Time**

1. Waiting Time
2. Set-up
3. Rework
4. Transportation

## Graphical Symbols

Processing (○)  
Transportation (○)  
Inspection (□)  
Stoppage (▽ as WIP)  
(△ as Material)

## Pendekatan Kaizen

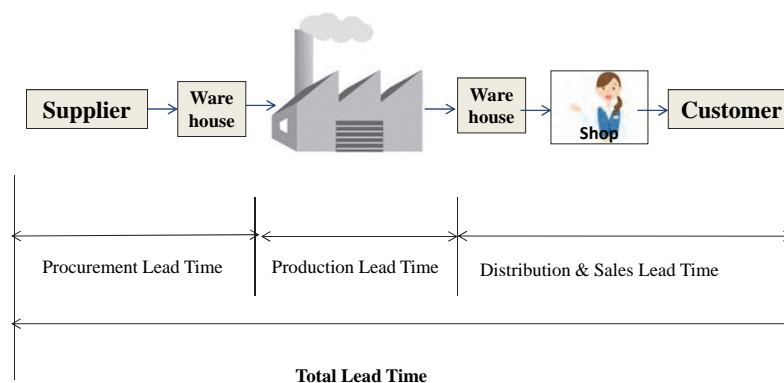
**(ECRS)**

E: Eliminate  
C: Combine  
R: Rearrange  
S: Simplify

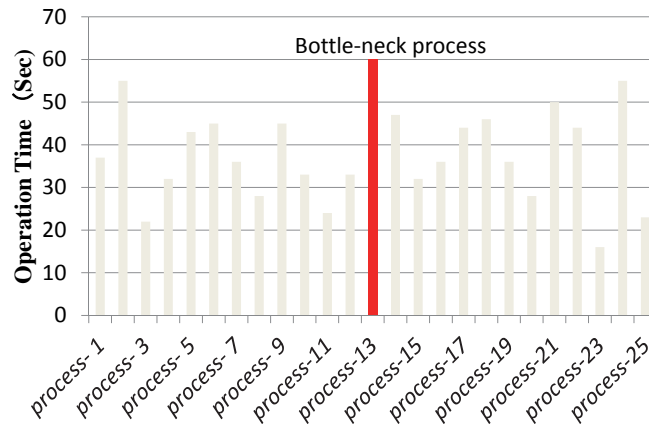
## Productivity Enhancement

1. Lead Time
2. Line Balance Efficiency (L.B.E.)
3. Case Study of L.B.E Improvement

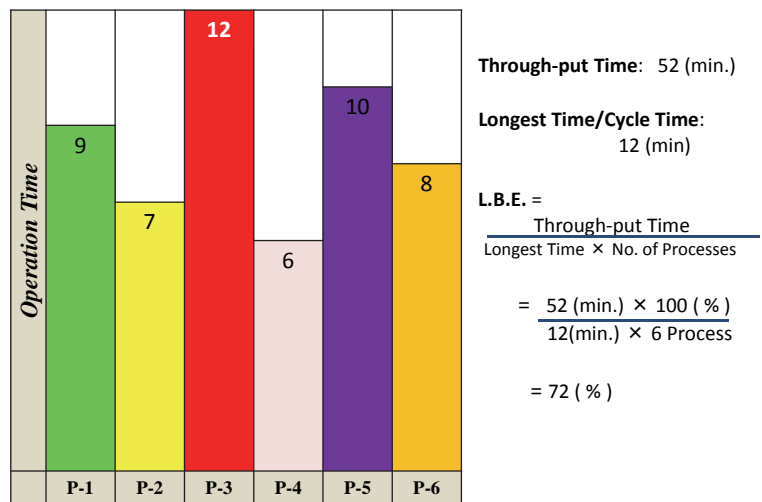
## Lead Time



### Line Balance Efficiency (L.B.E)



### Line Balance Efficiency(LBE)





## ANNEX 11

### Overviews of the Pre-training and the Training in Japan on Production Management for Top Management in the Third Year

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## Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery



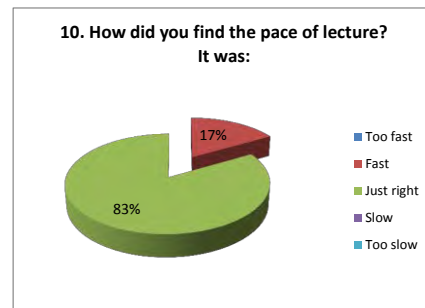
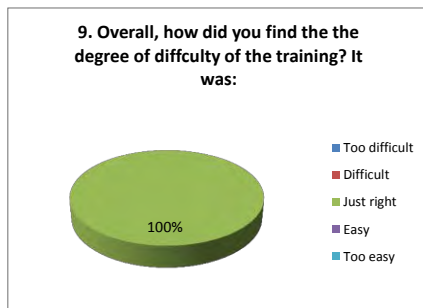
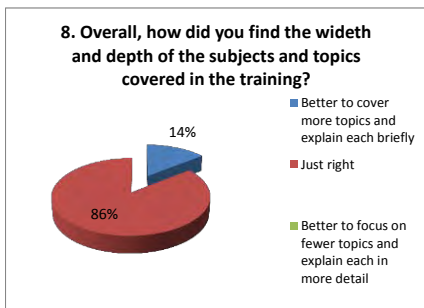
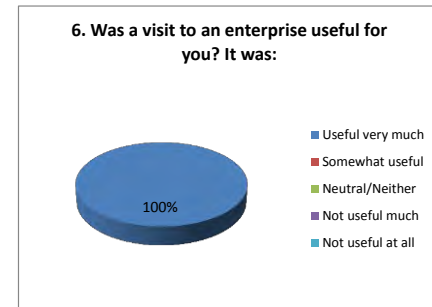
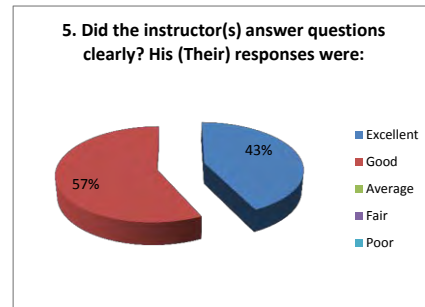
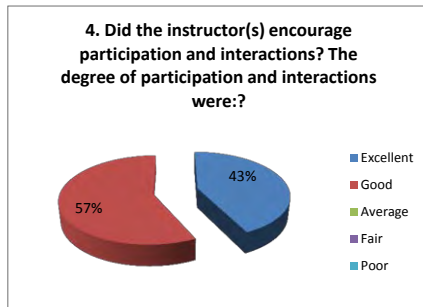
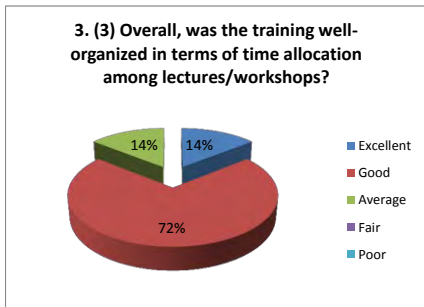
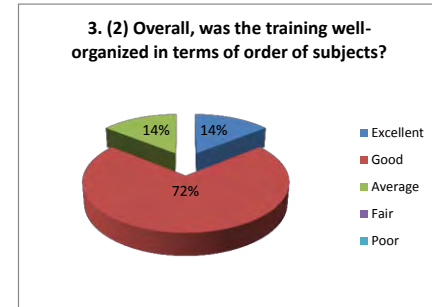
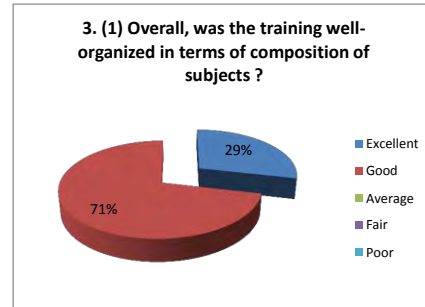
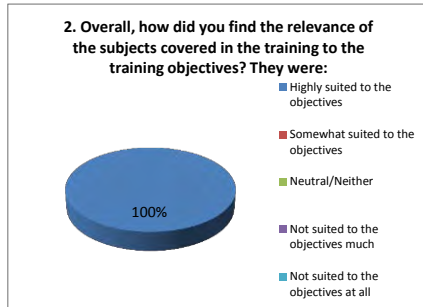
### Schedule Pelatihan Top Management dan Pengajar

#### (1) Pelatihan Manajemen Produksi Indonesia (Pre-Training)

	Hari		Waktu	Isi Pelatihan	Pengajar
1	1-Aug	Senin	8:00 ~ 8:30	Pendaftaran	
			8:30 ~ 9:20	Pembukaan • Orientasi	JICA Team
			9:20 ~ 9:40	Istirahat	
			9:40 ~ 11:00	Kemampuan Manajemen (1. Terhadap Customer)	N. ARAI
			11:00 ~ 11:30	Pengumuman	
			11:30 ~ 12:30	Istirahat	
			12:30 ~ 13:50	Teknologi Manajemen (1. Asal dan sejarahnya)	T. NISHIDA
			13:50 ~ 14:00	Istirahat	
			14:00 ~ 15:20	Teknologi Manajemen (2. Ciri Jepang : Kaizen, QC Circle)	T. NISHIDA
			15:20 ~ 15:30	Pengumuman	
2	2-Aug	Selasa	8:30 ~ 9:50	Teknologi Manajemen (3. Ciri Jepang : 5S, Quality Control berdasar statistik)	RURUT AMIRU
			9:50 ~ 10:00	Istirahat	
			10:00 ~ 11:20	Pengenalan contoh kasus (5S, Maintenance sendiri)	RURUT AMIRU
			11:20 ~ 11:30	Pengumuman	
			11:30 ~ 12:30	Istirahat	
			12:30 ~ 13:50	Pengenalan contoh kasus 5S di MIDC	AGUS HERMAWAN
			13:50 ~ 14:00	Istirahat	
			14:00 ~ 15:20	Pengenalan contoh kasus 5S di MIDC	AGUS HERMAWAN
15:20 ~ 15:30	Pengumuman				
3	3-Aug	Rabu	8:30 ~ 9:50	Manajemen Perusahaan: Edisi Dasar (Kepuasan pelanggan dan Mutu management)	T. NISHIDA
			9:50 ~ 10:00	Istirahat	
			10:00 ~ 11:20	Manajemen Perusahaan: Edisi Dasar (Profitabilitas)	T. NISHIDA
			11:20 ~ 11:30	Pengumuman	
			11:30 ~ 12:30	Istirahat	
			12:30 ~ 13:50	Manajemen Perusahaan: Struktur Perusahaan	T. NISHIDA
			13:50 ~ 14:00	Istirahat	
			14:00 ~ 15:20	Manajemen Perusahaan: Strategi Perusahaan	T. NISHIDA
15:20 ~ 15:30	Pengumuman				
4	4-Aug	Kamis	~	PT. Komatsu Indonesia	
5	5-Aug	Jumat	8:30 ~ 9:50	Manajemen Perusahaan: Manajemen Proses (1)	T. NISHIDA
			9:50 ~ 10:00	Istirahat	
			10:00 ~ 11:20	Manajemen Perusahaan: Manajemen Proses (2)	T. NISHIDA
			11:20 ~ 11:30	Pengumuman	
			11:30 ~ 13:00	Istirahat	
			13:00 ~ 14:20	Pengenalan contoh kasus: Kaizen (perbaikan) kualitas	T. NISHIDA
			14:20 ~ 14:30	Istirahat	
			14:30 ~ 15:50	Pengenalan contoh kasus: Peningkatan produktivitas	T. NISHIDA
			15:50 ~ 16:00	Pengumuman	



Training for Top Management (Production Management) (1 - 5 August, 2016) Feedback



**7. Please give us any comments and/or suggestions on the visit to the enterprise.**

Useful (2)

It was useful to see how KOMATSU is doing 5S and TQM.

The visit gave us an opportunity to compare KOMATSU and our enterprise and see where we are in terms of 5S implementation.

Would like to visit an enterprise which is not implementing 5S.

**11. Please name the subject or topic which you found the most valuable in the training.**

TQM, IE, QC 7 tools, Policy and management of enterprise

5S case study

Management technology

Management

5S and management

**12. Please name, if any, subjects or topics which you need more explanation.**

Management

Process management, Productivity improvement

KAIZEN, management technology

**13. Please name, if any, subjects or topics which you think should have been covered in the training.**

Defect reduction, Productivity improvement of employees

Statistics

**14. Please name, if any, subjects or topics which you think may be deleted from the training.**

No answer

**16. Please give us any comments and/or suggestions.**

Using more figures and/or illustration is helpful for better understanding.

Good training (2)

Hope the training is longer next time.

Project on Enhancement of  
Metalworking Capacity for Supporting  
Industries of Construction Machinery  
in Indonesia

Completion Report on Training in Japan  
(Production Management)  
(The 3rd)

September 2016

UNICO INTERNATIONAL CORPORATION  
Japan Development Service Co., Ltd.

## 1. Report on Production Management Training

### 1.1 Course Outline

(1) Course's title: Training on Production Management

(2) Training period

August 21, 2016 (Sun) (Participants arrived in Japan) – September 3, 2016 (Sat)  
(Participants returned to Indonesia) – 14 days

(3) Number of participants and classification by organization

This training course was conducted for staff in the metalworking organizations relating to the “Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia” and personnel of related enterprises in top management positions, totaling 7 persons<sup>1</sup>. A participant from an enterprise returned to Indonesia on August 27, receiving a notice that her close relative had passed away.

(The list of participants is shown in 2. Appendix 2.1)

Table 1 Classification of Participants in the Training Course by Organization

Metal Industry Development Centre (MIDC)	2
Tegal Dinas	2
Private companies	3
Total	7

Source: JICA Project Team

### 1.2 Training Outline

(1) Training design concept

The training course for top management is planned to be conducted for three times, once in each of the three consecutive years from 2014, and this course constitutes the third one. As in

<sup>1</sup> This training course was conducted simultaneously with the Training on Casting Technology (with Focus on Steel Casting), as a part of the “Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia.” The original project plan expected 15 participants in the casting technology course and 5 in the production management course, based on the Record of Discussions (R/D) of the Ministry of Industry (MOI) and Japan International Cooperation Agency (JICA). However, since the MOI requested to increase the number of participants in the latter, the project increased it to seven this year while reducing that to the former to 13.

the last two courses, it was implemented as a package combined with pre-training in Indonesia, which was held on August 1-5.

As for the objective and course items, the training course was designed to promote further understanding of production management on the basis of what the participants learned in the pre-training course, and learn how Japanese casting enterprises run factories as well as how support institutions help enterprises under the industry-government-academia partnership. As knowledge relating to casting technology is essential for upgrading overall levels of production technology, some lectures and factory visits have covered casting technology.

Fig.1 shows the project goal, outcome and their connection with major activities in the "Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia." The trainees are expected to give on-site guidance to enterprises with fellow middle management course trainees or conduct activities for quality and productivity improvement under the on-site guidance toward the achievement of the project goal: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.

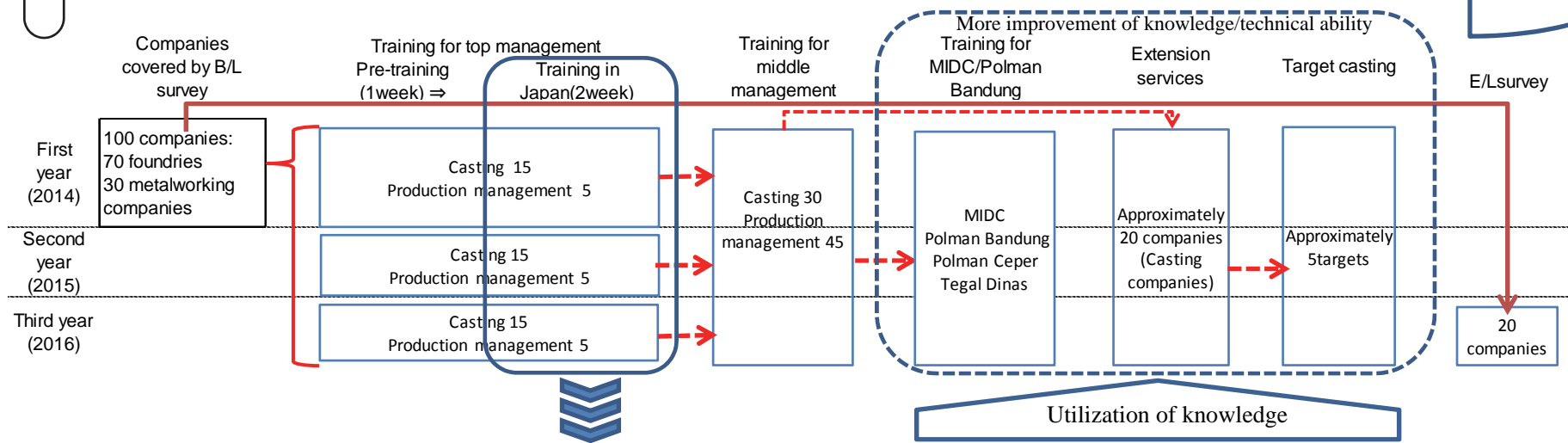
Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia

Project goal: Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations

Outcome:

- (1) Technical service providing capacity of targeted metalworking organizations for foundries on casting (in particular, steel casting) including production management is improved.
- (2) Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.
- (3) An action plan for sustainable development of service providing capability on metalworking for supporting industries or construction machinery is drafted.

Achievement/Realization



Training on Production Management in Japan

Training goal: To learn and understand production management technology required for staff in the metalworking organizations and top management of private enterprises in related industry

Training items: (1) To learn production management technology

(2) To understand trends relating to the Japanese construction machinery industry and manufacturing in general

(3) To review examples of support systems by Japanese technical support organizations

(4) To review examples of working of Japanese certification system relating to casting skills

(5) To visit metal working companies and construction machinery companies in Japan including steel casting to learn their practice for the purpose of applying it to the participants' organizations

and enterprises

Source: JICA Project Team

Fig.1 Overall Conceptual Design of the Training Course on Casting

## (2) Training schedule and course outline

Table 2 shows the training schedule. More detailed timetable is shown in Appendix 2.2 “Detailed Training Plan (Actual Version).” The field tour to a local foundry scheduled on August 30 was canceled due to a typhoon.

Table 2 Training Schedule

Date	Time	Type	Course Outline	Place of training
Aug.21(Sun)	~		Arrival	
Aug.22(Mon)	10:00 ~ 12:30		Briefing	JICA Tokyo (TIC) 4F SR403
	13:30 ~ 14:50		Systems to make workshops profitable (1)	
	15:00 ~ 16:30	Lecture	Systems to make workshops profitable (2)	
Aug.23(Tue)	9:00 ~ 10:20	Lecture	What is management? (management philosophy, corporate culture, corporate organization)	JICA Tokyo (TIC) 4F SR404
	10:30 ~ 12:00	Lecture		
	13:00 ~ 14:20	Lecture	Management strategy (management planning, management resources, and business domains)	
	14:30 ~ 16:00	Lecture		
Aug.24(Wed)	10:00 ~ 12:00	Field Tour	Field tour to a foundry	Nippon Chuzo Co., Ltd.
	14:20 ~ 15:40	Lecture	Management analysis (analytical techniques, balance sheet, profit and loss statement)	JICA Tokyo (TIC) 4F SR404
	15:50 ~ 16:20	Lecture		
Aug.25(Thu)	10:20 ~		Travel to Morioka, Iwate Prefecture	
	14:30 ~ 16:00	Lecture	Iwate meister system: origins and results	
Aug.26(Thu)	9:00 ~ 10:20	Lecture	Examples: guidance for local foundries by Research Center for Casting Technology of Iwate University	Ditto
	10:30 ~ 12:00	Field Tour	Field tour to Research Center for Casting Technology of Iwate University	
	13:00 ~ 14:20	Lecture	Examples: management of small- and mid-sized iron foundries	
	14:30 ~		Independent research, Report preparation	
Aug.27(Fri)	9:00 ~ 12:00	Lecture	Technology-driven management (manufacturing technology strategy, management strategy)	Ditto
	12:45 ~		Travel to Sendai, Miyagi Prefecture	
Aug.28(Sat)			Independent research, Report preparation	
Aug.29(Sun)	7:00 ~		Travel to Kitagami, Iwate Prefecture	Iwate Iron Co., Ltd. Oshu Casting Technology Exchange Center Mizusawa Chuzosho Co., Ltd.
	9:00 ~ 10:30	Field Tour	Field tour to a foundry	
	11:30 ~ 13:00	Lecture	Industry-government-academia partnership underway	
	14:00 ~ 16:00	Field Tour	Field tour to a foundry	
	16:00 ~		Travel to Akita Prefecture	
Aug.30(Tue)	10:20 ~ 12:00	Field Tour	Field tour to a foundry -Canceled due to the typhoon	Hokko Metal Co., Ltd.
	13:30 ~ 15:00	Field Tour	Field tours to foundries (*cancelled)	Tohoku Kikai Seisakusho Co., Ltd.
	15:10 ~		Travel to Fukushima	
Aug.31(Wed)	9:00 ~ 9:15	Field Tour	Overview of Fukushima Steel Works Co., Ltd.	Fukushima Steel Works Co., Ltd.
	9:20 ~ 10:40	Lecture	Machining process	
	10:50 ~ 12:00	Lecture	Machining process	
	13:00 ~ 15:00	Field Tour	Field tour to a foundry	
	15:10 ~ 16:00	Field Tour	Q & A	
Sep.1(Thu)	16:10 ~		Travel to Tokyo	JICA Tokyo (TIC) 4F SR201
	9:00 ~ 10:20	Lecture	Formulation of business plans and production plans	
	10:30 ~ 12:00	Lecture	Process Management (Waste Elimination, Toyota Production System, Total Quality Management)	
	13:00 ~ 14:20	Lecture	Quality control (customer needs and service)	
Sep.2(Fri)	14:30 ~ 16:00	Lecture	Quality assurance (quality assurance system, quality inspection, product liability)	JICA Tokyo (TIC) Annex 2F Room A
	10:30 ~ 12:00		Self-education and report preparation	
Sep.3(Sat)	14:00 ~ 17:00		Wrap-up Meeting (Presentation/Evaluation)	JICA Tokyo (TIC) Annex 2F Room A+B
	~		Departure	

Source: JICA Project Team

## (3) Training curriculum

Table 3 presents a general outline of the training curriculum that has been planned according to the training goals and items.

Table 3 General Outline of the Training Curriculum

Training goal	Training item	Training programs
To learn and understand production management technology required for staff of technical support organizations and top management of private enterprises.	1) To learn production management techniques	<ul style="list-style-type: none"> <li>a. Systems to make workshops profitable (1) (2)</li> <li>b. What is management? (management philosophy, corporate culture, corporate organization)</li> <li>c. Management strategy (management planning, management resources, and business domains)</li> <li>d. Management analysis (analytical techniques, balance sheet, profit and loss statement)</li> <li>e. Machining Process</li> <li>f. Formulation of business plans and production plans</li> <li>g. Process Management (Waste Elimination, Toyota Production System, Total Quality Management)</li> <li>h. Quality Control</li> <li>i. Quality Assurance</li> </ul>
	2) To understand trends relating to the Japanese construction machinery industry and manufacturing in general	<ul style="list-style-type: none"> <li>j. Technology-driven management (manufacturing technology strategy, management strategy)</li> </ul>
	3) To learn an example of support systems by Japanese technical support organizations	<ul style="list-style-type: none"> <li>k. Example: guidance for local foundries by Research Center for Casting Technology of Iwate University</li> <li>l. Field tour to Research Center for Casting Technology of Iwate University</li> <li>m. Industry-government-academia partnership in practice</li> </ul>



Training goal	Training item	Training programs
	4) To learn an example of Japanese certification systems relating to casting skills	n. Iwate meister system: origins and results – Canceled
	5) To visit foundries in Japan to learn their practice for the purpose of applying it to the participants' organizations and enterprises	o. Field tour to a foundry (Nippon Chuzo Co., Ltd.) p. Example: management of small- and mid-sized iron foundry q. Field tour to a foundry (Iwate Iron Co., Ltd.) r. Field tour to a foundry (Mizusawa Chuzosho Co., Ltd.) s. Field tour to a foundry (Hokko Metal Co., Ltd.) -Canceled t. Field tour to a foundry (Tohoku Kikai Seisakusho Co., Ltd.) -Canceled u. Field tour to a foundry (Fukushima Steel Works Co., Ltd.)

Source: JICA Project Team

General outlines of individual training programs are as follows.

1) To learn production management techniques

a. Systems to make workshops profitable (1) (2) (lecture)

Lecturer: Mr. Ikuo Ichino (Senior consultant, Japan Development Service, Co., Ltd.)

Outline: A general outline of systems to make foundries profitable and their basic concepts (break-even point, basics of production activity, quality control and environmental management, concept and elimination of wastes, factory unit cost management, and cost reduction techniques)

b. What is management? (management philosophy, corporate culture, corporate organization) (lecture)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Basic knowledge on company and management (differences in ideas and philosophies on company and management over various historical periods and among different cultures, and among countries), and general outlines of management philosophies of leading Japanese managers with distinguished philosophy, including Mr. Kounosuke Matsushita, Mr. Toshio Idemitsu, and Mr. Ikujiro Nonaka, together with various SME managers

c. Management strategy (management planning, management resources, and business

domains) (lecture)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Management strategy formulation process, operation and management of parts industries and management strategy (including examples in the parts industry in emerging countries), and exercise on SWOT analysis

- d. Management analysis (analytical techniques, balance sheet, profit and loss statement) (lecture)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Basic knowledge on management analysis (financial statements, production/sales costs, break-even point), and management analysis techniques

- e. Machining Process (lecture)

Lecturer: Mr. Mikio Yonezawa (Department Manager, Department of Machining Process,, Fukushima Steel Works Co., Ltd.)

Outline: Outline of major machining processes, overview of process management techniques and its application

- f. Formulation of business plans and production plans (lecture)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Policy management, target management, and day-to-day management, key points in standardization and defect reduction, and incorporation of quality control in the production process

- g. Process Management (Waste Elimination, Toyota Production System, Total Quality Management)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Process management based on the Toyota Production System including Kanban method and Kaizen activities

- h. Quality control (customer needs and service) (lecture)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Objectives of quality control, and a general outline of quality control and management techniques in the production process (including 7 QC tools)

- i. Quality assurance (quality assurance system, quality inspection, product liability)

(lecture)

Lecturer: Mr. Kouzou Sakai (President, Sakai Engineering and Management Consulting)

Outline: Difference between quality control and quality assurance, significance of quality assurance, recall cases of Toyota Motor Corporation, FTA and FMEA, organization for quality assurance and its roles, major functions of quality assurance department of the manufacturing industry, quality assurance system diagram, and quality assurance and ISO

2) To understand trends relating to the Japanese construction machinery industry and manufacturing in general

j. Technology-driven management (manufacturing technology strategy, management strategy) (lecture)

Lecturer: Mr. Masayoshi Watanabe (Guest Professor, Department of Science and Engineering of Iwate University)

Outline: Japan's development strategies and strength of Japanese style mono-zukuri (manufacturing) (mass production, human resources and uniformity), and importance of role of the machine parts industry as the basis of manufacturing

3) To learn an example of support systems by Japanese technical support organizations

k. Examples: guidance for local foundries by Research Center for Casting Technology of Iwate University (lecture)

Lecturer: Mr. Hiroshi Horie (Guest Professor, Department of Science and Engineering of Iwate University)

Outline: Role and activity record of Research Center for Casting Technology, and cases of local and international contributions by the center

l. Field tour to Research Center for Casting Technology of Iwate University (field tour)

Outline: Field tour with focus on learning the current state of research and development systems and equipment relating to dies/molds, casting, and complex devices, together with industry-academia joint research facilities and equipment that serve as a core of R&D and human resource development relating to mono-zukuri technology, and actual working of industry-academia collaboration

m. Industry-government-academia partnership underway (lecture)

Lecturer: Mr. Yoshiyuki Shoubuzawa (Specially Appointed Professor, Department of Science and Engineering of Iwate University)

Outline: Ongoing collaborations by Iwate University, Iwate Industry Promotion Center, Iwate Prefecture Industrial Technology Center, and companies in Iwate Prefecture, issues facing the foundry industry in Iwate, creation of Nambu Ironware and manufacturing steps for craft ironware, collaboration by Mizusawa Casting Study

Group (under the Mizusawa Foundry Industry Cooperative), Iwate University, and Iwate Prefecture Industrial Technology Center, and the outcomes of related technical development initiatives in response to the needs of companies in the prefecture

- 4) To learn an example of Japanese certification systems relating to casting skills
  - n. Iwate meister system: origins and results (lecture)

Lecturer: Mr. Sadahito Hiratsuka (Professor, Department of Science and Engineering of Iwate University)

Outline: Overview of the Iwate meister fostering project designed to train “human resources for 21<sup>st</sup> century manufacturing” who work for local enterprises and are capable of contributing to local development, an education curriculum for molding and foundry engineering in the graduate school of Iwate University, which serves as a place of human resource development of the project, and the meister accreditation system
- 5) To visit foundries in Japan to learn their practice for the purpose of applying it to the participants’ organizations and enterprises
  - o. Field tour to a foundry (Nippon Chuzo Co., Ltd.) (field tour)

Outline: Field tour to observe and study production systems for cast steel products by a large scale company in Japan
  - p. Examples: management of small- and mid-sized iron foundries (lecture)

Lecturer: Mr. Kenzo Maeda (President, Shibata Seisakusho)

Outline: General outline of Shibata Seisakusho, the company’s guiding precepts as casting specialist organization, and management strategy of the company based on SWOT analysis
  - q. Field tour to a foundry (Iwate Iron Co., Ltd.) (field tour)

Outline: Field tour to observe and study production systems and technologies for cast iron products and aluminum castings of all sizes
  - r. Field tour to a foundry (Mizusawa Chuzosho Co., Ltd.) (field tour)

Outline: Field tour to study integrated production systems operated by a small and medium-sized foundry in Japan, from casting to machining and coating
  - s. Field tour to a foundry (Hokko Metal Co., Ltd.) (field tour) -canceled; course materials have been distributed  

Outline: Field tour to study production systems for cast iron products operated by a small and medium-sized foundry in Japan
  - t. Field tour to a foundry (Tohoku Kikai Seisakusho Co., Ltd.) (field tour) -canceled;

course materials have been distributed

Outline: Field tour to study production systems for cast iron products operated by a small and medium-sized foundry in Japan

- u. Field tour to a foundry (Fukushima Steel Works Co., Ltd.) (field tour)

Outline: Field tour to observe production systems for cast steel products and the Anzen Do-jo for safety education by a large scale company in Japan

### 1.3 Reviewing of the Training Course

#### (1) Lectures

As the levels of knowledge on production management were not particularly high among the participants, each lecture was designed to include basic knowledge in relevant fields. Since target of the training course were persons in top management positions, the training course offered lectures about process management in production fields as well as business management.

Lectures regarding methods and techniques included group works, Q and A, and discussions about management control and production management case studies of the enterprises/organizations the trainees are belonging to, emphasizing on applying specific methods and techniques and thereby understanding their current conditions, considering possible choices in management and looking for specific measures for reducing manufacturing cost. Furthermore, the training course was designed to let them learn and inspire from examples with specific figures of Japanese foundries about business environment, strategies, cost structure, methods and approaches to keep making profit.

Contents of the training course is considered to match the needs of the trainees given that they showed strong will "utilize this learning opportunity to improve management and process management conditions" as described later.

#### (2) Discussion, practical training, workshop, and presentation

The trainees performed presentation on the topics below in the evaluation meeting held in the afternoon of September 2nd, the final day of the training course. For this presentation, the trainees separated into two groups: (Group 1) Trainees from MIDC and Tegal Dinas, (Group 2) Trainees from private companies.

- 1) Valuable or impressive items, learning experiences
- 2) Possible application of learnings in activities of their organizations and workplaces (draft plan)

Group 1 proposed a draft plan which included promotion of the industry-government-academia partnership, information dispatch through media channels about support their organizations provide, holding of training sessions for safety education and human

resource development, implementation of on-site guidance at companies, and development of technical certification and product certification systems.

Group 2 listed activities to undertake after returning to Indonesia: setting up strategies and plans based on facts and data, development of operation manuals, day-to-day management by daily reports, and implementation of Kaizen activities driven by all staff for quality and productivity improvement.

Asked to think about necessary budget and implementation period as concrete as possible while preparing the draft plan, Group 1 indicated necessary budget necessary for the activities as well as and showed a specific implementation period. The project hopes that they actually put the plan into practice, not forgetting it as a plan just for presentation.

(3) Field tour

The training program included field tours of small/medium and large sized foundry companies. However, field tours of two companies were cancelled due to the typhoon. As trainees were encouraged to observe and question on process management and human resource development of Japanese companies, there were no complains such as “I wanted to visit factories other than casting foundries” although none of the trainees were from casting organizations/companies. While many manufacturing companies in Indonesia tend to underestimate safety education and safety measures, a field tour to the Anzen Do-jo at the Fukushima Steel Works Co., Ltd. became a remarkable opportunity to recognize importance of safety education.

On the other hand, although it is natural for the Japanese enterprises to protect business secrets, the number of opportunities when the trainees could take photos of manufacturing sites decreased, comparing with the last year and the year before last. Also, a trainee commented that it would have been better if there was more time to ask questions.

(4) Training period, arrangement of lecture and field tour sessions, and course content

As previously mentioned, the training course was implemented as a package combined with the 5-day pre-training course in Indonesia. The course was designed with the same goals and items as those of the training courses in the past two years, with a primary aim to obtain basic knowledge and concept of quality control and business management that those in top management positions need to understand, while covering key information on a support system for companies as well, which can be useful for staff members of support organizations.

This training course started with a lecture in Tokyo. After a field tour to a foundry in Kawasaki, an activity base was moved to Morioka, followed by a lecture in Iwate University and foundry field tours in the Tohoku region. Then, an activity base was returned to Tokyo for lectures and wrap-up. Although frequency of travelling lowered comparing with last year and the year before last, the schedule still included frequent

travelling. Besides, trainees had to carry around their entire luggage as the final accommodation in Tokyo was not JICA Tokyo. As a result, some participants commented that keep travelling from one place to another made them tired.<sup>2</sup>

Even though it is difficult to always satisfy all the trainees consisting of staff from metal processing support organizations and managers in private companies, the training program was designed with a balance to meet the needs of both parties. For instance, a lecture of the industry-government-academia partnership showed a case study of a company supported in the partnership and its accomplishment. Also, a discussion of the company SWOT analysis encouraged trainees from support organizations to consider what kind of support they could offer to improve business opportunities and to reduce threats for private companies of private enterprises.

(5) Course materials, facilities and equipment

As carried out last year and the year before last, text materials for the training course were all translated to Indonesian and distributed to the trainees on the first day, while text materials which lecturers permitted them to use back in Indonesia were summarized in CD-R and distributed to them on the last day of the training.

Lectures were held mainly in JICA Tokyo and the Department of Science and Engineering of Iwate University including the Research Center for Casting Technology, while some lectures took place in meeting rooms of companies visited in field tours. In both cases, lectures were delivered in an environment which trainees could concentrate on them. In foundries, the Panaguide (wireless audio transmitter/receivers) was supplied for each trainee as noise level was high inside foundries. Also a helmet was distributed to each trainee as a safety measure during field tours in foundries.

#### 1.4 General Profiles of Participants

(1) Qualification requirements

Since this training program is primarily designed for those in top management positions, it was requested to the project's main counterpart - the Ministry of Industry - to recruit and select companies' supervisor-class personnel in charge of business management and production, as well as from those engaged in the "Project to strengthen metalworking capability of supporting industries of construction machinery in Indonesia," while meeting the following qualification requirements:

- 1) Recommendation by the Indonesian government;
- 2) Person who is expected to manage a company or organization in the future (top

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<sup>2</sup> There were no similar comments from trainees of Training on Casting Technology (with Focus on Steel Casting), who travelled together with them.

- management);
- 3) Good health condition; and
- 4) Not in military service.

Since these personnel are generally in a difficult position to be absent from their workplaces for a two-week period, it was anticipated that the participants would not necessarily meet the qualifications. However, it turned out that all the selected participants were top management personnel.

(2) Motivation for participation and attitude during training

Participants generally showed very high motivation for learning. Even though participants in last year and the year before last also showed high motivation with active discussions and questions, strong motivation of the participants in this year, especially those from private companies, “to make full use of the learning opportunity in the training course and thereby apply learnings to improve company management and factory operation” was evident from their comments and questions. Also, it was observed that participants from supporting organizations considered seriously “what kind of support is possible to offer for development of companies.”

## 1.5 Future Application of Training Results

(1) Training results

As previously mentioned, it is difficult to meet diverse needs of the trainees with different backgrounds. Nevertheless, as estimated from the results of questionnaire surveys and comments heard from participants during the training, it is adequate to assume that the participants have returned to Indonesia with sufficient knowledge expected to learn and understand. Therefore, it is reasonable to judge that training course’s objectives have been accomplished.

(2) Expected applications of training results

This training course is designed as a package combined with a training program for middle management in Indonesia, on-site guidance at enterprises and development of a target casting, as shown in Figure 1. Participants of the training course consist of those from private companies previously dispatched trainees for the middle management training program, those from private companies which were receiving on-site guidance to develop a target casting, and those from supporting organizations to provide on-site guidance for enterprises as OJT.

Participants of this training course, past training courses and the future training course



are expected to share and apply their knowledge in their organizations/companies as a leader of management and quality/productivity improvement activities or expected to apply in on-site guidance activities for quality improvement and cost reduction.

#### 1.6 Training Environment

Lectures under the training program were conducted at JICA's Tokyo International Center, Iwate University, and meeting rooms of companies visited for field tours. All the facilities and equipment were provided in good conditions to ensure effective and efficient training as they were in the past two years.

#### 1.7 Special Notes

None

## 2. Appendices

### 2.1 List of the participants

No.	Name	Organization	Position
1	Mr. Purbaja Adi Putra	MIDC	Head of Machining and Welding Section
2	Mr. Helmi Hariyadi	MIDC	Head of Training Section
3	Ms. Eni Aryani	PT. Karya Paduyasa	Manager of Production Planning and Inventory Control (PPIC)
4	Mr. Bambang Susanto	Tegal Dinas	Director
5	Ms. Lasmini Nurhayati	PT. Arkha Jayanti	Director
6	Mr. Achmad Deddy Wirawan	PT. Prima Karya	Manager of Finance
7	Mr. Irsyat Sumarwanto	Tegal Dinas	Section Head, Plan and Data Analysis, Plan Division

Source : JICA Project Team

## 2.2 Detailed Training Plan (Actual)

Please refer to the page 4 of this report.

## 2.3 Evaluation (Feedback from the Trainees)

Contrastive Table between the Trainees and the numbers tied to them.

No.	Name
1	Mr. Bambang Susanto
2	Mr. Helmi Hariyadi
3	Mr. Purbaja Adi Putra
4	Ms. Eni Aryani
5	Mr. Achmad Deddy Wirawan
6	Mr. Irsyat Sumarwanto

**BAGIAN I Hasil pelatihan****Tujuan program**

**To learn and understand production management technology required for staff in the metalworking organizations and top management of private enterprises in related industry**

Q1. Apakah Anda telah mencapai Tujuan Program?

← Telah mencapai		Tidak mencapai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>4</b>	<b>2</b>		

Q2. Komentar dan saran (terutama jika tingkat penilaian Anda 1 atau 2).

**5. It was better if we could have visited small enterprises and/or receive lectures on them.**

Q3. Jawablah pertanyaan di bawah ini mengenai "mata pelajaran".

(1) Mata pelajaran yang sangat berguna

⟨Mata pelajaran⟩

1. 4. 6. Management strategy
3. Visit to enterprises
2. Process management
5. QC 7 tools
5. 5S
5. TQM
4. How to reduce defect rates

⟨Alasan⟩

4. We can earn more if we can reduce defect rates.
6. I learnt basics on business management, production planning, and business strategy.
3. I saw how Japanese enterprises apply technology and tools which I learnt in class.

2. It is useful for reducing defects.  
 5. Practicing 5S has become a part of culture in Japanese enterprises. 5S is useful for improving factory operation. QC 7 tools help us to find problems and look for solutions. TQM does to keep producing quality products and thereby increase customer satisfaction.

(2) Mata pelajaran yang tidak perlu

〈Mata pelajaran〉
〈Alasan〉

(3) Mata pelajaran yang tidak diberikan, tetapi perlu dimasukkan

〈Mata pelajaran〉
3. Safety control and workplace injury prevention
〈Alasan〉
3. To prevent human errors leading to mistakes and accidents

#### Tujuan Modul 1

To learn production management, support systems of technical support organizations, and skill qualification systems.

Q1. Apakah Anda telah mencapai Tujuan Modul 1?

← Telah mencapai		Tidak mencapai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1
1	5		

No answer 1

Q2. Komentar dan saran (terutama jika tingkat penilaian Anda 1 atau 2)

5. I hope that Indonesian technical support organizations also give technical advice to SMEs.

#### Module Output 2

To visit small and medium-sized casting enterprises (including those produce steel castings), learn situations and trends of manufacturing in Japan, and thereby use learnings back in Indonesia, either in their own enterprises or in the advisory service for enterprises.

Q1. Apakah Anda telah mencapai Tujuan Modul 2?

← Telah mencapai		Tidak mencapai →	
<input type="checkbox"/> 4 1	<input type="checkbox"/> 3 5	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1

2. Komentar dan saran (terutama jika tingkat penilaian Anda 1 atau 2)

**5. Japanese metal processing/ construction machinery enterprises are run efficiently. They have skilled employees and advanced machinery.**

Q3. Jawablah pertanyaan di bawah ini mengenai "mata pelajaran" dari seluruh Tujuan Modul.

(1) Mata pelajaran yang sangat berguna

⟨Mata pelajaran⟩

1. Management of technology
3. Visit to Fukushima Steel Works
2. Visit to casting enterprises
5. Quality control
4. Support system by technical assistance organizations

⟨Alasan⟩

3. Could see how a large enterprise with multiple units controls safety and health in.
2. Can compare them with Indonesian counterparts
5. Quality products deliver more value-added. Need to value quality more than quantity.
4. Assistance from public support organizations helps enterprises.

(2) Mata pelajaran yang tidak perlu

⟨Mata pelajaran⟩

⟨Alasan⟩

(3) Mata pelajaran yang tidak diberikan, tetapi perlu dimasukkan

⟨Mata pelajaran⟩

3. Visit to Shibata Seisakusho

⟨Alasan⟩

3. The enterprise, which performed poorly at one time, attains high profitability now.

**BAGIAN II Rancangan Pelatihan**

Q1. Apakah Anda merasa rancangan pelatihan ini sesuai bagi Anda atau organisasi Anda untuk mencapai Tujuan Program?

(✕rancangan pelatihan: susunan dan keseimbangan pada pelatihan)

← Sesuai		Tidak sesuai →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>2</b>	<b>4</b>		

Q2. Apakah lama pelatihan telah sesuai?

Lama	Sesuai	Singkat
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>6</b>	

Q3. Apakah menurut Anda jumlah peserta pelatihan ini telah sesuai?

Terlalu banyak	Sesuai	Terlalu sedikit
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>5</b>	<b>1</b>

Q4. Apakah Anda telah dapat belajar dari pengalaman peserta lain di pelatihan ini?

← Dapat		Tidak dapat →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>2</b>	<b>4</b>		

Q5. Apakah ada banyak kesempatan untuk memperoleh pengalaman secara langsung pada kunjungan ke lapangan dan praktik?

← Ada cukup banyak		Hanya sedikit →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1
<b>2</b>	<b>4</b>		

Q6. Did you have enough opportunities to participate actively in the course, such as discussions and workshops?

← Ada cukup banyak		Hanya sedikit →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1
<b>2</b>	<b>4</b>		

Q7. Apakah kuliah bermutu tinggi dan dapat dimengerti dengan baik?

← Puas		Tidak puas →	
<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>2</b>	<b>4</b>		

Q8. Apakah Anda puas dengan buku teks dan materi yang digunakan dalam pelatihan ini?

← Puas		Tidak puas →	
<input type="checkbox"/> 4 <b>2</b>	<input type="checkbox"/> 3 <b>4</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1

Q9. Apakah menurut Anda pengetahuan dan pengalaman di Jepang yang telah diperoleh melalui pelatihan ini akan berguna?

<input type="checkbox"/> A Ya, dapat digunakan secara langsung pada pekerjaan. <b>4</b>
<input type="checkbox"/> B Tidak dapat digunakan langsung, tetapi dapat diadaptasikan pada pekerjaan. <b>2</b>
<input type="checkbox"/> C Tidak dapat digunakan langsung atau diadaptasikan, tetapi dapat menjadi referensi bagi saya.
<input type="checkbox"/> D Tidak, sama sekali tidak berguna

Q10. Apakah Anda telah mendapat fasilitasi yang sesuai (misalnya saran untuk memahami kuliah lebih baik, saran untuk penyusunan Action Plan, dll.) untuk mencapai tujuan Anda ?

← Puas		Tidak puas →	
<input type="checkbox"/> 4 <b>2</b>	<input type="checkbox"/> 3 <b>4</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1

Q11. Apakah Anda puas dengan penerjemahan lisan dan layanan pengelolaan pelatihan (koordinasi dan persiapan yang dilakukan oleh koordinator pelatihan)?

	← Puas		Tidak puas →	
■Penerjemahan lisan	<input type="checkbox"/> 4 <b>4</b>	<input type="checkbox"/> 3 <b>2</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1
■Koordinasi	<input type="checkbox"/> 4 <b>3</b>	<input type="checkbox"/> 3 <b>2</b>	<input type="checkbox"/> 2	<input type="checkbox"/> 1 No answer <b>1</b>

Q12. Apakah Anda telah dapat memahami masyarakat dan budaya Jepang selama tinggal di Jepang?

← Dapat		Tidak dapat→	
<input type="checkbox"/> 4 <b>2</b>	<input type="checkbox"/> 3 <b>3</b>	<input type="checkbox"/> 2 <b>1</b>	<input type="checkbox"/> 1



Q13. Tandailah tingkat kepuasan Anda terhadap hal-hal di bawah ini terkait fasilitas penginapan.  
(※ Jika Anda tidak tinggal di JICA Center atau Hotel, tandailah dengan X.)

	←Puas		Tidak puas →		X
■Fasilitas di JICA Center	<input type="checkbox"/> 4 4	<input type="checkbox"/> 3 2	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Makanan di JICA Center	<input type="checkbox"/> 4 3	<input type="checkbox"/> 3 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Layanan di JICA Center	<input type="checkbox"/> 4 5	<input type="checkbox"/> 3 1	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Fasilitas di Hotel	<input type="checkbox"/> 4 5	<input type="checkbox"/> 3 1	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>
■Layanan di Hotel	<input type="checkbox"/> 4 5	<input type="checkbox"/> 3 1	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>

Q14. Tulislah komentar atau saran untuk perbaikan terkait pertanyaan no. 1 - 13 di atas

3. Appreciate if we could have more time for discussion when visiting enterprises.
4. All lectures were useful for me. Moving long distance with large bags many times for visiting enterprises made me tired.
5. Appreciate if hotels would have compasses to show the direction to Makkah
6. We spent a lot for moving from an enterprise to another one. If possible, it is better to stay at one place and visit enterprises in the city.

### **BAGIAN III Hal yang Ditemukan dan Dipelajari di Jepang**

1- 4.( Penting ):"Pengetahuan yang diperoleh di Jepang dan penggunaanya"

Q1. Di antara pengetahuan yang Anda peroleh melalui pelatihan ini, pilihlah pengetahuan yang berguna (metode, layanan, organisasi, sistem, konsep), teknik dan keahlian yang dapat diadopsi atau diadaptasikan untuk menyelesaikan masalah-masalah di negara Anda.

1. KAIZEN and 5S are needed in Indonesia, especially Indonesian SMEs so that they can grow.
2. Industrial system – to apply it in Indonesia.
3. Training on safety and health, KAIZEN.
4. Methods, systems, and concepts.
5. 6. Practice of 5S

Q2. Jelaskanlah mengapa pengetahuan tersebut berguna.

1. It helps SMEs to change a way of thinking and formulate plans and strategies.
2. A lot of SMEs need know-how.
3. It enables the management to find problems and countermeasures.
4. To improve labor productivity.

- 5. It makes clean well-organized and efficient.**  
**6. Practice 5S as the Japanese do.**

Q3. Jelaskanlah bagaimana itu diadopsi atau diadaptasikan ke dalam organisasi atau negara Anda. Selain itu, jelaskan pula jika ada masalah untuk mengadopsi atau mengadaptasikannya.

- 1. To hold a training for SMEs and tell them the concept of 5S. It is usefule for enterprises.**  
**2. The participants share what they have learnt with enterprises.**  
**3. To have a meeting in the morning every day to share information between sections and solve problems.**  
**4. Methods and systems are applicable in my enterprise.**  
**5. I would like to implement 5S in my enterprises. I'm sure it has a positive effect.**  
**6. Indonesian enterprises can apply 5S.**

Q4. Tandailah aspek Jepang atau karakteristik orang Jepang yang mengesankan Anda selama tinggal di Jepang.

<input type="checkbox"/>	Baik hati 4	<input type="checkbox"/>	Sangat detail 5
<input type="checkbox"/>	Tepat waktu 6	<input type="checkbox"/>	Sejarah dan budayanya bagus 1
<input type="checkbox"/>	Patuh terhadap peraturan 6	<input type="checkbox"/>	Makanannya enak 1
<input type="checkbox"/>	Giat bekerja 4	<input type="checkbox"/>	Bersih dan indah 6
<input type="checkbox"/>	Sopan 2	<input type="checkbox"/>	Keamanan terjaga 6
<input type="checkbox"/>	Pendiam	<input type="checkbox"/>	Terlalu macet
<input type="checkbox"/>	Bekerja berlebihan	<input type="checkbox"/>	Alamnya kaya 1
<input type="checkbox"/>	Lain-lain 1		

Episode peristiwa yang dialami terkait aspek dan karakteristik tersebut.

- (1)**
- 1. Someone took me to my destination when I got lost.**  
**2. Someone took me to TIC when I got lost.**  
**3. I got such an impression from the Japanese which I met in the training.**  
**4. Japanese are kind and try to help others.**  
**5. It is clean everywhere, towns and enterprises.**  
**6. Everything is conducted as scheduled.**

**(2)**

1. Training is conducted on time.
2. All training activities were conducted as scheduled.
3. I felt so from lectures and visits to enterprises.
4. People follow traffic rules so I did not feel scary when crossing the road.
5. The Japanese walk a lot, take train, and like reading
6. The Japanese give detailed information.

**(3)**

1. All the accommodation, TIC and hotels, are clean and I felt comfortable.
2. It was clean in the town in Tokyo as well as in regions.
5. The Japanese take care of others and respect elderly people.

5. (Opsional): "Esai mengenai Pengalaman di Jepang"

Tuliskan esai mengenai pengalaman di Jepang yang sangat mengesankan Anda sebagai pesan terhadap masyarakat di negara Anda dan masyarakat Jepang. Ada kemungkinan esai dikirim ke kantor JICA di Jepang atau negara lain untuk digunakan dalam kehumasan.

3. It appears for me that the Japanese aim at being perfect. Hard working, trying to be better, polite kind and modest. They help those in need.
4. The Japanese follow rules, so I felt safe and was comfortable. I'm sorry that there was no place where I could pray and that I could not hear azan.

**Q4. Please write freely about your comments on JICA program and/or Japan.**

**Positive ;**

2. The project team and coordinators always organized the training in a professional manner especially when the training schedule had to be adjusted due to typhoon. Even small issues were addressed.
3. Hard working, punctual, and caring.
4. I got new experiences. It was good to know each other with those from other countries.
5. 6. I visited many places, but we stay at each one of the places only for a short period.

**Negative.**

1. 5. 6. Many of signs and maps in town are only in Japanese.

※Jawaban Anda akan digunakan oleh JICA untuk peningkatan program. Terima kasih atas kerjasama Anda.

ANNEX 12  
Future Action Plan (draft)

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# Future Action Plan (draft)

~Target kegiatan setelah proyek selesai dalam rangka pengembangan secara berkelanjutan kemampuan memberikan servis berkaitan dengan metal working (casting dan machining) ditujukan kepada industri pendukung mesin konstruksi~

Januari 2017

Future Action Plan (draft) Working Group  
JICA Project Team

Plan 1 Pembentukan platform bersama industri, pemerintah dan pendidikan untuk promosi industri pendukung alat konstruksi Indonesia

<p>Tujuan dan ringkasan</p>	<p>Industri alat konstruksi Indonesia memiliki pasar terbesar di Asia Tenggara, maka pemerintah pun membuat kebijakan mendorong ekspor benda jadi alat konstruksi dan pengadaan suku cadang dalam negeri bagi alat konstruksi di masa depan. Tetapi saat ini permintaan bahan baku mineral dan lain-lain merosot (= merosotnya penjualan alat berat pertambangan), pertumbuhan ekonomi yang stagnan menyebabkan berkurangnya investasi infrastruktur (merosotnya penjualan alat berat konstruksi), bagi industri alat berat konstruksi posisinya menjadi melawan arus. Walaupun industri alat berat konstruksi kelas dunia sudah bersama-sama berinvestasi di Indonesia, namun tidak berarti industri pendukung alat berat dalam hal ini pemrosesan suku cadang sudah cukup memiliki daya saing kelas internasional. Dari hal tersebut, agar industri alat berat konstruksi dan industri pendukungnya dapat berkembang dengan pesat perlu dengan segera melakukan kaizen dengan segera terhadap permasalahan berikut ini.</p> <ul style="list-style-type: none"> <li>• Meningkatkan daya saing internasional produsen komponen dalam negeri dalam hal kemampuan teknologi produksi, kualitas, harga, waktu delivery dll, agar dapat memenuhi permintaan komponen di dalam negeri.</li> <li>• Dalam rangka berupaya meningkatkan secara dasar keseluruhan industri pendukung alat konstruksi, diperlukan teknologi bagi produsen komponen yang efektif, pembinaan manajemen produksi, dan pembangunan dan penataan sistem bantuan yang berkelanjutan.</li> <li>• Mobilisasi total Industri, pemerintah dan pendidikan untuk promosi industri Indonesia.</li> </ul> <p>Untuk menjawab tantangan ini, perlu dibentuk "Platform Forum Bersama Pemerintah dan swasta untuk kebangkitan industri pendukung industri alat konstruksi Indonesia (Badan Pertimbangan Pengembangan Industri Pendukung Alat Konstruksi Indonesia)" yang terdiri dari pihak pemerintah yang diwakili Kementerian Perindustrian dan pihak swasta yang diwakili HINABI dan POLMAN (Bandung dan Ceper) sebagai institusi pendidikan SDM dan lain-lain, merencanakan dan menjalankan berbagai macam program. Hal ini merupakan bentuk penyelesaian masalah seperti yang diatas dan sebagai usaha peningkatan industri pendukung alat konstruksi.</p>
<p>Institusi pelaksana</p>	<p>9 instansi yakni: Kementrian Perindustrian Direktorat Industri Permesinan dan Alat Mesin Pertanian (Dit IPAMP), Sekretariat Direktorat Jenderal Permesinan (ILMATE), Sekretariat Direktorat Jenderal Industri Kecil dan Menengah (IKM), BPPI, BBLM, POLMAN Ceper, POLMAN Bandung, HINABI dan APLINDO.</p> <p>Sekretariat Platform (Badan Pertimbangan) ditempatkan di Direktorat Industri Permesinan dan Alat Mesin Pertanian (Dit IPAMP), sebagai yang menjalankan tugas operasional (bertugas sebagai fasilitator promosi industri pendukung mesin konstruksi Indonesia).</p>
<p>Isi Kegiatan dan tata cara</p>	<p>Sekretariat (Dit. IPAMP) dibawah prakarsa Dirjend. ILMATE Desember 2016 membentuk Komite Persiapan, membentuk komite</p>

pelaksanaannya	<p>persiapan bertugas untuk mempersiapkan pembentukan Platform (selanjutnya disebut [Badan Pertimbangan promosi industri pendukung alat konstruksi Indonesia]), ( Nama Badan ini akan ditetapkan hasil konsultasi komite persiapan).</p> <p>(1) Langkah 1 Pembentukan Badan Pertimbangan industri, pemerintah dan pendidikan dalam rangka mendukung peningkatan industri pendukung alat konstruksi Indonesia.</p> <ol style="list-style-type: none"> <li>a. Membentuk Badan Pertimbangan Pengembangan Industri Pendukung Alat Konstruksi Indonesia (Nama sementara) yang beranggotakan pelaksana Institusi seperti di atas , di bawah prakarsa Dirjen Industri Logam, Mesin, Alat Transportasi, elektrik elektronik (ILMATE) Kementerian Perindustrian (anggota utama Badan Pertimbangan pada dasarnya anggota yang terlibat dalam pertemuan penyusunan Action Plan)</li> <li>b. Deklarasi berdirinya Badan Pertimbangan pada pertengahan bulan Februari 2017. Kemudian dilaksanakan rapat paripurna yang Pertama selambat-lambatnya dalam bulan Maret.</li> <li>c. Menetapkan tata tertib Badan, memastikan sistim manajemen, dan peran anggota didalam badan, (lihat halaman draft tata tertib Badan). Sekretariat ditempatkan di Dit IPAMP Kementerian Perindustrian. Direktorat tersebut menyiapkan anggaran dengan asumsi diselenggarakan pertemuan Badan Pertimbangan 4 kali dalam satu tahun.</li> </ol> <p>(2) Langkah 2 Menyusun setiap action plan dengan rinci, merencanakan pelaksanaan dan pengelolaannya</p> <ol style="list-style-type: none"> <li>a. Menetapkan langkah-langkah rencana rinci membangkitkan (action plan) industri pendukung alat konstruksi Indonesia (laporan ini berupaya mendetailkan, mengaktualisasikan usulan pelaksanaan sampai dengan akhir Februari 2017 dengan referensi action plan yang telah diusulkan)</li> <li>b. Mendapatkan anggaran pelaksanaan, koordinasi antar instansi, membangun sistem kolaborasi yang diperlukan dan penempatan personil.</li> <li>c. Pengawasan Pelaksanaan action plan.</li> <li>d. Jika diperlukan Koordinasi dengan Institusi donor internasional (permintaan untuk proyek bantuan dll)</li> </ol> <p>(3) Langkah 3 Melakukan evaluasi monitor pelaksanaan action plan, jika diperlukan diupayakan mereview plan.</p> <p>Sekretariat menyusun schedule kegiatan untuk action plan tahun 2017 (atau perencanaan 3 tahun dll), dan segera menjalankan plan yang memungkinkan.</p>
Input (Anggaran dll)	<p>Karena organisasi ini berbentuk badan pertimbangan, maka biaya yang keluar hanyalah biaya rapat-rapat. Biaya rapat 4 kali per tahun sejumlah Rp.30.000.000,- menjadi beban Kementerian Perindustrian. biaya transportasi peserta pada dasarnya di tanggung oleh peserta</p>
Indikator kinerja	<ul style="list-style-type: none"> <li>• Terbentuknya Badan Pertimbangan Bersama Industri, Pemerintah dan Pendidikan untuk promosi industri pendukung alat konstruksi Indonesia, tersusunnya tabel rencana kerja Action plan.</li> </ul>



	<ul style="list-style-type: none"> <li>• Dilaksanakannya action plan yang telah disetujui</li> </ul>
Poin pertimbangan	<p>Merupakan badan pertimbangan bersama industri, pemerintah dan pendidikan. Direktur Jenderal Industri Logam, Mesin, Alat Transportasi, Elektrik elektronik (ILMATE) Kementerian Perindustrian sebagai Ketua, sebagai wakil Ketua Badan Pertimbangan ditetapkan 2 orang, Direktur IPAMP dan ketua HINABI. Walaupun anggotanya lebih banyak dari unsur pemerintahnya, sebisa mungkin mempertimbangkan suara dari pihak swasta. Dengan kata lain, memang pemerintah berperan sentral, namun agar tujuan dapat tercapai perlu dibuat suatu sistim di badan pertimbangan ini agar suara dari sektor swasta dan pendidikan sedapat mungkin dapat tercermin.</p> <p>Wakil ketua memungkinkan untuk bertindak sebagai ketua, dengan urutan yang ke 1 adalah Direktur IPAMP, yang ke 2 adalah ketua HINABI.</p> <p>Perwakilan institusi peserta adalah anggota resmi, jika tidak dapat berpartisipasi meeting maka dapat menunjuk wakil.</p> <p>Dalam program ini, pemerintah, swasta, pendidikan yang berkepentingan bersatu dalam memajukan industri pendukung alat konstruksi, dengan tujuan menjalankan perencanaan dan eksekusi langkah-langkah yang diperlukan. Bersamaan dengan itu, Badan Pertimbangan turut juga mengevaluasi memonitor pelaksanaan kebijakan promosi peningkatan.</p> <p>Biaya transportasi, bantuan uang harian bagi peserta pertemuan tidak disiapkan oleh program ini, pada dasarnya ditanggung oleh sendiri. Oleh karena itu diharapkan memiliki perasaan tugas yang kuat dari setiap institusi dan leadership dari Direktorat IPAMP yang mengarahkan secara keseluruhan agar operasionalnya berjalan lancar.</p>
Waktu pelaksanaan	Dideklarasikan pada Februari 2017, Setelah itu dilakukan rapat maksimum 4 kali dalam 1 tahun. Rapat tidak harus dilakukan di Kementerian Perindustrian di Jakarta, tapi dapat juga dipertimbangkan untuk diselenggarakan di Bandung di BBLM, atau di Sekretariat HINABI (Komatsu Indonesia) dll.
Penanggung jawab utama	Operasional Badan pertimbangan adalah Direktorat Industri Permesinan dan Alat Mesin Pertanian Kementerian Industri (IPAMP) Direktorat Jenderal Industri Logam, Mesin Alat Transportasi, Elektrik elektronik (ILMATE), sebagai sekretariat di dukung oleh Sesditjend ILMATE .

**Tata tertib Badan Pertimbangan Pengembangan  
Industri Pendukung Alat Konstruksi Indonesia (draft)**

**Tujuan.**

Industri alat konstruksi Indonesia memiliki pasar terbesar di Asia Tenggara, maka pemerintah pun membuat kebijakan mendorong ekspor benda jadi alat konstruksi dan pengadaan suku cadang dalam negeri bagi alat konstruksi di masa depan. Namun, walaupun perusahaan perakitan alat konstruksi terkenal sudah lengkap ada di Indonesia, industri pendukung manufaktur suku cadangnya masih lemah sehingga prosentase ketergantungan pada ekspor masih tinggi. Maka industri pendukung alat konstruksi secara keseluruhan perlu ditingkatkan, untuk menunjukkan tumbuhnya industri yang menjanjikan di Indonesia, dirasa perlu mempertimbangkan penyusunan kebijakan pengembangan dengan lebih rinci, seperti yang dituangkan sebagai aktifitas pada pasal 3 tata tertib ini.

Pasal 1 Nama	Badan Pertimbangan ini bernama, “BADAN PERTIMBANGAN PENGEMBANGAN INDUSTRI PENDUKUNG ALAT KONSTRUKSI INDONESIA (selanjutnya disebut “Badan Pertimbangan”)
Pasal 2 Tujuan	Perwakilan dari sektor industri, pemerintah dan pendidikan yang tergabung di badan ini bersatu mengumpulkan pemikirannya untuk pengembangan industri pendukung alat konstruksi di Indonesia, bertujuan mengatasi masalah yang dihadapi dan memajukan industri pendukung alat konstruksi.
Pasal 3 Aktifitas	Untuk mencapai tujuan seperti yang tertulis pada pasal sebelumnya, badan ini melakukan aktifitas sebagai berikut. (1) Mengangkat dan memikirkan, merencanakan memecahkan permasalahan yang dihadapi industri pendukung alat konstruksi Indonesia (2) Mensosialisasikan dan meningkatkan pembinaan SDM, kualitas dan manajemen produksi di industri pendukung (3) Menyusun perencanaan dan melaksanakan percepatan TKDN komponen serta suku cadang utama. (4) Koordinasi dan kolaborasi antar instansi terkait dalam rangka pengembangan industri pendukung ini (5) Monitoring dan evaluasi pelaksanaan kebijakan
Pasal 4 Anggota	Badan ini adalah organisasi yang memiliki keterkaitan dengan industri pendukung alat konstruksi, perwakilan instansi yang sepeham dengan tujuan seperti yang tertulis pada pasal 2. Terdiri dari 9 instansi i: Sekretariat Ditjen ILMATE, Sekretariat Ditjen IKM, BPPI, BBLM, POLMAN Ceper, POLMAN Bandung, HINABI dan APLINDO
Pasal 5 Ketua dan Wakil Ketua	Badan Pertimbangan memiliki 1 orang Ketua dan 2 orang Wakil Ketua . Ketua nya adalah : Direktur Jenderal ILMATE Wakil Ketua : Ditempat kan 2 orang, Direktur IPAMP dan Ketua HINABI Wakil ketua memungkinkan untuk bertindak sebagai ketua, dengan urutan yang ke 1 adalah Direktur IPAMP, yang ke 2 adalah ketua

	<p>HINABI.</p> <p>Masa jabatan Ketua dan Wakil Ketua adalah 2 tahun dan dapat di perpanjang. Apabila terjadi rotasi organisasi induk nya pada masa jabatan berjalan maka diganti oleh pejabat yang baru.</p>
Pasal 6 Sekretariat	Sekretariat Badan berada di Dit.IPAMP Ditjen ILMATE dan dengan fungsi kesekretariatannya di dukung oleh SetDitjen ILMATE
Pasal 7 Rapat	Rapat yang terdiri atas Rapat rutin sebanyak 4 kali dalam 1 tahun dan rapat luar biasa atas nama ketua. Pemanggilan rapat harus dilakukan oleh sekretariat selambat-lambatnya 1 minggu sebelum rapat diselenggarakan.
Pasal 8 Biaya	Biaya badan berasal dari anggaran Kemenperin (aktual teknis pengluara diatur internal Kemenperin)
Pasal 9 Penambahan anggota dan pembubaran	Penambahan instansi menjadi anggota dapat dilakukan atas persetujuan rapat rutin yang keputusannya di buat oleh Ketua. Pembubaran Badan Pertimbangan dapat diputuskan didalam rapat rutin
Pasal 10 Kerahasiaan	Instansi dan advisor yang menjadi anggota harus menjaga kerahasiaan data dan informasi jika telah diklasifikasikan rahasia oleh sekretariat dan dilarang membocorkannya kepada pihak ke tiga tanpa ijin sekretariat.
Pasal 11 Lain-lain item operasional	Selain dari hal-hal yang telah ditetapkan di dalam pasal-pasal ini dan yang belum ada ketetapanannya, atau yang menimbulkan perbedaan pemahaman mengenai tata tertib ini akan diputuskan oleh Ketua setelah berdiskusi dengan sekretariat.

Plan 2 Program pendidikan tenaga terampil casting dan steel casting Indonesia oleh HINABI

Tujuan dan ringkasan	Dengan tujuan meningkatkan kemampuan tenaga bagian produksi suku cadang casting dan steel casting untuk alat konstruksi. HINABI, sebagai penyelenggara, mengadakan program yang pelatihan mendapatkan keterampilan pemrosesan ditambah, yang berkaitan dengan manajemen produksi dan kualitas, dengan harapan dapat meningkatkan daya saing industri casting dan steel casting untuk alat konstruksi Indonesia.
Perusahaan dan orang yang menjadi target peserta	Persyaratan peserta adalah dengan fokus tenaga lapangan (memiliki pengalaman kerja 3 tahun atau lebih) perusahaan anggota HINABI, perusahaan yang terdaftar di HINABI-AVL. Perusahaan di luar anggota HINABI pun dapat menjadi peserta namun secara total tidak melebihi 1/3 peserta.
Institusi pelaksana	Penyelenggara utama : Asosiasi Industri Alat Berat Seluruh Indonesia (HINABI), Pendukung pelaksana: Direktorat Industri Permesinan dan Alat Mesin Pertanian Kementerian Perindustrian
Program	<p>Pelaksanaan program yang dititik beratkan pada latihan kerja selama 2 minggu (10 hari), 1 tahun 3 kali, dengan memanfaatkan sumber daya dan SDM HINABI. Sekretariat HINABI bertindak sebagai pelaksana operasional. Biaya yang dibutuhkan untuk pelaksanaan program ini di tanggung oleh HINABI (termasuk dalam bentuk barang) namun apabila di butuhkan dana untuk komodasi dan ang harian peserta, maka akan ditanggung oleh Kemenperin. (Perhatian: jumlah dan skala pelaksanaan pada akhirnya bergantung kepada anggaran, namun diupayakan agar jumlah peserta program ini paling sedikit 30 orang dalam setahun)</p> <p>(1) Langkah 1 Membentuk komite persiapan program pelatihan di internal HINABI</p> <ol style="list-style-type: none"> <li>a. Membentuk komite persiapan untuk menetapkan isi program pelatihan, dan garis besar pelaksanaan. Yang menjadi pengajar program pelatihan, tidak selalu harus dari anggota komite. Anggota komite terdiri dari perusahaan sekretariat HINABI.</li> <li>b. Komite persiapan menyusun estimasi biaya, pembebanannya berkoordinasi dengan institusi terkait . (perhatian : jika mendapat kerjasama dari Komatsu Indonesia, dipertimbangkan untuk memanfaatkan fasilitas Takumino-mori yang merupakan pusat pelatihan dari perusahaan tersebut.)</li> <li>c. Menunjuk petugas penyusun kurikulum (merangkap pengajar saat pelaksanaan program), berjumlah 5-6 orang yang berasal dari pensiunan perusahaan anggota sekretariat, atau mantan peserta pelatihan JICA. Kemudian juga dipertimbangkan memanfaatkan tenaga pengajar dari POLMAN Bandung.</li> </ol> <p>(2) Langkah 2 Pembuatan kurikulum pelatihan dan persiapan pelaksanaan pelatihan</p>

	<p>a. Membentuk komite pembuat kurikulum pelatihan oleh orang yang ditunjuk seperti diatas. Membuat usulan program pelatihan yang memperhatikan needs dunia usaha, atau mengadopsi program pelatihan JICA, yang dijadikan sebagai usulan program pelatihan HINABI dan juga usulan indek keberhasilan.</p> <p>b. Menyusun mempertimbangkan detail sistim penilaian kompetensi, sistim pendaftaran. Juga dilakukan mempertimbangkan penerapan sistim ujian sertifikasi.</p> <p>c. Menentukan tempat pelatihan (teori dan praktek), mendiskusikan jadwal, menetapkan prosedur pelaksanaan.</p> <p>d. Memastikan ketersediaan biaya pelaksanaan</p> <p>(3) Langkah 3 Pelaksanaan program pelatihan</p> <p>a. Mempromosikan dan menyebarkan informasi program pelatihan kepada Institusi dan dunia industri terkait.</p> <p>b. Membuka pendaftaran dan menilai kemampuan peserta</p> <p>c. Melaksanakan dan mengawasi jalannya pelatihan</p> <p>d. Penilaian akhir peserta pelatihan.</p> <p>Karena titik berat pelaksanaan program pelatihan ini ada pada pelatihan kerja, maka tempat pelaksa (perusahaan) dapat saja dilakukan di lini produksi yang ada di perusahaan (seperti Takumino mori Center dari Komatsu Indonesia). Dalam hal ini maka para peserta harus menjaga kerahasiaan. Kemudian, walaupun dititikberatkan pada latihan kerja, dalam program pelatihan tersebut dimasukkan juga kurikulum teknik manajemen produksi dan manajemen kualitas dilapangan (kaizen).</p>
Input	<p>Di rencanakan untuk memanfaatkan training center perusahaan anggota HINABI dengan gratis. Pengajar dipilih yang berasal dari perusahaan anggota HINABI yang lulus training JICA, pensiunan dari 4 perusahaan alat konstruksi, atau dari Polman Bandung dan tanpa honor. Biaya yang lain di tanggung secara bersama antara HINABI dan Kementerian Perindustrian dengan pembagian pembiayaannya ditentukan terlebih dahulu. Pada dasarnya Kemenperin akan menanggung biaya akomodasi dan uang harian peserta. Untuk jumlah orang yang menjadi target peserta berbeda, ajukan estimasi dengan harga tetap, ajukan permintaan ke kemenperin sebelumnya. Direktorat Industri Permesinan dan Alat Mesin Pertanian Kementerian Perindustrian akan memakai anggaran seminar dan pelatihannya untuk membantu program ini.</p>
Anggaran	<p>Jumlah Peserta tahunan : total 30 orang (3 kali pelaksanaan)</p> <p>Biaya penginapan : \$60×13 hari ×10 orang (total jumlah peserta) = \$7,800 (≅ Rp.100 Juta) Biaya 100% di tanggung oleh Dit IPAMP.</p> <p>Biaya transportasi : Biaya transportasi menjadi beban masing-masing peserta.</p> <p>Biaya Text book, perlengkapan : \$1,500 (≅ Rp.20 Juta) (HINABI menanggung biaya aktualnya)</p> <p>Sewa ruangan dan makan siang : Biaya aktual di tanggung oleh HINABI.</p>

	<p>Dari item di atas, besar biaya pelaksanaan tahunan diperkirakan sekitar Rp.120 juta.</p> <p>Kepada peserta yang berasal dari lokasi yang berdekatan dengan tempat pelatihan dan tidak menginap tidak diberikan biaya penginapan.</p>
Indikator kinerja	<p>HINABI menetapkan level pelatihan yang berdasarkan pada standard kemampuan skill casting dari Komatsu Indonesia. Indeks keberhasilan adalah apabila tercapainya level semua peserta pelatihan. Akan tetapi HINABI berhak untuk menentukan apakah materi pembinaan di pisah menurut bahan yang digunakan, atau tidak.</p> <p>Persyaratan pendaftaran adalah, mereka yang setelah lulus dari pelatihan ini akan menjadi pemimpin kegiatan QC di perusahaan masing-masing.</p>
Poin pertimbangan	<p>Action plan ini, disusun berdasarkan program pelatihan proyek JICA (termasuk kurikulum, text book dll). Sebisa mungkin, untuk memasukkan pengalaman dan pendapat dari institusi dan mantan peserta program pelatihan JICA di dalam penyusunan perencanaannya. Kemudian, program pelatihannya juga harus disesuaikan dengan rencana pelaksanaan sistim sertifikasi profesi.</p> <p>Kurikulum pelatihan disusun dengan referensi berdasarkan teori manajemen produksi dan text book yang digunakan proyek JICA.</p>
Waktu pelaksanaan	Mulai dari April 2017, 3-kali setahun. (April, Juli, Oktober 2017)
Penanggung jawab	Sekretariat HINABI Didukung oleh Ditjen IPAMP

## Plan 3 Program layanan jasa teknis untuk industri casting dan cast steel

Tujuan dan ringkasan	Layanan jasa pembuatan prototype suku cadang casting dan steel casting, bimbingan produksi, order produksi dan layanan jasa lainnya yang dibutuhkan di dalam proses produksi, di berikan oleh BBLM, POLMAN Ceper dan POLMAN Bandung. Bertujuan untuk peningkatan kemampuan teknologi industry casting dalam negeri dan meningkatkan substitusi import suku cadang alat konstruksi. Program ini sekaligus sebagai program pendidikan tenaga terampil casting dan steel casting di industri casting yang bertumpu pada pelatihan praktis. Dengan kata lain, program ini bertujuan untuk mendidik tenaga terampil casting melalui layanan pemberian jasa teknis perusahaan suku cadang casting untuk meningkatkan level perusahaan casting dengan tujuan akhir dari program ini adalah mentransfer teknik proses produksi dan tata cara manajemen kualitas serta manajemen produksi ke perusahaan swasta.
Target peserta	Industri casting dan steel casting lokal diluar anggota HINABI atau yang tidak terdaftar dalam HINABI AVL (Approval Vendor List) yang berminat untuk mengembangkan suku cadang alat konstruksi (perhatian : Tidak harus perusahaan yang memproduksi suku cadang alat konstruksi, seluruh industri manufaktur suku cadang logam dapat menjadi peserta, dilaksanakan secara nasional).
Institusi pelaksana	Balai Besar Logam dan Mesin (BBLM) POLMAN Ceper POLMAN Bandung Direktorat Industri Permesinan dan Alat Mesin Pertanian Kementerian Perindustrian sebagai instansi pendukung pelaksanaan program ini dan yang mengadakan anggaran yang dibutuhkan untuk merealisasikan program ini. Program ini dilaksanakan oleh 3 institusi BBLM, Polman Bandung, Polman Ceper
Isi Kegiatan	BBLM, POLMAN Ceper dan Bandung memanfaatkan fasilitas dan SDM sendiri yang diperlukan dalam pembuatan produk casting dan steel casting, untuk memberikan jasa layanan teknis bagi industri pendukung alat konstruksi secara berbayar.  (1) Langkah 1 Membangun sistim layanan jasa bantuan teknis (frame work) a. Penetapan personel, kelompok, cara pendaftaran, prosedur, penetapan tarif dll. b. Pembuatan pamflet jenis layanan. c. Penyiapan system pelaksanaan layanan jasa internal institusi termasuk bagian yang mensupport secara tak langsung  (2) Langkah 2 Pelaksanaan program (layanan jasa teknis industri manufaktur casting dimulai Februari 2017) a. Mencari pelanggan perusahaan untuk jasa layanan konsultasi yang diberikan 3 instansi, melalui aktifitas humas Kemenperin (memanfaatkan majalah PR Kemenperin, event dan lain-lain) b. Briefing detail mengenai spesifikasi produk. Perkiraan biaya secara garis besar. c. Membuat MoU layanan jasa teknis dengan industri pelanggan

	<p>(3) Langkah 3  Mulai jasa layanan teknis termasuk pengembangan produk trial.</p> <ol style="list-style-type: none"> <li>a. Layanan jasa teknis dimulai setelah konfirmasi pembayaran uang muka</li> <li>b. Penilaian hasil prototype pihak internal (jumlah prototype ditentukan sebelumnya)</li> <li>c. Penilaian prototype oleh pihak external</li> </ol> <p>(4) Langkah 4  Mulai memproduksi (termasuk bimbingan produksi yang dilakukan oleh pihak perusahaan)</p> <ol style="list-style-type: none"> <li>a. Produksi di mulai, aktual bimbingan produksi atau melakukan order produksi.</li> <li>b. Dukungan perluasan pasar produk tersebut.</li> </ol> <p>Pada dasarnya program ini sama dengan program pembinaan tenaga terampil casting dan steel casting yang diselenggarakan HINABI pada plan 2, mempunyai tujuan yang sama pada poin ekspansi industri pendukung sebagai usaha berupaya meningkatkan kemampuan keterampilan tenaga casting, steel casting di dalam negeri. Akan tetapi dari segi jasa pelayanan teknis, perbedaan yang mendasar ada pada peserta diminta untuk menanggung sebagian dari biaya (termasuk pemberian bahan baku)..Sebagai akibatnya, pesertanya kemungkinan hanya akan terbatas pada perusahaan yang memiliki rencana bisnis yang jelas saja.(bukan hanya melatih dan meningkatkan kemampuan karyawan saja).</p> <p>Walaupun disebutkan tujuannya membina tenaga terampil casting, steel casting, selama peserta (perusahaan) diminta untuk membayar, maka perlu untuk membuat program yang secara langsung berhubungan dengan profit di sisi perusahaan (bentuk manfaatnya terlihat). Aktualnya adalah dalam bentuk, instansi pelaksana menerima permintaan pengembangan prototype dari supplier suku cadang tertentu, membuat produk kerja sama dengan supplier tersebut hingga produk jadi. Melalui proses tersebut, dibuat program yang dapat meningkatkan kemampuan tenaga terampil dari supplier suku cadang tersebut, dapat juga meningkatkan teknis manajemen produksi di lini produksi. Dengan kata lain, dari sisi instansi pelaksana, hal ini dapat di sebut sebagai program khusus untuk supplier suku cadang tertentu.</p>
Input	<p>Besar dana yang akan di terima oleh instansi yang menyediakan bantuan tehnik pembuatan prototype, bimbingan produksi, penerimaan order dan lain-lain, berdasarkan tabel tarif yang telah dibuat sebelumnya. Untuk kasus aktual dibuatkan masing-masing estimasi biaya.</p> <p>Untuk pengembangan prototype oleh IKM, Kementrian Perindustrian akan memberikan subsidi dengan persentase tertentu (70~80% dari total penawaran). Untuk itu, besar anggaran bantuan tahunan harus ditetapkan sebelumnya.</p> <p>Sebagai service provider input tenaga kerja dan biaya sampai saat ini belum jelas, dilakukan estimasi dengan berdasarkan pengalaman layana teknis yang selama ini dijalankan.</p> <p>Kemudian sedapat mungkin memanfaatkan sebesar-besarnya 12 orang Counter part yang telah menerima transfer teknologi , sumbangan mesin dan fasilitas melalui proyek JICA.</p>
Anggaran	<p>Besar biaya yang harus dibayar atas pemberian jasa layanan pada</p>



	<p>dasarnya ditanggung oleh pengguna jasa (perusahaan). Tetapi, seperti yang tertulis diatas, karena tergantung pada isi kontrak dengan supplier suku cadang tertentu, maka sistim perhitungan biayanya adalah biaya pengembangan prototype, biaya bimbingan produksi dan jasa layanan lainnya harus di hitung per perusahaan dan bukan dari jumlah teknisi yang akan dibimbing. Yang menjadi tujuan utama adalah pendidikan tenaga terampil melalui pelatihan aktual teknik dan bukan mencari keuntungan melalui pengembangan prototype atau keberhasilan membuat produk. Meskipun tidak ada batasan jumlah peserta per perusahaan, batasannya adalah dalam jumlah yang tidak menyulitkan dalam memberikan bimbingan.</p> <p>Jenis jasa layanan teknis dari ke tiga instansi dan perkiraan besar dana yang di perlukan (per tahun)</p> <p><b>(1) Cakupan pelaksanaan BBLM</b>  <b>Tujuan :</b> Bekerjasama dengan Polman Ceper dan Polman Bandung, BBLM memberikan layanan jasa teknis pengembangan prototype suku cadang casting dan cast steel, bimbingan proses produksi atau membuat produk berdasarkan order, dengan tujuan meningkatkan kapasitas industri casting dalam negeri dan mempromosikan produksi domestik part casting . Yang dimaksud dengan produk suku cadang casting atau cast steel disini tidak terbatas pada suku cadang alat konstruksi saja melainkan sebagai bentuk kontribusi BBLM dalam meningkatkan industri casting dalam negeri melalui pemanfaatan fasilitas dan kemampuan yang dimiliki.</p> <p>Tahun 2017 dengan program dibawah ini yang dilakukan selama satu tahun.</p> <p>☞ Januari~Maret 2017 Penyusunan program layanan jasa teknis BBLM.</p> <ol style="list-style-type: none"> <li>a. Berkordinasi dengan Kemenperin (Ilmate, IKM) untuk menentukan jenis produk , pengguna produk dan industri binaan yang akan membuat produk</li> <li>b. Berkordinasi dengan pengguna produk dan industry pembuat prototipe (produk)</li> <li>c. Membuat MoU dengan pengguna produk dan industri pembuat prototipe (produk)</li> </ol> <p>➤ Mulai April 2017 Bantuan jasa teknis di mulai, termasuk pembuatan prototype  Target pemberian jasa bantuan teknis tahun fiskal 2017 sebanyak 2 produk prototipe komponen cor yang masih diimpor. Kerjasama BBLM dan industri, direncanakan akan di kerjakan dengan memanfaatkan kerjasama fasilitas dan SDM BBLM untuk memproduksi benda trial.</p> <p>➤ Pertengahan Des 2017 Penyelenggaraan Seminar sosialisasi hasil (1 hari) (BBLM penyelenggara)  Apabila BBLM sulit mengadakan seminar, maka dapat diganti dengan ikut pada pameran yang di selenggarakan Kemenperin.</p> <p>Target peserta : Industri Casting seluruh Indonesia</p> <p>Anggaran : Pada prinsipnya biaya layanan jasa dibebankan kepada penerima keuntungan (Industri). Sebelumnya sebagai institusi support</p>
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	<p>teknologi menetapkan tabel biaya untuk pengembangan prototype, pembinaan produksi dan kontrak produksi. Melakukan masing-masing estimasi penawaran untuk masing-masing kasus aktual. Industri penerima layanan yang memesan melakukan pembayaran, dapat juga dilakukan pembebanan biaya transportasi, penyediaan bahan material dll.</p> <p>Untuk pengembangan prototype yang dilakukan IKM, sebagai Kemenperin dapat mensubsidi dengan perbandingan tetap . Untuk tahun anggaran 2017 diperkirakan anggaran subsidi kemenperin Rp.40,000,000.-</p> <p><b><u>Penanggung Jawab pelaksana:</u></b> <b><u>Dr. Bimo Pratomo/ Kepala Bidang Penelitian dan Pengembangan BBLM</u></b></p> <p>(2) Cakupan pelaksanaan POLMAN Bandung Sama dengan yang selama ini dilaksanakan oleh POLMAN Bandung terhadap Industri swasta, dilanjutkan caranya. (penyediaan bahan, biaya pengerjaan beban industri). Dengan dipusatkan pada part casting mesin konstruksi sebagai target barang, dengan perkiraan target 5 - 7 item barang part casting dan machining setahun. Untuk pengembangan prototype yang dilakukan IKM, sebagai Kemenperin mensubsidi dengan perbandingan tetap . Untuk tahun anggaran 2017 diperkirakan anggaran subsidi Kemenperin Rp.30,000,000.-</p> <p>Cara pelaksanaan dan periode waktu : Berikut adalah pelaksanaan tahunan dari tahun 2017.</p> <ul style="list-style-type: none"> <li>➤ Mulai Februari 2017 Polman Bandung membangun system (framework) untuk program layanan jasa support teknologi.       <ol style="list-style-type: none"> <li>a. Penetapan personel, metoda aplikasi, prosedur, tarif dll.(review system yang ada)</li> <li>b. Penyiapan system pelaksanaan layanan jasa internal POLMAN Bandung termasuk bagian yang mensupport secara tak langsung</li> </ol> </li> <li>➤ Mulai pertengahan Maret mulai operasional layanan jasa support teknologi       <ol style="list-style-type: none"> <li>a. Kontrak dengan pelanggan yang ada, mencari pelanggan</li> <li>b. Pertemuan detail mengenai spesifikasi produk dan isi layanan jasa teknologi, perkiraan biaya secara garis besar.</li> <li>c. Membuat MOU support teknologi dengan pelanggan.</li> </ol> </li> <li>➤ Mulai May 2017 mulai layanan jasa teknologi termasuk pengembangan prototype Target layanan jasa teknologi tahun anggaran 2017 berjumlah 7 kasus (didalamnya , 3 kasus pembinaan memproduksi produk, pembuatan prototype, 3 kasus kontrak produksi)</li> <li>➤ Pertengahan Des 2017 Penyelenggaraan Seminar sehari sosialisasi hasil (1 hari) (Penyelenggara POLMAN Bandung)</li> </ul> <p>Jika pelaksanaan seminar sulit dilaksanakan POLMAN Bandung, maka dapat diganti dengan ikut serta pada pameran yang di</p>
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	<p>selenggarakan MIDC atau Kemenperin.</p> <p><b><u>Penanggung jawab :</u></b>  <b><u>Dr. Yuliadi Erdani / Wakil Direktur POLMAN Bandung bagian Penelitian, Pengembangan, Produksi dan Kerjasama</u></b></p> <p>(3) Cakupan pelaksanaan POLMAN Ceper  Tujuan : Melakukan layanan jasa teknologi yang berkaitan dengan percobaan pembuatan prototype, pembinaan pembuatan produk, dan kontrak produksi casting dan part steel casting untuk area Jawa Tengah, berperan dalam meningkatkan kemampuan teknologi industri casting dan promosi produk domestik part alat konstruksi pada daerah yang sama. Kemudian bertujuan menjadi pusat pelatihan praktek program pembinaan SDM teknologi casting dan steel casting industri casting area Jawa Tengah.</p> <p>Kemudian, program ini dilaksanakan selaras dengan yang diselenggarakan Kemenperin [Program Promosi Industri Area Ceper].</p> <p>Cara pelaksanaan dan periode waktu : Berikut adalah pelaksanaan tahunan dari tahun 2017.</p> <ul style="list-style-type: none"> <li>➤ Mulai Februari 2017 Polman Ceper membangun system (framework) untuk program layanan jasa support teknologi. <ul style="list-style-type: none"> <li>a. Penetapan personel, metoda aplikasi, prosedur, tarif dll.(review system yang ada)</li> <li>b. Penyiapan system pelaksanaan layanan jasa internal POLMAN Ceper termasuk bagian yang mensupport secara tak langsung</li> </ul> </li> <li>➤ Mulai pertengahan April mulai operasional layanan jasa support teknologi <ul style="list-style-type: none"> <li>a. Mencari pelanggan</li> <li>b. Pertemuan detail mengenai spesifikasi produk dan isi layanan jasa teknologi, perkiraan biaya secara garis besar.</li> <li>c. Membuat MOU support teknologi dengan pelanggan.</li> </ul> </li> <li>➤ Mulai Mei 2017 mulai layanan jasa teknologi termasuk pengembangan prototype  Target layanan jasa teknologi tahun anggaran 2017 berjumlah 5 kasus (didalamnya , 3 kasus pembinaan memproduksi produk, pembuatan prototype 2 kasus )</li> <li>➤ Pertengahan Des 2017 Penyelenggaraan Seminar sosialisasi hasil (1 hari) (Penyelenggara POLMAN Ceper)  Bersamaan dengan seminar dilakukan pameran produk, event untuk memperkenalkan produk Ceper dan POLMAN Ceper kepada buyer domestik.</li> </ul> <p>Target peserta : Industri casting Ceper, Yogyakarta, seluruh area Jawa Tengah.</p> <p>Anggaran : Pada prinsipnya biaya layanan jasa dibebankan kepada penerima keuntungan (Industri). Sebelumnya institusi support teknologi sebagai menetapkan tabel biaya untuk pengembangan prototype,</p>
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	<p>pembinaan produksi dan kontrak produksi. Untuk kasus aktual disiapkan estimasi penawaran untuk masing-masing. Industri penerima layanan jasa melakukan pembayaran, dapat juga dilakukan pembebanan biaya transportasi, penyediaan bahan material dll.</p> <p>Untuk pengembangan prototype yang dilakukan IKM, sebagai Kemenperin dapat mensubsidi dengan perbandingan tetap . Untuk tahun anggaran 2017 diperkirakan anggaran subsidi kemenperin Rp.30,000,000.-</p> <p><b><u>Penanggung jawab pelaksana :</u></b> <b><u>Mr. Sumeru Yoso / Wakil Direktur POLMAN Ceper</u></b></p> <p>Demikian, untuk ke 3 institusi tersebut di atas Kemenpering menyiapkan dana subsidi sebesar Rp.100,000,000.-/tahun. Bantuan subsidi dapat juga diganti dalam bentuk penyediaan bahan baku untuk pengembangan prototype.</p>
Indikator kinerja	<p>Indikator kinerja pertahun:</p> <ul style="list-style-type: none"> <li>➤ BBLM : Pembuatan Protortype 2 item</li> <li>➤ POLMAN Bandung : Layanan jasa teknologi Target 7 kasus (didalamnya pembinaan memproduksi produk 3 kasus, pembuatan prototype 1 kasus, pemesanan produksi 3 kasus)</li> <li>➤ POLMAN Bandung : Layanan jasa teknologi Target 5 kasus (didalamnya pembinaan memproduksi produk 3 kasus, pembuatan prototype 2 kasus)</li> </ul>
Poin pertimbangan	<p>Konten dari layanan jasa bantuan teknis dalam program ini tidak harus yang berhubungan dengan casting suku cadang alat konstruksi. Penekanannya ada pada peningkatan produksi domestik suku cadang casting dan cast steel pada umumnya. Pengembangan prototype sampai kepada pembuatan produk tidak harus merupakan satu paket layanan, proses dapat di buat sesuai kebutuhan pelanggan.</p>

Plan 4 Program sosialisasi Kaizen (peningkatan kualitas dan produktifitas) di lapangan

Tujuan dan ringkasan	<p>Sosialisasi peningkatan kualitas, produktifitas (kaizen) yang banyak dibutuhkan oleh industri pendukung alat konstruksi Indonesia, dilakukan melalui seminar, workshop dan konsultasi serta jasa bimbingan di tiap perusahaan. Tujuannya adalah untuk meningkatkan daya saing dunia usaha secara keseluruhan melalui peningkatan kapasitas manajemen.</p> <p>Ini adalah program jasa konsultasi kaizen di lapangan, namun sekaligus memiliki arti sebagai program pencerahan kaizen di lapangan dan manajemen untuk perusahaan kecil dan menengah.</p>
Institusi pelaksana	<p>Dilaksanakan Dit IKM Logam Mesin Elektronika dan Alat angkut Ditjen IKM dengan memanfaatkan jasa biro konsultan swasta, berdasarkan kebijakan pelaksanaan program yang telah ditetapkan oleh Badan pertimbangan peningkatan industri pendukung alat konstruksi Indonesia,</p>
Target Peserta	<p>Industri pendukung alat konstruksi termasuk industri pengecoran logam dan perusahaan IKM yang berencana mengembangkan usaha menjadi industri pendukung alat berat.</p>
Isi Kegiatan dan urutan pelaksanaan	<p>Operasional Sekretariat di tempatkan di dalam Direktorat IKM, dari kegiatan pencerahan sampai dengan aktual pembinaan di lapangan dilaksanakan berdasarkan kebutuhan pihak industri.</p> <p>(1) Langkah 1 Menempatkan sekretariat operasional Kaizen lapangan di Dit IKM Logam Mesin Elektronika Alat angkut</p> <ol style="list-style-type: none"> <li>a. Penempatan 1 orang yang bertugas khusus untuk program ini di sekretariat Dit. IKM. Membuat daftar calon pembimbing yang berasal dari instansi pelaksana.</li> <li>b. Penetapan isi program (dari seminar setengah hari, pelatihan hingga bimbingan lapangan selama maksimal 6 bulan), dan cakupan pelaksanaan.</li> <li>c. Menyiapkan anggaran pelaksanaan</li> <li>d. Rekrutmen konsultan yang sesuai dengan isi program, memilih dan membuat surat kontrak</li> </ol> <p>(2) Langkah 2 Melakukan promosi, sosialisasi dan kegiatan bimbingan lapangan.</p> <ol style="list-style-type: none"> <li>a. Mulai melakukan kegiatan sosialisasi(pencerahan) tentang isi program dan cakupan pelaksanaan.</li> <li>b. Pelatihan seminar setahun 3 kali dilakukan, bersamaan dengan pencerahan kegiatan juga memperluas pengetahuan dasar.</li> <li>c. Merencanakan, melaksanakan workshop 3 kali setahun</li> <li>d. Mulai lakukan diagnosis sederhana di lapangan</li> </ol> <p>(3) Langkah 3 Pelaksanaan bimbingan Kaizen lapangan</p> <ol style="list-style-type: none"> <li>a. Terhadap perusahaan yang berminat pada bimbingan kaizen lapangan, dilakukan diagnosis sederhana, dan disampaikan perkiraan biayanya.</li> <li>b. Bimbingan kaizen lapangan di mulai berdasarkan kontrak yang di buat perusahaan dengan instansi penyedia jasa layanan konsultasi dan bimbingan.</li> <li>c. Dit. IKM melakukan evaluasi secara berkala.</li> </ol>

Outline pelaksanaan program sosialisasi kaizen genba (peningkatan kualitas dan produktifitas) di Tegal

**Tujuan :** Sebagai area model ke-1 ditahun fiskal 2017 Ditjen IKM Kemenperin akan melaksanakan program sosialisasi kaizen lapangan (peningkatan kualitas dan produktifitas) ditujukan untuk IKM Indonesia,

Pelaksanaan seminar sosialisasi kaizen, kaizen workshop dengan target IKM logam, bimbingan di lapangan untuk perusahaan IKM di wilayah Tegal, berupaya meningkatkan kualitas, manajemen produksi, dan kemampuan manajemen untuk IKM pada area tersebut. Secara bersamaan dilakukan pula program yang sama di wilayah yang berbeda verifikasi efektifitas program, memanfaatkan sosialisasi kaizen di wilayah lain.

Di Tegal JICA melaksanakan program SMIDep dan MISi. Tenaga ahli dari Jepang pada masing-masing program tersebut mengajarkan cara meningkatkan manajemen produksi terhadap perusahaan IKM setempat, dapat dikatakan bahwa di wilayah tersebut menerapkan kegiatan kaizen, termasuk Dinas setempat.

**Waktu pelaksanaan dan cara :** Program yang dibawah ini dilaksanakan selama satu tahun.terhitung sejak tahun 2017.

- ☞ Awal Februari 2017 Pelaksanaan seminar setengah hari sosialisasi Kaizen  
(Mengundang 120 orang pengusaha IKM dengan harapan akan terkumpul 70 peserta)
- ☞ Pertengahan April 2017 Workshop kaizen (pelatihan intensif selama 4 hari, dengan total 40 jam)  
(di pilih 2 orang dari satu perusahaan, total 20 orang dari peserta seminar diatas untuk mengikuti program workshop ini)
- ☞ Juni - Desember 2017 Pelaksanaan program kaizen lapangan untuk IKM  
(dipilih 8 perusahaan dari peserta workshop diatas yang berminat untuk mengikuti program kaizen. Masing-masing perusahaan akan mendapatkan pelatihan di lokasi pabrik dengan mengupas permasalahan kaizen yang aktual sebanyak 10 kali (10 hari). (diawali orientasi untuk perusahaan peserta semua, kemudian membuat rencana pelaksanaan tiap perusahaan, selanjutnya pelaksanaan 2 kali sebulan x 5 bulan bimbingan lapangan)
- ☞ Pertengahan Desember 2017 Seminar sehari presentasi hasil kegiatan masing-masing perusahaan sekaligus sosialisasi kaizen.  
(Seminar sehari dengan acara presentasi keberhasilan 8 perusahaan yang mengikuti program kaizen. Target peserta 70-80 orang).

Penyebaran undangan, sewa ruangan, pengiriman materi ke peserta, menyiapkan kendaraan bagi pembimbing dan lain-lain untuk keperluan kegiatan diatas, dilaksanakan oleh Dinas Perindustrian Kabupaten Tegal.

**Target peserta :** Perusahaan pengerjaan logam di Tegal termasuk perusahaan casting.

	<p><b>【sebagai informasi】</b> 5 perusahaan dibawah ini yang menjadi target perusahaan dalam OJT di Tegal dalam program JICA-MISi. Mendapatkan kerjasama dalam seminar dll.</p> <p>PT. Prima Karya PT. Gaya Teknik Utama CV Rejeki Abadi Machinery PT. Millako PT. Karya Paduyasa</p> <p><b>Penyelenggara</b> : Ditjen IKM menyusun rencana dan menyiapkan anggaran, pelaksanaan dilakukan oleh Dinas di Tegal. Pembicara seminar dan konsultan pelatihan di perusahaan adalah staff Dinas Tegal yang pernah mendapatkan pelatihan dari ahli Jepang dalam proyek pelatihan JICA ini. Atau bisa juga dengan memanfaatkan tenaga konsultan lokal (misalnya dari Indonesia Quality Management Association, PQM Consultants dll), pemilihan konsultan dilakukan oleh Ditjen IKM.</p>
Input	<ul style="list-style-type: none"> <li>• Tenaga ahli Kaizen (memanfaatkan ahli dari masing-masing konsultan)</li> <li>• Seminar dan workshop tidak dipungut biaya, biaya ditanggung oleh Direktorat IKM</li> <li>• Untuk pembinaan aktual Kaizen lapangan dilakukan setelah pembayaran fee dari perusahaan, (konsultan swasta yang melaksanakan acara seminar dan workshop bekerja dengan dasar mendapat perintah langsung dari perusahaan. Sedang dipelajari kemungkinan memanfaatkan dana untuk kepentingan umum Kemenperin).</li> </ul>
Anggaran	<p>Dengan asumsi Kementerian Perindustrian dapat menanggung seluruh biaya penyelenggaraan seminar dan workshop. Oleh karena itu dalam platform kaizen plan 1, dilakukan diskusi nilai budget dan ditetapkan sebagai anggaran tahunan.</p> <p>Realisasi tahun fiskal 2017, untuk rencana program kaizen yang awal direncanakan diadakan di Tegal, dengan anggaran sebesar Rp 350 juta. Dengan perincian detail sebagai berikut.</p> <p><b>Anggaran</b> : Anggaran dibawah adalah dari Ditjen IKM di order ke Dinas Perindustrian Tegal atau biro konsultan.</p> <p>☞ Anggaran seminar Rp34.000.000,- Sewa ruangan 80 orang x Rp 150.000 x 2 kali setahun = Rp 24.000.000,- Honor pembicara, uang transport, pembuatan materi (untuk 2 kali) = Rp 10.000.000</p> <p>※ Pembicara dipertimbangkan untuk mengangkat kisah sukses perusahaan di Bekasi atau Jakarta yang mengikuti program OJT dalam program MISi</p> <p>☞ Biaya workshop Rp72.500.000,- Sewa ruangan 25 orang x Rp 150.000 x 4 hari = Rp 15.000.000</p>

	<p>Akomodasi, 25 orang x Rp 500.000 x 3 hari = Rp 37.500.000  Honor pembicara, ongkos transport, pembuatan materi = Rp 20.000.000  ✘ Pertimbangkan penggunaan ruangan untuk workshop memakai fasilitas Dinas. Sehingga dapat menghemat biaya</p> <p>☞ Biaya pelaksanaan kaizen lapangan di perusahaan Rp 225.000.000  Fee konsultan Rp 3.000.000 x 8 perusahaan x 2 kali ber bulan x 5 kali = Rp 240.000.000,-  Biaya transportasi dan lain-lain Rp 15.000.000</p> <p><b>TOTAL BIAYA Rp 361.500.000</b></p>
Indikator kinerja	<ul style="list-style-type: none"> <li>• Mengumpulkan peserta pelatihan seminar 150 orang atau lebih per tahun.</li> <li>• Target bimbingan kaizen lapangan 8 perusahaan lebih per tahun</li> <li>• Menambah jumlah IKM yang dapat menjadi perusahaan yang terdaftar di AVL dari HINABI</li> </ul>
Poin pertimbangan	<p>Bertujuan untuk meningkatkan kemampuan manajerial industri pendukung secara keseluruhan, peningkatan QC dan manajemen produksi, dapat dikatakan juga sebagai promosi industri usaha kecil dan menengah dan mikro</p> <p>Maka, tujuan lain dari proyek ini adalah menyebar luaskan dan menciptakan pengertian melalui kegiatan promosi seminar dan workshop.</p> <p>Yang didalamnya, memusatkan pemikiran untuk penyebaran program di daerah industri pengecoran atau industri pengerjaan logam lainnya. Dan memanfaatkan alumni pelatihan konsultan perusahaan IKM yang diselenggarakan JICA sebagai pelatihnya.</p> <p>Dari perusahaan swastanya diperkirakan dari Indonesia Quality Management Association (IQMA), atau PQM Consultant</p>



Schedule pelaksanaan Action Plan

	2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
Plan 1	Establishment of the committee within February 							
Plan 2								
Plan 3								
Plan 4								

ANNEX 13

Future Action Plan (draft): Plan5, 6 and 8

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Plan 5 Rencana Penguatan BBLM

<p>Tujuan dan ringkasan</p>	<p>Balai Besar Logam dan Mesin didirikan sebagai instansi penelitian industri logam dan permesinan pada tahun 1969, ditempatnya sekarang di Bandung. Sejak terjadi reorganisasi di tubuh Kemenperin sebagai instansi pengawasan, saat ini instansi ini berada dibawah satu Direktorat. Sebagai instansi pemerintah yang tugas pokoknya melakukan penelitian logam dan mesin manufaktur ini tetap eksis sampai saat ini. BBLM akan memasuki usianya yang ke 50 pada tahun 2018. Kemajuan teknologi pengecoran logam, perubahan postur Industri di Indonesia dan permintaan pasar pun telah mengalami perubahan dalam kurun waktu ini. Disini perlu untuk melakukan refleksi sampai dimana instansi ini dapat menjawab perubahan pasar dan perubahan masyarakat. Dengan kata lain, menghadapi usianya yang ke 50, agar dapat menjawab tantangan jaman, dituntut untuk melakukan inovasi, peningkatan kapasitas dan re organisasi.</p> <p>Sementara, dalam pelaksanaan action plan di proyek ini, BBLM menjalankan peran sentralnya sebagai instansi penyedia jasa teknik. Kedepan, diharapkan instansi ini tidak hanya sibuk didalam dengan penelitian dan pengembangannya, tetapi secara aktif melakukan jasa bantuan ke perusahaan-perusahaan sebagai bentuk kontribusinya ke masyarakat.</p> <p>Di dalam plan ini akan dilakukan revisi strategi BBLM dari yang pasif ke dalam menjadi institusi yang terbuka melalui re organisasi dan perubahan kesadaran para staffnya.</p>
<p>Target Peserta</p>	<p>Seluruh staff BBLM</p>
<p>Institusi pelaksana</p>	<p>Balai Besar Logam dan Mesin (BBLM) Di dukung oleh Kementrian Perindustrian</p>
<p>Isi Kegiatan</p>	<p>Dalam plan ini akan dilakukan analisa kondisi terkini BBLM, visi dan misi hingga ditahun 2030, penentuan bidang usaha dan cara mengembangkannya, pembentukan sistim organisasi yang tepat, membuat rencana keuangan, merealisasikan dalam usaha membangkitkan kembali institusi ini. Setelah disetujui untuk dimasukkan ke dalam action plan, dapat langsung di jalankan di intern BBLM</p> <p>(1) Langkah 1</p> <p>BBLM dengan Kepala BBLM sebagai Ketuanya dan membentuk komit. Mendirikan komite revitalisasi BBLM di intern kecil di 4 bagian dibawahnya. Tiap komite kecil melakukan analisa dibagiannya dengan sistim SWOT (selain memanfaatkan perangkat kaizen). Komite revitalisasi BBLM mengumpulkan seluruh analisa dan memetakan masalah yang dihadapi untuk dijadikan sebagai peta jalan menuju tahun 2030.</p> <p>Data staff BBLM per Januari 2016. Jumlah pegawai 142 orang (termasuk pegawai honorer) Dengan Bapak Eddy Siswanto sebagai Kepala, membawahi 4 bidang, Tata Usaha, Pengembangan dan Kerjasama Tehnik, Penelitian dan Pengembangan serta Penilaian Kesesuaian. Anggaran BBLM pada tahun anggaran 2015 mencapai 23 milyar Rupiah, 3,8 milyar diantaranya adalah penghasilan dari pelayanan jasa. Setengah dari anggaran di peroleh dari Kemenperin.</p> <p>Layanan jasa yang di lakukan di BBLM adalah, penelitian dan pengembangan, proses pemanasan dan pemrosesan dengan mesin untuk logam, konsultasi, supervisi, kalibrasi, pendidikan SDM dan lain-lain. Akhir-akhir ini BPPI lebih mengintensifkan instansi litbang dibawahnya untuk meningkatkan pemasukan. Demikian juga dengan BBLM yang terus berusaha, namun karena terikat regulasi sehingga bidang yang dapat dikerjakan sangat sedikit, keterbatasan anggaran institusi ini mengakibatkan terbatas pula jasa layanan yang dapat diberikan. Pemasukannya yang hanya 15% dari total anggaran mengakibatkan instansi ini terus terikat dalam kegiatan yang sempit.</p>

(2) Langkah 2

Komite Revitalisasi BBLM mengumumkan visi, misinya sampai tahun 2030. (untuk selanjutnya disebut , bahan pertimbangan)

Visi :

Menjadikan BBLM sebagai institusi terkemuka dalam bidang penelitian dan pengembangan teknologi terapan manufaktur dan logam sekaligus institusi internasional yang berkontribusi bagi kemajuan industri Indonesia

Misi :

1. Menjadi yang terdepan dalam penelitian dan pengembangan teknologi terapan manufaktur dan logam di Indonesia, sebagai mitra usaha bagi pengembangan teknologi monozukuri perusahaan.
2. Melakukan layanan jasa bantuan teknis manajemen produksi dan teknik produksi berbasis monozukuri untuk perusahaan IKM.
3. Melakukan pendidikan SDM teknisi manajemen produksi dan teknologi informasi dibidang manufaktur dan logam
4. Menjalin kerjasama dengan pihak industri dan pendidikan untuk pertukaran informasi teknologi manufaktur dan logam, dan lain-lain.

(BBLM tidak menjadi institusi penelitian dasar atau yang mempromosikan pengembangan teknik yang melahirkan inovasi. BBLM harus menjadi instansi promosi dan penelitian teknologi terapan dibidang manufaktur dan logam, akan terjadi transformasi alami dari suasana penelitian dan pengembangan menjadi instansi yang menitikberatkan pada kegiatan yang mendukung perusahaan atau daerah industri.)

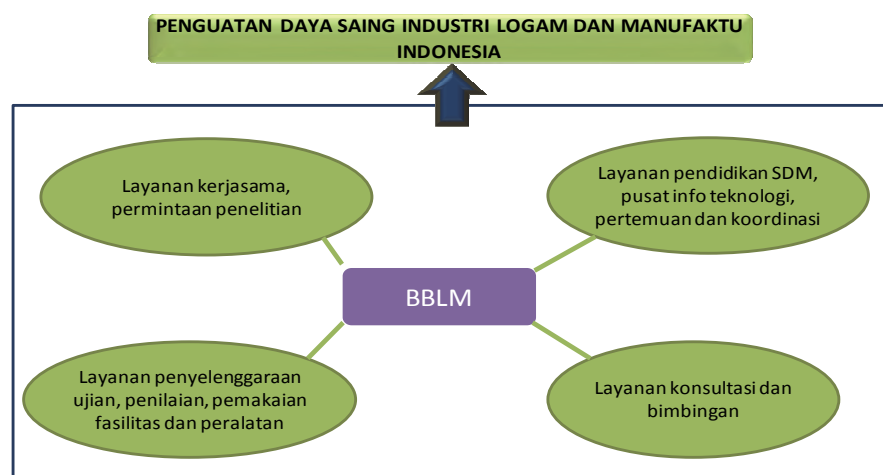
(3) Langkah 3

Memberikan layanan perencanaan keuangan, pendirian organisasi, pemilihan bidang usaha.

a. Menentukan jenis layanan

Berikut adalah 4 bidang yang menjadi dasar kegiatan BBLM (untuk sementara difokuskan pada teknologi terapan)

1. Permintaan penelitian, proyek kerjasama, layanan litbang
2. Konsultasi teknis (berproduksi, bantuan pendirian proyek, bantuan kaizen teknik manajemen)
3. Penyelenggaraan ujian, penilaian, layanan pemakaian tempat dan peralatan)
4. Pendidikan SDM, pusat informasi teknologi, layanan pertemuan dan koordinasi



b. Menyusun sistim manajemen dan organisasi

Melakukan re organisasi yang ada. Untuk 3 tahun kedepan dimanfaatkan Untuk melakukan pelatihan kualitas bagi seluruh staff, mengubah cara berfikir setiap personil staffnya. Untuk pelatihan akan dipanggil pelatih dari luar (akan diminta

	<p>anggaran dari Pusdiklat Kemenperin)</p> <p>Saat melakukan re organisasi dan pendirian sistim manajemen yang baru, hal yang harus diperhatikan adalah,</p> <ol style="list-style-type: none"> <li>1. Menentukan dan melaksanakan target per orang per bagian dan sistim penilaiannya.</li> <li>2. Diadakan pertemuan per kuartal untuk melihat pencapaian dari tiap personilnya (termasuk sosialisasi kebijakan 1 tahun 1 kali dan pengumuman pencapaian)</li> <li>3. Dibuka bagian baru dengan nama, Bagian kerjasama promosi perusahaan sebagai bagian yang meneliti trend perusahaan dan sebagai bentuk fokusnya pada aktifitas memberikan bantuan kepada perusahaan</li> <li>4. Merekrut staff khusus dari perusahaan swasta (honoror) untuk menularkan gaya manajemen perusahaan swasta (peneliti sekalipun perlu untuk memahami naluri bisnis saat mulai berproduksi)</li> <li>5. 5 Jumlah staff maksimum 150 orang termasuk pegawai honoror, jabatan. Penempatan dengan jabatan rangkap dimungkinkan.</li> </ol> <p>c. Menyusun anggaran dan rencana keuangan</p> <p>Anggaran BBLM pada tahun fiskal 2015 sebesar 23 milyar rupiah. 19,5 milyar (85%) diantaranya adalah untuk membayar gaji dan biayaperawatan fasilitas. Selama ini BBLM memosisikan dirinya sebagai lembaga litbang, namun anggaran untuk penelitian dan pengembangan hanya 600 juta , atau setara dengan 3%, kemudian untuk biaya pendidikan intern 400 juta. Pada kolom isi kegiatan diatas ditekankan pentingnya untuk melakukan kegiatan marketing, namun dana untuk marketing pada tahun 2015 hanya 30 juta rupiah per tahun.</p> <p>Secara keseluruhan, anggaran untuk Kementerian Perindustrian kecil, sehingga penambahan anggaran untuk institusi dibawahnya tidak dapat diharapkan. Ditengah kecilnya dana penelitian dan pengembangan BBLM, tidak mudah untuk melakukan pelayanan jasa bantuan teknik ke perusahaan apalagi meningkatkannya. Maka, untuk sementara BBLM harus berinisiatif untuk memanfaatkan sumber dari luar dan berusaha untuk meningkatkan pemasukan. Contoh sumber dari luar adalah selain anggaran dari BPPI sebagai badan pengawas langsung, juga memanfaatkan anggaran program tertentu dari bagian,atau direktorat lain atau dari badan lain (termasuk Dinas). Perlu dengan cermat untuk menggali sumber-sumber dana dari luar ini.</p> <p>Selanjutnya adalah meningkatkan pemasukan. Meningkatkan pemasukan yang berasal dari dana kerja sama, biaya konsultasi teknik, biaya kalibrasi dan dari sewa fasilitas. Suber dana dimasa depan seperti komisi pembuatan produk, komisi pembuatan produk, inspeksi produk, dana sertifikasi hingga royalti atas HAKI (hak paten yang dimiliki Kemenperin). Pemasukan yang berasal dari kegiatan tertentu dapat juga dialihkan untuk proyek berikutnya.</p> <p>Dengan perhitungan kasarnya, misalnya 35 milyar per tahun untuk 150 pegawai. 20 milyar diantaranya untuk pembayaran gaji dan biaya perawatan fasilitas, sisanya diperuntukkan sebagai dana kegiatan. Dari kebutuhan anggaran 35 milyar, 25 milyar diantaranya adalah anggaran dari Pemerintah, sisanya didapat dari pemasukan. Perlu untuk membuat rencana finansial yang rinci.</p> <p>(4) Langkah 4</p> <p>Memulai memberikan pelayanan konsultasi.</p> <ol style="list-style-type: none"> <li>a. Mulai menerima konsultasi dari perusahaan. Menentukan jenis konsultasi</li> <li>b. Jasa service ke pelanggan (perusahaan). Jika berbayar, maka perlu dibicarakan oleh kedua pihak sebelumnya dan dibuat surat perjanjian.</li> <li>c. Memulai pelayanan jasa sebagai instansi bantuan teknik, termasuk jasa berbayar</li> </ol> <p>Konsultasi awal dari perusahaan ke instansi pelaksana, melalui telpon, email atau dengan datang berkunjung dapat diberikan secara gratis selama 2 jam. Kunjungan</p>
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	<p>awal ke perusahaan untuk melakukan penelitian awal (dalam 1 hari) dapat diberikan secara gratis juga. Biaya-biaya ini dapat dimasukkan kedalam biaya realisasi program pemberian pelayanan jasa</p> <p>Untuk tahun fiskal 2017, anggaran realisasi program pemberian pelayanan jasa ini sebesar 40-50 juta.</p> <p>Apabila, didalam jasa pelayanan tersebut ada pengiriman tenaga ahli, maka service fee untuk tenaga ahli tersebut adalah 1,5 juta rupiah perhari (diluar ongkos transportasi dan akomodasi)</p>
Input	Plan ini harus diikuti oleh seluruh pegawai BBML, disusun rencana revitalisasi untuk 3 bulan dan direalisasikan.
Anggaran	Perlu di bicarakan dengan BPPI, berdasarkan rencana revitalisasi.
Indikator kinerja	<p>Indikator kinerja diberikan per proyek (pemberian jasa)</p> <p>Standard dari penerimaan jasa konsultasi masing-masing instansi teknis, adalah minimal 30 konsultasi per tahun.</p> <p>Ditargetkan, layanan berbayar lebih dari 15.</p>
Poin pertimbangan	<p>Pada dasarnya plan revitalisasi ini disusun dan ditetapkan sendiri oleh BBLM Namun, Kemenperin dan JICA merasa perlu untuk membantu. Seperti bantuan kunjungan ke Jepang, Thai, Malaysia untuk melihat manajemen instansi pemerintah pemberi bantuan teknis.</p> <p>Sebagai instansi pemerintah pemberi jasa teknis, penting bagi BBLM untuk mendapat kepercayaan dari perusahaan swasta, untuk itu juga perlu melakukan perubahan cara berfikir bagi seluruh pegawainya.</p>

Plan 6 Program pembentukan dan pelaksanaan sistim sertifikasi keterampilan casting

<p>Tujuan dan rangkuman</p>	<p>Menyiapkan sistim sertifikasi keterampilan profesi casting, meningkatkan keterampilan tehnisi casting, membuktikan dengan tepat level keterampilan. Dengan memperbanyak tehnisi yang memiliki sertifikat, memungkinkan untuk membuat target meningkatnya ketrampilan casting dan semakin tingginya daya saing secara menyeluruh. Peserta program ini tidak dibatasi pada tehnisi casting dari industri alat berat saja, tetapi tehnisi casting di Indonesia secara menyeluruh termasuk industri otomotif. Maka program ini menjadi penghubung antara program pendidikan tehnisi dan sistim sertifikasi nasional yang bertujuan untuk memajukan industri casting Indonesia</p> <p>Perhatian: Pada tahun 2014, Indonesia menjadi negara dengan penjualan kendaraan terbanyak di ASEAN melampaui Thailand. Sejalan dengan ini produksi suku cadang kendaraan, termasuk suku cadang casting di dalam negeripun meningkat, keperluan penerapan sistem sertifikasi tenaga terampil untuk casting di dunia industri suku cadang mobil lebih dibutuhkan.</p>
<p>Institusi pelaksana</p>	<p>Badan Standar National Profesi (BNSP) LSP LMI Asosiasi Industri Pengecoran Logam Indonesia (APLINDO), HAPLI, BBLM, POLMAN, HINABI, GAIKINDO dll sebagai institusi pendukung.</p>
<p>Isi aktifitas dan urutan pelaksanaannya</p>	<p>Membentuk sistim sertifikasi teknologi pengolahan casting sebagai salah satu jenis pekerjaan sertifikasi keterampilan negara Indonesia. Bertujuan untuk meningkatkan kualitas industri casting dalam negeri yang bersamaan dengan itu, meningkatkan kapasitas tenaga terampil.</p> <p>(1) Langkah 1 LSP Logam dan Metal menyiapkan bahan keperluan sertifikasi keterampilan casting yang pada akhirnya dilegalisasi oleh BNSP.</p> <ol style="list-style-type: none"> <li>a. Sub komite casting dari LSP logam dan metal, menyiapkan draft metode ujian, klasifikasi pembagian ketrampilan pada cast iron, cast steel, metal non ferous dengan berpegang pada standard ketrampilan dan metode ujian JAVADA (Jepang),</li> <li>b. Dengan berpijak pada isi diskusi dengan pihak terkait, draf akhir diajukan untuk mendapatkan persetujuan dari BNSP sebagai cara pelaksanaan ujian</li> <li>c. BNSP mempublikasikan cara sertifikasi yang telah disetujui</li> </ol> <p>(2) Langkah 2 Mempublikasikan cara dan metode sertifikasi ke dunia industri, kemudian melakukan persiapan pelaksanaan</p> <ol style="list-style-type: none"> <li>a. Target melakukan ujian perdana adalah 12 bulan setelah informasi dipublikasikan (sebisa mungkin disesuaikan dengan schedule pelaksanaan sertifikasi BNSP), menentukan tempat ujian</li> <li>b. Menyusun rencana ujian tahunan. Menyiapkan anggaran yang sesuai</li> <li>c. Membuka pendaftaran peserja ujian, menyelaraskan standard penilaian dan menyiapkan team penguji</li> </ol> <p>(3) Langkah 3 Pelaksanaan sertifikasi ketrampilan casting.</p> <ol style="list-style-type: none"> <li>a. LSP logam dan metal melaksanakan ujian sertifikasi keterampilan casting pertama</li> <li>b. Mencetak sertifikat untuk yang lulus</li> <li>c. Melakukan evaluasi pelaksanaan uji sertifikasi keterampilan casting pertama, melakukan pendataan</li> </ol>



Input	<p>Biaya yang terkait persiapan dll (termasuk penyebaran informasi) di bantu oleh BNSP dan Pusdiklat Kemenperin</p> <p>Ujian dilaksanakan dengan membayar, sebagian dari biaya pelaksanaan ujian di bebaskan kepada peserta (perusahaan pengirim) (biaya ujian diperkirakan Rp.1.000.000)</p> <p>Tempat ujian memakai fasilitas BBLM, POLMAN, perusahaan swasta dll, biaya aktual seperti biaya material, biaya pengembangan dan lain-lain dibebaskan ke peserta atau ke BNSP, Kemenperind, Kemendikbud.</p> <p>Biaya yang diperlukan untuk latihan peserta ujian, dibebaskan kepada peserta atau perusahaan asalnya (sebagian subsidi BNSP, Kemenperind).</p>
Anggaran	<p>Dengan referensi dari sistem ujian profesi yang lain, biaya ujian sertifikasi casting ditetapkan dengan mempertimbangkan kekhususannya (keperluan biaya material dan biaya energi dll)</p> <ol style="list-style-type: none"> <li>a. Honor asesor Rp. 6 juta</li> <li>b. Biaya pelaksanaan Rp.1.5juta x 50 orang = Rp.75 juta.</li> </ol> <p>Biaya pencetakan sertifikat oleh LSP-LMI disamakan dengan jenis pekerjaan lain.</p>
Indikator kinerja	Setiap tahun ditargetkan 40 orang lebih lulus pada uji kompetensi casting SKKNI yang ditetapkan BNSP,
Item pertimbangan	Walaupun dengan standard sertifikasi BNSP, perlu dipertimbangkan standard yang sebanding dengan standard internasional. Maka, di dalam penyusunannya perlu dipertimbangkan untuk mencari dukungan dari Perusahaan Jepang. Koordinasi dengan perusahaan swasta, khususnya HINABI adalah kunci sukses penerapan sistim ini, contoh dari Die and Mold Association dapat dijadikan bahan pertimbangan
Waktu Pelaksanaan	Selanjutnya dilaksanakan 2 kali setahun.
Penanggung jawab	LSP-LMI

### Plan 8 Program promosi Industri Casting Ceper

<p>Tujuan dan rangkuman</p>	<p>Di daerah Ceper kabupaten Klaten Jawa Tengah berkumpul lebih dari 300 perusahaan casting besar kecil. Secara sejarah dimulai dari produksi pacul dan bajak sebagai peralatan pertanian, atau benda-benda seni tradisional, dan lain-lain produksi benda casting di sekitar diri kita, saat ini berkecimpung memproduksi sampai dengan part industri yang diperlukan roda kereta atau mesin. Awalnya pun Jawa Tengah, Solo dan Jogja adalah terkenal sebagai daerah pengerjaan logam di Indonesia, terutama kehadiran daerah Ceper dapat disebutkan sebagai sentra daerah casting.</p> <p>Akan tetapi, di sisi lain perusahaan casting daerah Ceper yang tradisional pun tidak dapat mengikuti arus modernisasi dalam menghadapi bermacam-macam permasalahan. Secara umum perusahaannya berskala kecil, perusahaan yang memiliki tungku peleburan listrik tidak lebih dari sekitar 40 perusahaan. Kemudian, sebelum kemandirian skill dan fasilitas, dihadapkan kepada permasalahan yang besar pada sisi manajemen control dan manajemen produksi yang modern.</p> <p>Presiden Jokowi pada saat masih menjabat sebagai walikota Solo, perhatian tenaganya kepada peningkatan infrastruktur di Solo dan sekitarnya, dan dirasakan juga manfaatnya di daerah Ceper. Akan tetapi peningkatan infrastruktur sosial industri casting Ceper tidak dimanfaatkan dengan tuntas, selain itu, industri pengecoran tidak dapat mengikuti kemajuan Industrialisasi Indonesia secara keseluruhan, ditambah dengan berpindah keluarnya tenaga terampil, saat ini dapat disebutkan kondisi perindustriannya stagnan. Mengingat situasi ini Pemerintah Indonesia memutuskan untuk memulai pengaktifan kembali dari wilayah industri sebagai bagian dari promosi industri daerah.</p> <p>Program ini menunjukkan perencanaan untuk pengembangan langkah-langkah promosi yang dibagi menjadi jangka pendek dan jangka panjang untuk mempromosikan industri casting Ceper dengan peningkatan sistem promosi dipusatkan di POLMAN Ceper.</p>
<p>Institusi pelaksana</p>	<p>Di level pemerintah pusat, support di sisi kebijakan dan keuangan dilakukan oleh Kemenperind secara keseluruhan, dipusatkan di Ditjend IKM, di level pemerintah daerah promosi dilakukan Dinas Perindagkop Klaten, POLMAN Ceper, Batur Jaya sebagai instansi utama.</p>
<p>Isi aktifitas dan prosedur pelaksanaan</p>	<p>Program ini adalah sebuah rencana sebagai program promosi industri dengan objek perusahaan casting dari daerah Ceper dengan berbagai langkah dari promosi industri pendukung alat konstruksi yang telah dijelaskan.</p> <p>(1) Langkah1</p> <p>Pembentukan Komite Promosi Industri Casting Ceper.</p> <p>Kemenperind dan yang terkait di daerah membentuk Komite Promosi Industri Casting Ceper. Sekretariat Komite ditempatkan di Ditjen IKM dan Ilmate, dengan struktur anggota direktorat terkait di Kemenperind selain itu, Disperidagkop Klaten, POLMAN Ceper Batur Jaya dan perwakilan HINABI.</p> <p>Kemudian, pada tahap pelaksanaan kebijakan, dalam sekretariat Batur Jaya merangkap menjadi sekretariat program ini, dilaksanakan koordinasi program di Ceper.</p> <p>Komite ini berdiskusi dan merumuskan pelaksanaan rencana secara aktual (tujuan, pembegian tugas, termasuk schedule), anggaran yang</p>

diperlukan untuk pelaksanaanditunjang oleh anggaran dari Kemenperind. Dalam rencana pelaksanaan sudah termasuk kebijakan yang tertulis di bawah ini.

(2) Langkah 2

Membangun Pengembangan bersama, sistem pelaksanaan service konsultasi. Untuk hal ini menyiapkan memperkuat fasilitas POLMAN Ceper.

- a. Sebagai kesatuan dari penguatan sistem POLMAN Ceper, mengupayakan penyiapan fasilitas yang diperlukan untuk promosi industri casting Ceper
  - High Frequency Furnace
  - Scanning Electronic Microscopy
  - Hobbing Gear
- b. Mengidentifikasi target casting untuk bekerja dengan strategis di daerah. POLMAN Ceper, Batur Jaya dan HINABI berdiskusi mengidentifikasi Target Casting yang akan dikerjakan di waktu yang akan datang (dalam waktu 1-3 tahun) di daerah Ceper, perusahaan yang mengembangkan, pembagian tugas lembaga terkait, prosedur, schedule, quotation anggaran dll, ditetapkan dengan detail. Barang yang dimasa yang akan datang dapat ditangani dengan fasilitas industri di Ceper, mudah berkaitan dengan produksi massal.
- c. Mendapatkan spesifikasi produk atau produk sampel, untuk memulai pengembangan prototype.

(3) Langkah 3

Sebagai program penyebaran Perbaikan industri casting Ceper, melaksanakan perencanaan seminar perbaikan, workshop dan program perbaikan lapangan pada industri tertentu dengan target manajemen perusahaan dan middle manajemen dari perusahaan terkait dengan industri casting di daerah.

- a. Dengan memanfaatkan program penyebaran perbaikan oleh Ditjend IKM (Plan 5 dari usulan ini), melaksanakan penyebaran perbaikan , seminar, workshop di daerah Ceper. Dalam hal ini, seminar penyebaran dilakukan dengan seminar setengah hari, sedapat mungkin menjadi tempat menyebar luaskan ringkasan, metode dan efek perbaikan kepada banyak orang (diperkirakan sekitar 200 orang dalam penyelenggaraan 1 kali). Sedangkan untuk workshop dikumpulkan 20 s/d 30 perusahaan dilakukan training selama 5 hari.
- b. Melaksanakan bimbingan program perbaikan terhadap (sekitar 5) perusahaan tertentu. Lama pembimbingan tergantung kepada kondisi lembaga yang menjadi target, diperkirakan sekitar 6 s/d 24 bulan, terutama mengupayakan pengembangan metode secara basic seperti penerapan 5S, aktifitas QC, manajemen stok dll.

Kemudian, konsultan yang ditunjuk untuk seminar dan bimbingan, Kemenperind mendelegasikan pekerjaan ke konsultan swasta. Dengan demikian yang bertugas mengorder adalah dari sisi Ditjend IKM.

(4) Langkah 4

Mengupayakan ekspansi sistem beasiswa ditujukan kepada siswa POLMAN Ceper.

- a. Ekspansi dikembangkan sistem beasiswa yang sedang dijalankan oleh Disperindagkop Klaten yang telah dijalankan selama 2 tahun. Saat ini penerimanya adalah 20 orang, jumlah penerimanya dikembangkan

	<p>mendai sejumlah 30 orang, (perlu disiapkan anggaran untuk hal ini)</p> <p>b. POLMAN Ceper bersama dengan Disperindagkop Klaten, melakukan upaya kepada industri alat berat, otomotif, pembangkit listrik, mesin agar menerapkan sistem beasiswa perusahaan swasta.</p>
Input	Selain anggota yang membentuk komite promosi industri casting Ceper, diinput konsultan swasta yang menerima pendelegasian. Lebih dari itu kepada POLMAN Ceper diinput mesin material dalam rangka penguatan fasilitas dalam sekolah.
Anggaran	<p>Untuk menjalankan proyek ini dalam 1 tahun kedepan diperlukan anggaran sekitar sebagai berikut.</p> <ul style="list-style-type: none"> <li>• Biaya program pengembangan bersama produk potensial Rp.150 million x 4 items=600 millions</li> <li>• Biaya bantuan pelaksanaan service konsultasi kepada industri Rp. 3 million x 6 months x 5 companies = 90 millions</li> <li>• Biaya Penguatan fasilitas POLMAN Ceper Total Rp. 4.5 Milyar</li> <li>• Biaya penyelenggaraan penyebaran perbaikan dan seminar, workshop 200 x Rp.100,000 x 1=Rp.20,000,000 30 x Rp.300,000 x 5 days=Rp.45,000,000</li> <li>• Biaya bantuan konsultasi lapangan perbaikan 5 x Rp.2,000,000/month x 6 months =Rp.60,000,000</li> <li>• Beasiswa yang ditujukan untuk mahasiswa POLMAN Ceper 30 x 27,000,000/ a person/year=Rp.810,000,000</li> </ul> <p>Total keseluruhan Rp. 6.200.000.000,-</p>
Indikator kinerja	<ul style="list-style-type: none"> <li>• Sampai dengan Desember 2019, produksi corannya meningkat 50% dari level tahun 2015</li> <li>• Menetapkan benda target casting di daerah, sampai dengan tahun 2019 ditargetkan produksi baru 10 item.</li> <li>• Sampai dengan Desember 2019, jumlah pengusaha naik 30% dari level tahun 2015</li> </ul>
Item pertimbangan	<p>Dalam program ini, dilakukan berbagai cara, mulai dari seminar setengah hari, pembinaan SDM dan perbaikan, ada banyak dan perlu waktu yang lama untuk sampai mendapatkan hasil. Dilain pihak dari sisi pemerintan dimintakan mewujudkan hasil dalam waktu cepat, bersamaan dengan mempertimbangkan poin ini, dimintakan usaha untuk mendapatkan pengertian kepada pihak terkait.</p> <p>Kemudian, walaupun mendapatkan support dari Kemenperind, yang menjadi pemeran utama pelaksana adalah daerah Ceper, harus menunjukkan peran utama daerah dan kemauan yang kuat untuk mencapai target.</p>
Waktu pelaksanaan	Telah diinstruksikan promosi industri casting Ceper oleh Menteri Perindustrian, dengan dasar usulan ini, Kemenperind dan daerah Ceper segera dimulai bergerak.

Penanggung jawab utama	Ditjend IKM Kemenperind, Ditjend ILMATE Kemenperind, Dinas Perindagkop Klaten POLMAN Ceper Sekretariat Batur Jaya
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ANNEX 14

The Completion Report of the Training in Japan for  
Indonesian Managing Staff on  
industry-government-academia collaboration for  
the foundry industry

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Project on Enhancement of  
Metalworking Capacity for Supporting  
Industries of Construction Machinery  
in Indonesia

Completion Report on Training in Japan  
(Supporting Industry Promotion through  
Industry-Government-Academia Collaboration  
for the Top Officials of Indonesia)

November 2016

UNICO INTERNATIONAL CORPORATION  
Japan Development Service Co., Ltd.



## 1. Report on the Training

### 1.1 Course Outline

#### (1) Course's title

Supporting Industry Promotion through Industry-Government-Academia Collaboration for the Top Officials of Indonesia

#### (2) Training period

October 23, 2016 (Sun) (Participants arrived in Japan) - October 29, 2016 (Sat) (Participants returned to Indonesia) - 7 days

#### (3) Number of participants and classification by organization

This training course was conducted for personnel in management positions in the metalworking organizations relating to the “Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia”, totaling 5 persons.

(The list of participants is shown in 2. Appendix 2.1)

**Table 1 Classification of Participants in the Training Course by Organization**

Ministry of Industry: MOI	1
Metal Industry Development Center: MIDC	1
POLMAN Bandung	1
POLMAN Ceper	1
HINABI	1
Total	5

Source: JICA Project Team

## 1.2 Training Outline

### (1) Training design concept

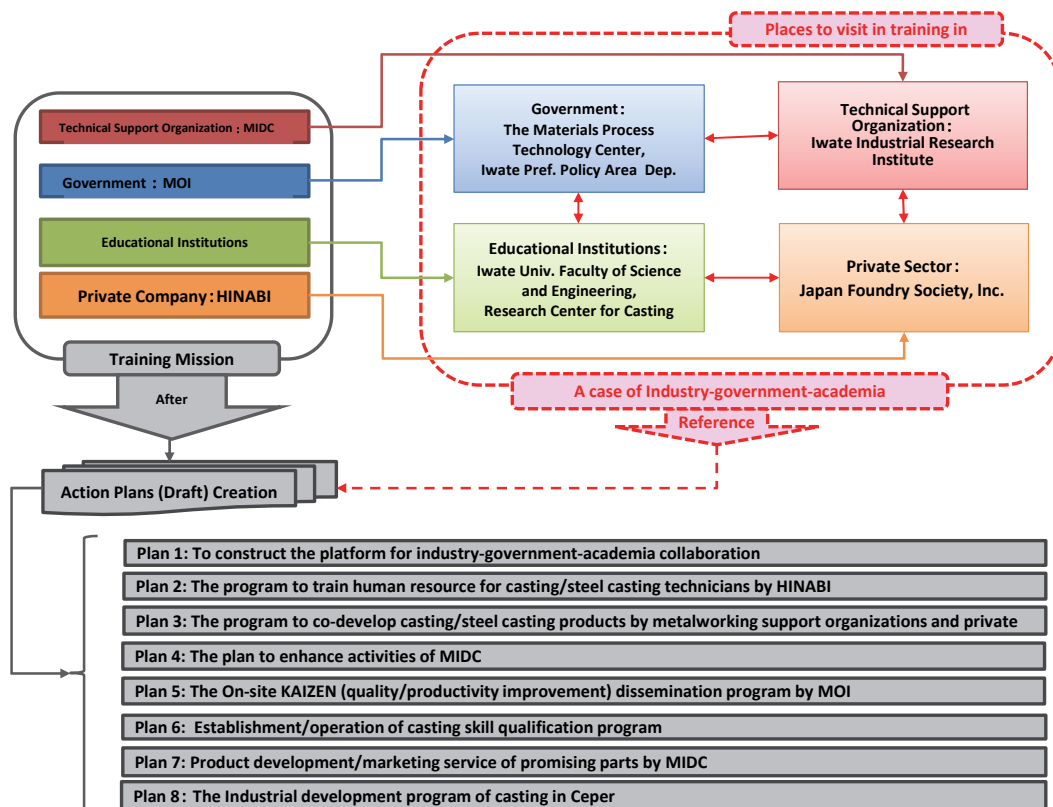
As the project period for the “Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia” comes to an end in March 2017, the draft action plan (A/P) has been in process of creation in collaboration with the metalworking organizations<sup>1</sup> and the JICA Project team; for implementation of continuous industrial development in supporting industries of casting, by the Indonesian government after the end of this project. In the draft A/P, related organizations of casting industry are to band together, construct the platform, provoke industry-government-academia collaboration, and set effective measures by combining each organization’s advantage. However, in the casting industry of Indonesia, currently there has been almost no opportunity for related industry-government-academia organizations to assemble all together; thus, more than few personnel do not grasp an image of “industry-government-academia collaboration.”

This training aimed to learn the framework and the system of industry-government-academia collaboration, by observing each aspect of entire process in an advanced case for casting industry and/or its supporting industries development in Japan. This includes aspects of planning, budget, implementation, and evaluation/monitoring. Eventually, in the draft A/P creation process, participants are expected to contribute for setting more effective measures for casting industry development, by utilizing knowledge learnt in this training after returning to Indonesia.

Fig.1 shows the overall conceptual design of the training course.

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<sup>1</sup> MOI, MIDC, HINABI and Polman Bandung



Source: JICA Project Team

Fig.1 Overall Conceptual Design of the Training Course

## (2) Training schedule and course outline

Table 2 shows a training schedule. The list of lecturers including their background is shown in 2. Appendix 2.1 “Detailed Training Plan (Actual Version).”

**Table 2 Training Schedule and Course Outline**

Date	Time	Type	Course Outline	Place of Training
23-Oct-16	~		Arrival of participants	
24-Oct-16	10:30 ~ 11:30		Briefing	JICA Tokyo (TIC) 4F SR401
	13:00 ~ 15:00	Lecture	Human resource development and its transition in Japanese casting industry	
	15:10 ~		Travel to Morioka	
25-Oct-16	9:00 ~ 10:20	Lecture	Industry-government-academia collaboration underway in Iwate Pref.	Iwate Univ. Dep. of Engineering, Common Education/Research Building 207
	10:30 ~ 12:00	Lecture	Iwate Meister System: Establishment and Record	
	13:00 ~ 15:00	Field Tour	Field Tour to the Research Center for Casting of Iwate Univ.	
26-Oct-16	10:00 ~ 12:00	Field Tour	Support for small-and-medium sized foundries	Iwate Industrial Research Institute, meeting room
	14:00 ~ 16:00	Lecture	Iwate Pref.: the effort to casting industry development – the industry-government-academia collaboration	
	16:10 ~		Travel to Osaka	
27-Oct-16	9:30 ~ 11:30	Field Tour	Field Tour to a foundry	Amagasaki Steel Casting Co., Ltd. Katsushiro Matex Co., Ltd.
	13:00 ~ 15:00	Field Tour	Field Tour to a metalworking factory	
	15:10 ~		Travel to Tokyo	
28-Oct-16	10:30 ~ 12:00	Lecture	Q&A Session (the Materials Process Technology Center)	JICA HQ, meeting room 222
	13:00 ~ 15:00		Wrap-up of the training (Discussion regarding the A/P, Report/evaluation of the training)	JICA HQ, meeting room 203
29-Oct-16	~		Departure of participants	

Source: JICA Project Team

## (3) Training curriculum

Table 3 shows an overview of the training curriculum planned according to the agreed training goal and training items, together with an outline of individual training programs.

**Table 3 Overview of the Training Curriculum**

Training goal	Training item	Training program
To learn a framework and historical background on the Japanese foundry industry and the industry - government - academia collaboration initiative	1) Collaboration of the industry, government and academia in the area of development policy for foundry-related supporting industries	<ul style="list-style-type: none"> <li>a. Human resource development in the Japanese foundry industry and its history</li> <li>b. Promotion of industry-government-academia initiatives in Iwate Prefecture</li> <li>c. Foundry industry promotion in Iwate: industry-government-academia collaboration</li> </ul>
	2) Industry-government-academia collaboration in planning, implementation and monitoring of individual policies and programs	<ul style="list-style-type: none"> <li>d. Origin and achievement of the Iwate meister system</li> <li>e. Field tour to the Foundry Technology Research Center at Iwate University</li> <li>f. Support for SMEs in the foundry industry (Iwate Prefecture Industrial Technology Center)</li> <li>g. Questions and answers (Sokeizai Center)</li> </ul>
	3) To visit small and medium-sized foundries and machining shops in Japan to acquire knowledge and information for use at individual companies (including those to receive KAIZEN-related consulting service).	<ul style="list-style-type: none"> <li>h. Field tour to a foundry (Amagasaki Casting Steel Co.)</li> <li>i. Field tour to a machining shop (Katsushiro Matex Co.)</li> </ul>

Source: prepared by the JICA project team

- 1) Industry-government-academia collaboration in the area of development policy for foundry-related supporting industries
  - a. Human resource development in the Japanese foundry industry and its history (lecture)

Lecturer: Mr. Yoshihiro Kakuta (executive director of Japan Foundry Society)

Outline: Historical background on the Foundry College from its inception, the training curriculum, operating system, record and reputation, with focus on the Human Resource Development Project on Core Personnel of the Foundry Industry that is carried out in the form of industry-government-academia collaboration and under the leadership of Japan Foundry Society.
  - b. Promotion of industry-government-academia initiatives in Iwate Prefecture (lecture)

Lecturer: Mr. Hiroshi Horie (visiting professor of Department of Science and Engineering, Iwate University)

Outline: Introduction and discussion on joint research projects on foundry technology, as closely related to foundries operating in Iwate Prefecture, conducted by Department of Science and Engineering of Iwate University, related human resource development, together with the role of the Foundry Technology Research Center that serves as contact point with individual foundries, the center's activity record, and case studies on the center's regional and international contribution
  - c. Foundry industry promotion in Iwate: industry-government-academia collaboration (lecture)

Lecturer: Mr. Kenji Shimizu (specialist, Regional Promotion Office, Policy Department, Iwate Prefecture Government)

Outline: History of industry-government-academia collaboration in Iwate and its management system, with an emphasis on the Iwate Network System (INS) that serves as a place for exchange among people representing the industry, government, academia, together with the private sector, by giving several examples on industry-government-academia collaboration projects to show how they are led by the Iwate prefectural government as representative of the public sector.
- 2) Industry-government-academia collaboration in planning, implementation and monitoring of individual policies and programs
  - d. Origin and achievement of the Iwate meister system (lecture)

Lecturer: Mr. Sadato Hiratsuka (professor of Department of Science and Engineering of Iwate University)

Outline: Introduction of the Iwate meister development project, which was initiated for the purpose of training "human resources to be engaged in the 21st century monozukuri (Japanese-style product development and making)" for the interest of local companies and economy, an educational curriculum for the die/mold making and foundry

- engineering field at graduate course of Iwate University (with an aim to develop it as place for human resource development relating to the Iwate meister development project, and the meister accreditation system
- e. Field tour to the Foundry Technology Research Center, Iwate University  
Lecturer: Mr. Sadato Hiratsuka (professor of Department of Science and Engineering of Iwate University)  
Outline: Field tour to visit and observe the status of research facility and equipment relating to dies, molds, foundry process, complex devices, and the current state of research and development on fundamental technology for the future “monozukuri” process, facility and equipment of the industry-academia joint research facilities that serve as a basis for relevant human resource development, and implementation of industry-academia collaboration initiatives
  - f. Support for SMEs in the foundry industry (Iwate Prefecture Industrial Technology Center)  
Lecturer: Mr. Hiroyuki Ike (Regional Independent Administrative Agency Iwate Industrial Research Institute Material Technology Manager)  
Outline: Introduction on the Iwate Prefecture Industrial Technology Center that provides more than 4,000 consultation services for SMEs in Iwate Prefecture, including its facility and equipment, and outline of a corporate support service system operated by the center
  - g. Questions and answers (Sokeizai Center)  
Lecturer: Mr. Noritsugu Itaya (vice president and executive director of Sokeizai Center)  
Outline: A question and answer session to explain Sokeizai Center’s projects on human resource development, public education, promotion of exchange among relevant personnel and organizations, and projects to develop technology relating to development of Sokeizai (element materials)
- 3) To visit small and medium-sized foundries and machining shops in Japan to acquire knowledge and information for use at individual companies (including those to receive KAIZEN-related consulting service).
- h. Field tour to a foundry (Amagasaki Casting Steel Co.)  
Outline: Field tour to Amagasaki Casting Steel Co. which, despite a small size (less than 50 employees), exports casting steel products to large enterprises in the U.S. and Europe, to learn their production technology

i. Field tour to a machining shop (Katsushiro Matex Co.)

**Outline:** Field tour to Katsushiro Matex Company's production facility and equipment, which consists of an integrated production system from cutting to coating, to learn their production technology and quality control

### **1.3 Overview on the Training Course**

#### **(1) Lecture**

To ensure efficient learning of industry-government-academia collaboration in the foundry industry in Japan, lectures were conducted by relevant personnel in government organizations, research institutes, educational institutions, and private organizations, and as a result, enabling participants to learn about industry-government-academia collaboration from different perspectives. In particular, as the training mission consisted of personnel representing the central government, educational institutes, and private organizations, they were enthusiastic about learning knowledge and experience relating to industry - government - academia collaboration in Japan by asking questions, especially lecture by personnel who is the counterpart of a respective member.

The lectures covered broad subjects, ranging from the historical background on industry-government-academia collaboration relating to the foundry industry in Japan as a whole or regions (including Iwate Prefecture), implementation methodology, monitoring and assessment, thus allowing the training mission members to learn industry-government-academia collaboration from multi-angles and different perspectives.

#### **(2) Discussion, practical training, exercise, and presentation**

On October 28, the last day of the training program, a briefing session was held in the afternoon to discuss a draft action plan to make a formal action plan to be developed on the basis of the training program and its learning outcomes after returning to Indonesia. Each training mission member presented a draft plan for his or her organization, followed by discussion on how industry-government-academia collaboration cases in Japan, as learned during the training program, could and would be applied to future plans in Indonesia. Notably, 3 out of 5 training mission members did not have experience in development of action plans, necessitating supplemental instruction in the process, while allowing the project team to obtain information that was not confirmed until then.

Overall, the training mission members expressed that the training program was very useful, together with appreciation, and the high level of satisfaction was seen from responses made in the questionnaire survey (see Appendix 2.3).



### (3) Field tour

The training program was started with field tours to Foundry Technology Center of Iwate University and Industrial Technology Center of Iwate Prefecture for the purpose of examining relevant facilities and equipment that serve as contact point with companies. The training mission members were able to obtain data and information on the type and size of facilities and equipment to be required for joint development projects with companies and other services to meet the actual needs.

As only one day was available for field tour to companies, the following companies were selected and visited.

#### 1) Amagasaki Casting Steel Co.

Amagasaki Casting Steel Co. is, despite a small size (less than 50 employees), exports casting steel products to large enterprises in the U.S. and Europe by using innovative production technology. The training mission visited and observed the company's production process and learned production technology and quality control.

#### 2) Katsushiro Matex Co.

Katsushiro Matex is a world leading company in the area of metalworking for construction machinery and operates a subsidiary in Indonesia, PT Katsushiro Indonesia. The field tour was thus focused on advanced production management technology. Because Dr. Budi Setyo Utomo has served as vice president of PT Katsushiro Indonesia until recently, the training mission was well received.

### (4) Training period, arrangement and content

The training program was designed for leading members of metalworking support organizations, all of who served as managers or equivalent and were difficult to take a long-term business trip. It was thus decided to make the training period short, five days, resulting in a busy schedule with frequent travels so as to attend lectures on a variety of topics in an efficient manner. As it was explained to the training mission members at the time of a pre-training orientation, few complaints were heard from the members advanced in years. As judged from comments made by the mission members at the assessment meeting, they did not feel the travels burdensome.

The formal schedule was started with lecture in Tokyo, followed by a travel to Morioka on the same day. On the next day, the training mission attended lectures at Iwate University and Iwate prefectural government and visited Industrial Technology Center. Then, they moved to Kansai, where they visited two factories (construction machinery and foundry), and finally returned to Tokyo for lectures and the meeting to discuss A/P and present learning outcomes. A travel from Morioka to Osaka covered a substantial distance, but travel time was relatively short because of availability of air service. Similarly, other travels were made by Shinkansen, thus minimizing physical stress on the mission members.

As discussed in (1), the training program was designed to cover broad areas with an aim to make comprehensive learning on industry-government-academia collaboration. In lectures

at Iwate University, efforts were made to maximize understanding by the mission members, e.g., the learning of a support system for foundries in an entire Iwate prefecture preceded the lecture at Iwate University.

(5) Textbooks, equipment and materials, facilities

All the textbooks, excepting those for which distribution was not permitted, were translated to Indonesian and were distributed to the training mission members on the first day.

Lectures were conducted at JICA's Tokyo headquarters, Department of Science and Engineering of Iwate University, Industrial Technology Center in Iwate prefecture, and companies visited for field tour. All of them were conducted in a good environment that allowed the members to concentrate. During the field tours to factories that were generally noisy, Panaguide systems were used while the helmets were provided to the participants.

## 1.4 Training Mission Members

(1) Qualification

As the training program was designed for manager-class personnel of the counterpart organizations (MOI, MIDC, Polman Bandung, Polman Ceper, and HINABI), request was made to MOI to select personnel who meet the following requirements and work as managing staff engaged in the organization's overall operation and management.

- 1) Recommended by the Indonesian government
- 2) Authorized to make a management decision with power to influence organizational management
- 3) In the healthy condition to participate in the training program
- 4) Not belonged to armed forces

Notably, a training mission member representing MOI was changed due to a change in the ministry immediately before the training program, and a deputy director general of Department of Machinery and Agricultural Machines – a main C/P for the Project – participated.

(2) Eagerness in participation

The training mission members were eager to learn from the training program and actively asked questions. Partly due to a small number of participants, they sincerely participated in lecture and field tour, indicating a strong will to absorb knowledge on industry-government-academia collaboration in Japan.

## **1.5 Use of Learning Outcomes**

### **(1) Learning outcomes from the training program**

As judged from the program feedbacks (see assessment by training mission members in Appendix 2.3) and opinions of the mission members, all of them seemed to be strongly impressed by industry-government-academia collaboration in the Japanese foundry industry. In particular, some were even surprised by the explanation at Industrial Technology Center in Iwate prefecture that the center provided some sort of technical support for around one half of manufacturing SMEs in the prefecture. All in all, they were able to achieve the purpose of learning the historical background and a mechanism of industry-government-academia collaboration that supported small and medium-sized foundries in Japan so as to use the knowledge for finalization of a draft action plan under preparation.

### **(2) Effective application of learning outcomes to A/P development**

During the training program, the participants shared the absence of a industry-government-academia collaboration system to support foundries in Indonesia as a fundamental problem and discussed the need to build it in the country. In particular, many of them pointed out the need for the government to take leadership and formulate relevant policies and support programs through discussion among stakeholders. In fact, this is the process proposed in a draft action plan prepared as part of the Project. It is therefore expected that the participants will communicate knowledge and experience obtained from the training program to other stakeholders at various occasions, such as a plenary meeting on the draft A/P, thus creating positive impacts on the A/P development toward the goal of promoting foundry-based supporting industries in an effective manner.

## **1.6 Training Environment**

Lectures were conducted at JICA's Tokyo headquarters, Department of Science and Engineering of Iwate University, Industrial Technology Center in Iwate prefecture, and companies visited for field tour. All of them were conducted in good conditions to provide an excellent training environment.

## **1.7 Other Special Remarks**

There is no other matter to be mentioned as a special remark.

## 2. Appendices

### 2.1 List of training mission member

#	Name	Organization
1	Ms. Katri Wahyuningsih	Deputy Director of Machinery & Agricultural Machinery Industries Directrate General of Metal, Machinery, Transportation Equipment & Electronic Industries
2	Dr. Budi Setyo Utomo	Advisor of Heavy Equipment Manufactures Assosiation in Indonesia (HINABI)
3	Mr.Eddy Siswanto	Chairman of Metal Industries Development Center (MIDC), Ministry of Industry
4	Dr. Ing. Yuliadi Erdani	Vice Director for Research, Development, Production and Partnership, POLITEKNIK MANUFAKTUR NEGERI BANDUNG (Polman Bandung)
5	Mr. Hussein Syifa	Chariman of POLITEKNIK MANUFAKTUR CEPER (Polman Ceper) Foundation

Source: Prepared by the JICA project team

## 2.2 Detailed Training Plan

### Detailed Training Plan

Please refer to the page 4 of this report.

### 2.3 Summary of Program Evaluation by Participants (based on the Questionnaire Survey)

~ 【Results of Questionnaire Survey on JICA Technical Training】 /Kuesioner~

#### Part 1 : Program Output/ BAGIAN I Hasil pelatihan

##### Tujuan program (Program's purpose)

Memahami mengenai 1. Kebijakan pengembangan Supporting Industry dengan adanya kerja sama antara akademisi, industri, dan pemerintah, 2. Baik proses pengambilan keputusan maupun pembagian tugas dan peran antara akademisi, industri dan pemerintah dalam implemetasi berbagai kebijakan di Jepang,

kemudian agar dapat menyusun Action Plan untuk pengembangan Supporting Industry yang efektif dan dapat dilaksanakan, sehingga dapat mengimplemntasikannya di Indonesia.

To learn Japan's public policy for development of supporting industries by means of industry-government-academia collaboration, the decision making process relating to various cases of program implementation, role-sharing among industry, government, academia sectors, with an aim to be able to develop and implement action plans for effective development of supporting industries

#### 1-1. How do you evaluate your own achievement with regard to the program goal? Indicate your evaluation according to the following scale.

Q1-1. Bagaimana penilaian Anda terhadap pencapaian diri Anda pada Tujuan Program?

← Telah mencapai/Fully achieved		Tidak mencapai/Not achieved →	
<input type="checkbox"/> 4 Bhudy, Yuriadi Hussein 3 person	<input type="checkbox"/> 3 Katori, Eddy 2 person	<input type="checkbox"/> 2	<input type="checkbox"/> 1

#### 1-2. Comment on your level of achievement

Q1-2. Apakah ada komentar mengenai tingkat pencapaian Anda tersebut?

- Future deployment of Indonesia's supporting industry development policy (Katori)
- I was able to learn actual examples of industry-government-academia collaboration (Bhudy)
- I was able to understand the concept of industry-government-academia collaboration (Eddy)
- Very good and satisfied (Yuriadi)
- I learned many beneficial things (Hussein)

### 2. Which program content was most beneficial to you?

Q2. Apa isi yang berguna dalam program?

- Industry-government-academia collaboration (Katori, Yuriadi)
- Actual cases of industry-government-academia collaboration in Iwate (Bhudy)
- Firm commitment by each actor in industry-government-academia collaboration (Eddy)
- Successful cases of industry-government-academia collaboration in Japan, which should be followed in

Indonesia (Yuriadi)

### 3. Suggestion for the program's improvement

Q3. Apakah ada saran untuk meningkatkan program?

- Comparative study on related regulation and control in Indonesia and Japan (Katori)
- Tight schedule due to frequent travels over long distance (Bhudy)
- Strong commitment by organization's top management to implementation of action plans (Eddy)
- Follow-up activity thorough FGD (Yuriadi)

### 4. Applicability of knowledge and experience learned in the program

Q4. Berikanlah komentar mengenai kemungkinan adaptasi pengetahuan dan pengalaman.

#### 4-1. List knowledge (techniques, business and organization, system, and concept), techniques and skills that can contribute to problem solving in Indonesia

4-1. Di antara pengetahuan yang Anda peroleh melalui pelatihan ini, pilihlah pengetahuan yang berguna (metode, layanan, organisasi, sistem, ikonsep), teknik dan keahlian yang dapat diadopsi atau diadaptasikan untuk menyelesaikan masalah-masalah di negara Anda.

- The building of an organization that enables committed and concerted efforts to aim for a general purpose of industrial promotion (Katori)
- Serious attitude of the Government in the enhancement of small and medium sized enterprises, especially in casting industry. It ranges to funds, product development, development of sales channels. (Budi)
- Applicability of organizational development techniques to Indonesia if small changes are made according to local conditions (Eddy)
- Japanese people make committed efforts to upgrade relevant knowledge and technology, which can be used as a model case for Indonesia. (Yuriadi)
- Iwate Network System (INS) (Houssein)

4-2. Please describe why the knowledge you chose is useful.

- Because it is a major challenge for Indonesia (Katori)
- Formation of a significant network by industry, government and academia: I hope that it is learned by relevant organizations through the JICA project. (Bhudy)
- It is relatively easy and quick to start (Eddy)
- Able to use formulation of future deployment guideline in Polman Bandung (Yuriaddy)
- Because each stakeholder is positively working toward regional development. (Houssein)

**4-3. How do you intend to adopt or apply it to your country? Also, identify issues relating to adoption or application.**

4-3. Jelaskanlah bagaimana itu diadopsi atau diadaptasikan ke dalam organisasi atau negara Anda. Selain itu, jelaskan pula jika ada masalah untuk mengadopsi atau mengadaptasikannya.

- To promote understanding by relevant organizations on primary importance of industry - government - academia collaboration in relation to industrial development. Because they work separately at present, it is important to ensure support from top management and to establish common understanding and awareness (Katori).
- The Japanese system is suitable for a small scale application using a model project, which should be suitable for development of local products and industries. Here, government can play a significant role in terms of financial assistance (Bhudy).
- A clear goal should be set at first, followed by development of an organization suitable for it. It should be noted that commitment including budgeting should be obtained from each actor in the industry-government-academia initiative. It should be considered as the most important issue (Eddy).
- Formulation and implementation of relevant policies through dissemination activity and FGD, followed by assessment and improvement (Yuriady)
- INS's system can be highly applicable to Indonesia, with some modifications and adjustments according to local conditions, together with "good will" of actors representing industry, government and academia. (Houssein)





ANNEX 15  
The Minutes of Meeting of  
The Final Joint Coordinating Committee Meeting

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**The Minutes of Meeting of  
The Final Joint Coordinating Committee Meeting  
on  
The Project on Enhancement of Metalworking Capacity  
for Supporting Industries of Construction Machinery**

The final Joint Coordinating Committee (JCC) Meeting on the “Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery” (hereinafter referred to as the “Project”) was held on 7 February, 2017 at the Ministry of Industry (MOI) of the Government of the Republic of Indonesia, and chaired by Director of Machinery & Agricultural Equipment Industry, Directorate General of Metal, Machinery, Transportation, and Electronic Industries (ILMATE), MOI.

In the final JCC Meeting, outcomes of project activities in the last three years were reviewed, in particular, achievement of Outputs and Project Purpose, and prospects for Overall Goal. In addition, the results of activities were also evaluated by means of DAC (Development Assistance Committee) Criteria for Evaluating Development Assistance.

All the participants in the JCC Meeting confirmed all the indicators given to Outputs and Project Purposes were achieved, and also agreed to the results of the review by DAC criteria.

The main points discussed and confirmed during the discussion in the final JCC Meeting are as per attached.

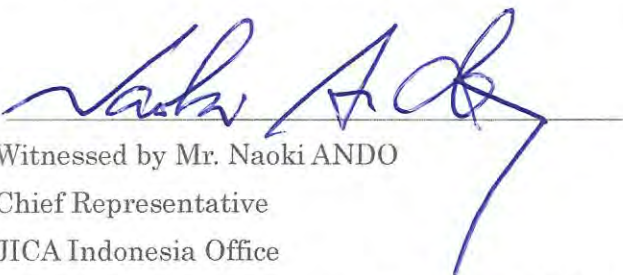
Jakarta,                      , 2017



Mr. Kenichiro SUGIYA  
Chief Advisor of Project on Enhancement of  
Metalworking Capacity for Supporting  
Industries of Construction Machinery



Mr. Zakiyudin  
Director of Machinery and Agriculture  
Equipment Industry, Directorate General of  
Metal, Machinery, Transportation, and  
Electronic Industry, Ministry of Industry



Witnessed by Mr. Naoki ANDO  
Chief Representative  
JICA Indonesia Office  
Japan International Cooperation Agency (JICA)

### The Main Points Discussed and Confirmed in the JCC Meeting

After opening remarks by Mr. Zakiyudin, Mr. Mikiya SAITO, Dr, Yuliadi Erdani, Dr. Sri Bimo Pratomo, and Mr. Sumer Yoso, Mr. Kenichiro SUGIYA shared the achievement of Outcomes and Project Purpose, the results of review by means of DAC Criteria for Evaluating Development Assistance, and prospects for Overall Goal.

Then, all the JCC members exchanged opinions and agreed to the followings:

#### 1. The Achievement of Outcomes and Project Purpose

The status of achievement of Outputs and Project Purpose were announced by Mr. Sugiya as follows, and were agreed by JCC members.

##### (1) Outputs

Outputs	<u>Objective Verifiable Indicators</u> Results	Status of Achievement
1. Technical service providing capability of targeted metalworking organizations for foundries on casting (in particular steel casting) including production management is improved.	1-1 Number of trainers who is capable of conducting extension services and lectures on casting: 11 trainers ----- ⇒ 12 Trainers	◎
	1-2 Development of manual for casting and its revision ----- ⇒ Completed	○
2. Technical service providing capability of targeted metalworking organizations for metalworking companies except for foundries on production management is improved.	2-1 Number of trainers who is capable of conducting on-site consultation services and lectures on production management: 11 trainers ----- ⇒ 11 Trainers	○
	2.2 Development of manual for production management and its revision ----- ⇒ Completed	○
3. An action plan for sustainable development of service providing capability on metalworking for supporting industries of construction machinery is drafted.	3-1 Development of a future action plan ----- ⇒ Completed	○

(Remarks: ○ -- Achieved, ◎ -- Achieved, exceeding the indicator)

(2) Project Purpose

Project Purpose	Objective Verifiable Indicators Results	Status of Achievement
<p>Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.</p>	<p>1. Satisfaction level of companies in supporting industries of construction machinery with the technical services provided by the Project</p>	<p>○</p>
	<p>⇒ *The results of feedback surveys conducted after each training course show almost "satisfactory" in general</p> <p>*The results of End-Line survey conducted on the targeted enterprises of extension service indicate that all the enterprises improved their technical ability comparing with that at Base-Line survey.</p>	
	<p>2. Number of companies which receive technical services on casting: 30 companies</p>	<p>◎</p>
	<p>⇒ Number of companies which participate in the training course for top-management and/or middle-management:</p> <ul style="list-style-type: none"> <li>- 1st Year: 11</li> <li>- 2nd Year: 9</li> <li>- 3rd Year: 5</li> </ul> <p>In addition, the number of companies which participate in Mini-training course in POLMAN Ceper was 28. Total Number was 43 (*Duplicate data were removed).</p>	

(Continues to the next page)

Project Purpose	Objective Verifiable Indicators Results	Status of Achievement
Technical services with improved quality for supporting industries of construction machinery will be provided by targeted metalworking organizations.	3. Technical level of target casting which targeted metalworking organizations can develop	○
	⇒ *Regarding the primary evaluation items of casting production, such as chemical component and mechanical property, were "passed" and approved by JICA experts and HINABI.  *Bracket manufactured by MIDC complied with the general standard of HINABI.	
	4. Number of companies which receive technical services on production management: 30 companies	◎
	⇒ Number of companies which participate in the training course for top-management and/or middle-management: - 1st Year: 13 - 2nd Year: 18 - 3rd Year: 3  In addition, 10 companies joined the extension services. Total number was 31(*Duplicate data were removed.).	

(Remarks: ○ – Achieved, ◎ – Achieved, exceeding the indicator)

**2. The results of review by means of DAC Criteria for Evaluating Development Assistance**

First of all, this review was jointly executed by ILMATE and JICA Project Team, and at the JCC, the following results of the review were agreed by other JCC members:

- 1) Relevance – High
- 2) Effectiveness – High
- 3) Efficiency – Moderate
- 4) Impact – Some positive impact is recognized (Prospects)
- 5) Sustainability – Moderate

### 3. Prospects of Overall Goal

Prospects of the achievement of Overall Goal were explained by Mr. Sugiya, and were shared with JCC members.

Overall Goal	Objective Verifiable Indicators Results	Prospects of Achievement
Metalworking technology of supporting industries of construction machinery will be improved.	1. Number of supporting industry companies which the metalworking technology and management is high evaluated by construction machinery manufacturers and/or user companies of construction machinery: 5 casting companies/10 metalworking companies	○
	⇒ *In the Project, 3 casting companies and 10 metal working companies were targeted as the extension service, and received a certain appreciation from HINABI.  *The target value is expected to achieve in the future if metalworking organizations continue the technical services towards supporting enterprises.	
	2. Number of companies in supporting industries which can newly produce steel casting parts that meet the needs of construction machinery industry: 4 companies	
	⇒ *Under the guidance of extension service in the Project, 3 casting companies in the suburbs of Ceper were able to manufacture the steel casting products which HINABI expects to procure from domestic suppliers.  *The outcomes of the Project is expected to spill over to the enterprises which are not selected as target for extension services.  *Overall Goal 2 is expected to achieve by executing the Plan 2 and 3 in the A/P (Draft).	



Overall Goal	<u>Objective Verifiable Indicators Results</u>	Prospects of Achievement
Metalworking technology of supporting industries of construction machinery will be improved.	3. Number of kind of steel casting parts which can be newly produced by supporting industries and which meet the needs of construction machinery industry: 6 kinds of parts	○
	<p>⇒ *In the Project, 6 kinds of steel casting products were manufactured by metalworking organizations (MIDC and POLMAN Bandung) , and 4 steel casting products were manufactured by the targeted 3 casting companies at the extension service.</p> <p>*Overall Goal 3 is also expected to achieve by executing the Plan 2 and 3 in the A/P (Draft).</p>	

(Remarks: ○ – It is expected to achieve)

4. Comments and the further request from Indonesian side;

- (1) Future Action Plan shall be carried out in accordance with the schedule in the draft.
- (2) Phase II of the project is highly expected. Phase II shall be planned as more intensive and long term period.
- (3) MIDC needs the further assistance from JICA. The ultimate objective for MIDC is to acquire the skills and technique for mass production of casting. In the sense, the Project shall be extended to reach the next level.
- (4) Trade skill test and certification system for casting shall be considered in the near future.
- (5) For the next opportunity, if any, the continual supervising by the JICA expert is expected since the experts stayed in Indonesia intermittently in the case of the Project.
- (6) Since POLMAN Bandung (P/B) is an educational organization, activities of JICA expert is expected to include some class lessons at the P/B.

## 5. Others

- (1) Summary of activities in the Project and suggestions for the future progress were explained by the both JICA expert, Mr. Arai (Casting) and Ms. Kiuchi (Production Management) respectively.
- (2) Ms. Katri of ILMATE publicly introduced the outline of the Future Action Plan with the detailed explanation of PLAN 1 to 4.
- (3) In order to achieve the Overall Goal, Mr. Sugiya made two recommendation as follows:
  - 1) To steadily implement the Future Action Plan
  - 2) To advance the technique of metalworking organizations (mainly MIDC)\* As for 2), both of JICA Project Team and MIDC agreed to discuss about the masterplan of the MIDC later on.
- (4) Implementation of the Future Action Plan is monitored by ILMATE, JICA Indonesia Office and Directorate General of International Resilience and International Access Development (DGKPAII, JICA Expert on Industrial Development), and they agreed to exchange information on the progress.

## 6. Closing Speech

- (1) MIDC – Mr. Enuh Rosdeni

Since the most important purpose is to improve the technical skill on small and medium enterprises (SMEs), it is imperative for them to upgrade the quality of products. Cost reduction and/or saving shall also be considered for the further progress.

- (2) JICA side – Mr. Saito

Improvement of technical level lasts forever. At first, I would like Indonesian side to tackle the implementation of the Future Action Plan. If you have any difficulties in the course of operation of the Future Action Plan, JICA Indonesia Office could discuss about the problems you might face.

- (3) Indonesia side – Mr. Zakiyudin

Development of technical ability at MIDC, P/B and POLMAN Ceper was dully confirmed. After this, we will continue the Future Action Plan as planned, and will hold the stakeholder meeting soon. On behalf of Indonesian side, I express my cordial thanks to JICA for your support on the Project.

End

Attachment: List of Participants



ANNEX 16  
Report of the End Line (E/L) Survey for  
the Supporting Industries of Construction Machinery  
in Indonesia

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***Report  
of  
The End line Survey for the Supporting Industries of  
Construction Machinery in Indonesia***



**Submitted by**



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## **Attachments**

1. Entry Data Table
  - A. Casting Survey
    - A.1 General Question Reference
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      - B.1.1 General Question Table Answer
    - B.2 Technical Question Reference
      - B.2.1 Technical Question Table Answer
      - B.2.2 Technical Question Scoring Table



**Report  
of  
The End line Survey for the Supporting Industries of  
Construction Machinery in Indonesia.**

**I. Background**

Within two years time Japan International Cooperation Agency (JICA) has conducted some training and supervision to Manufacturing Industries in the field of metalworking industries that produce supporting product for industry of construction machinery. The training itself provides some theories and practices held at Manufacturing Industry Development Center (hereafter referred to as MIDC) as well as at special class room set up by respective company. On the other hand some participants also have a chance to participate the foreign training in Japan organized by JICA. As a comparative study the participants also have a chance to join some side visit to some metal industries there.

The training and supervision provided by JICA more concentrated to production process for casting steel industries to match the customer product requirement whereas in the production management was more concentrated to production system transforms inputs to outputs of manufacturing industries in a whole.

In line with said implementation program therefore it needs to evaluate how far the effectiveness of training and supervision presented to support some activities in the production either in the casting technique or production management. By this program it is expected that product quality could be improved and meet the standart requirement.

**II. Survey Program**

The survey was conducted in 3 areas namely around Jakarta, Ceper and Tegal. The area around Ceper was focused on the improvement of casting process whereas the others were concentrated to the improvement in production management. The survey itself was done under door to door basis to the factory location of State Owned Company, Joint Venture Company, and Domestic Private Companies.

**III. Distribution of Respondents**

The Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery in Indonesia covers technology application and supervision as well as production management. Based on the implementation conducted by JICA therefore has been chose 14 respondents to be surveyed among others were 3 respondents around Ceper, 6 respondents around Jakarta, and 5 respondents around Tegal.

#### IV. Respondents Category.

There are two categories of respondents, one is from domestic investment industries and the other is from foreign investment industries. Based on the Central Statistic Bureau, the domestic investment industries can be classified according to their number of employee works, and the classification seen as follows:

1. Small industries: For industries with the number of employee less than 20 persons.
2. Medium industries: For industries with the number of employee of 20 to 99 persons.
3. Large industries: For industries with the number of employee above 100 persons.

From said classification point of view we come to the conclusion that the survey was conducted to large companies where 12 companies categorized as Domestic Private Companies (among others was PT. Atmaja Jaya, PT. Baja Kurnia, CV Karya Hidup Sentosa, PT. Waja Kamajaya Sentosa, PT. Sinar Perkasa Engineering, PT. Arkha Jayanti Persada, PT. Trieka Aimex, CV. Rejeki Abadi Makmur, PT. Prima Karya, CV. Karya Paduyasa, CV. Milako Tehnik Mandiri, and PT. Gaya Tehnik Utama), 1 company as State Owned Company, in this case PT. Wika Industri Konstruksi, and 1 company as Joint Venture Company, in this case PT. Kongo Citra Manufaktur Indonesia.

#### V. Survey Result.

##### A. Casting.

##### 1. Company Profile.

##### 1.1. General.

There were 3 domestic private companies have been taken as sampling in the casting industries that could represent overall analyses. These casting industries classified as large industries because the company hiring more than 100 person. The companies that have been surveyed were:

Name of respondent	Total employees
PT. Atmaja Jaya	225
PT. Baja Kurnia	200
CV. Karya Hidup Sentosa	2415

##### 1.2. Personnel.

The composition number of employees, average monthly salary, average term of office, and the average year of age were as follows:

Table A.1.2.1. The related number of employees.

<b><i>PT. Atmaja Kamajaya</i></b>	<b><i>Admin</i></b>	<b><i>Engineer</i></b>	<b><i>Production</i></b>	<b><i>Non Prod.</i></b>	<b><i>Total</i></b>
<i>Number of employees</i>	10	6	99	100	215
<i>Average monthly salary</i>	1500K	2250K	1750K	1500K	-
<i>Average term of office</i>	5 years	5 years	5 years	5 years	-
<i>Average year of age</i>	30 years	30 years	30 years	30 years	-

Note: K = IDR in thousand.

<b><i>PT. Baja Kurnia</i></b>	<b><i>Admin</i></b>	<b><i>Engineer</i></b>	<b><i>Production</i></b>	<b><i>Non Prod.</i></b>	<b><i>Total</i></b>
<i>Number of employees</i>	15	2	163	20	200
<i>Average monthly salary</i>	3000K	4000K	2000K	1500K	-
<i>Average term of office</i>	24 years	24 years	24 years	24 years	-
<i>Average year of age</i>	40 years	40 years	40 years	40 years	-

Note: K = IDR in thousand.

<b><i>CV. Karya Hidup Sentosa</i></b>	<b><i>Admin</i></b>	<b><i>Engineer</i></b>	<b><i>Production</i></b>	<b><i>Non Prod.</i></b>	<b><i>Total</i></b>
<i>Number of employees</i>	335	0	1890	190	2415
<i>Average monthly salary</i>	1452K	-	1452K	1452K	-
<i>Average term of office</i>	-	-	-	-	-
<i>Average year of age</i>	30 years	30 years	30 years	30 years	-

Note: K = IDR in thousand.

So far we also can see the lowest and the highest labor wage among the enterprises at the consecutive department that seen as follows:

Table A.1.2.2. Labor wage comparison.

<b>Type of job</b>	<b>Lowest labor wage</b>	<b>Highest labor wage</b>
Administration	335K	1452K
Engineer	2250K	4000K
Production	1452K	2000K
Non Production	1452K	1500K

Note: K = IDR in thousand.

In line with the recruitment point of view in the human resources it was mentioned that the problem arose mostly among other things was one or two of the following caption:

1. There is no related study learned with the job done by employees.
2. No qualified applicant match with the qualification required by company.

The overall of these industries are expected could absorb unemployment in a significant number, but by the effective capacity utilization as the result of specific training in the production process held by JICA, the company considered to recruit the employee in more effective way.

Therefore the current number of people who doing the job at said companies was drop and seen as follows:

Table A.1.2.3. Total current employees.

<i>Company's name.</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
PT. Atmaja Kamajaya.	10	6	99	100	215
PT. Baja Kurnia.	15	2	163	20	200
CV. Karya Hidup Sentosa.	335	0	1890	190	2415
<b>Total</b>	<b>360</b>	<b>8</b>	<b>2152</b>	<b>310</b>	<b>2830</b>

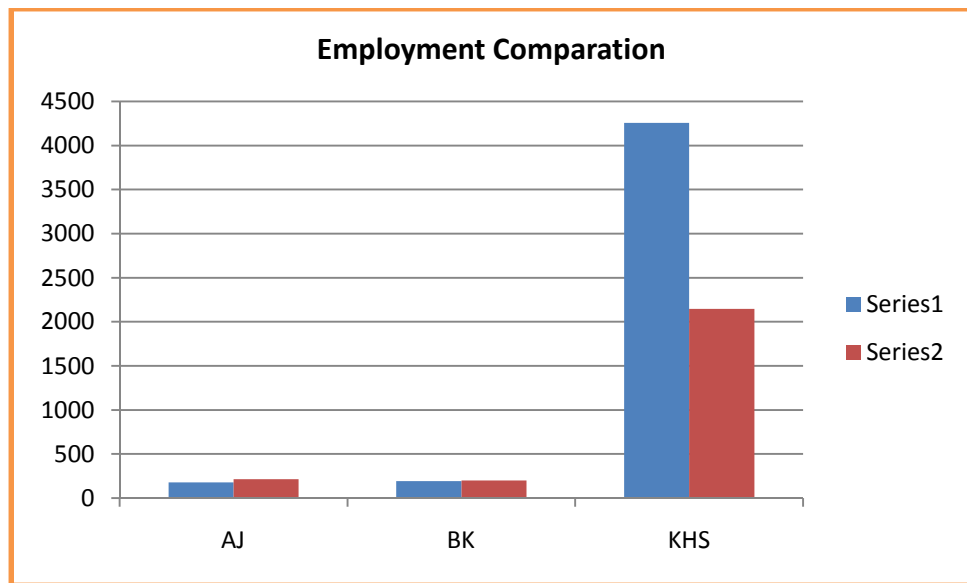
While the previous year the number people who doing the job with these companies was:

Table A.1.2.4. Total employees at the first survey.

<i>Company's name.</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
PT. Atmaja Kamajaya.	7	2	150	20	179
PT. Baja Kurnia.	9	3	170	11	193
CV. Karya Hidup Sentosa.	515	219	3009	515	4258
<b>Total</b>	<b>531</b>	<b>224</b>	<b>3329</b>	<b>546</b>	<b>4630</b>

Seen from the above, currently there was significant drop in one company but there was a little bit increase for the others. This situation can be illustrated as seen in the exhibit A.1.

Exhibit A.1.



Note : AJ stand for Atmaja Jaya PT.  
 BK stand for Baja Kurnia PT.  
 KHS stand for Karya Hidup Sentosa CV.

### 1.3. Production.

The main product item, last year product capacity per month and last year actual product of the consecutive companies seen in the following table:

Table A.1.3.1. Main Product item.

<i>Company</i>	<i>Main product item</i>	<i>Last year product capacity per month</i>	<i>Last year actual product.</i>
PT. Atmaja Jaya	1) Piano Frame. 2) Fitting Pipe. 3) Oil pump parts. 4) Backhoe	1) 200 ton. 2) 230 ton. 3) 250 ton. 4) 2 ton.	1) 120 ton. 2) 220 ton. 3) 240 ton. 4) 200 kg.
PT. Baja Kurnia.	1) Pumping Oil. 2) Part of Diesel. 3) Hydrant. 4) Part of Train.	1) 800 ton. 2) 400 ton. 3) 7000 units. 4) 50 ton.	1) 600 ton. 2) 300 ton. 3) 5000 units. 4) 10 ton.
CV. Karya Hidup Sentosa.	H.O. 1) Hand tractor. 2) Harvest machine. 3) Job Order. Tuksono Foundry. 1) Hand tractor. 2) Harvest machine. 3) Job Order.	1). 200 ton. 2). 120 ton. 3). 180 ton.  1). 180 ton. 2). 60 ton. 3). 60 ton.	1) 200 ton. 2) 120 ton. 3) 15 ton.  1) 180 ton. 2) 60 ton. 3) 30 ton.

For further information the Incoming Job Order received by CV. Karya Hidup Sentosa seen from the following table:

Table A.1.3.2. The incoming job order.

No.	Component name	Customer
1	Exhaust manifold	Kubota Corporation Japan
2	Air cleaner flange	Kubota Indonesia, PT
3	Crank case cover	Kubota Indonesia, PT
4	Coupling flange ( 13 type)	Mitsuboshi Belting Ind., PT
5	Floor operating table	Mega Andalan Kalasan
6	Chassis MAK	Mega Andalan Kalasan
7	Cylinder MAK	Mega Andalan Kalasan
8	Flange cylinder	Mega Andalan Kalasan
9	Boss, Rear hub	Suzuki Indomobil Motor
10	Boss *	Sumitomo
11	Small boss *	Sumitomo

Note: \*) JICA project, still in prototype process

Another prospective order from Sumitomo was 4 items of new part ( that was “Yoke”), and currently is still under bidding process.

#### 1.4. Efficiency.

The percentage to operate upon product line (each product per line), and percentage of accepted product each product per line seen from the following table :

Table A.1.4.1. Percentage to operate upon product line and accepted product.

<i>Company</i>	<i>Main product item</i>	<i>% to operate upon product line per month.</i>	<i>% of accepted product.</i>
PT.Atmaja Jaya	1) Piano Frame. 2) Fitting Pipe. 3) Oil pump parts. 4) Backhoe	1) 100 %. 2) 60%. 3) 60%. 4) 10%.	1) 95%. 2) 99%. 3) 95%. 4) 75%.
PT. Baja Kurnia.	1) Pumping Oil. 2) Part of Diesel. 3) Hydrant. 4) Part of Train.	1) 75 %. 2) 75%. 3) 65%. 4) 50%.	1) 98%. 2) 93%. 3) 95%. 4) 90%.
CV. Karya Hidup Sentosa.	H.O. 1) Hand tractor. 2) Harvest machine. 3) Job Order.	1) 100 %. 2) 100%. 3) 25%.	1) 92%. 2) 92%. 3) 92%.

	Tuksono Foundry.		
	1) Hand tractor.	1) 100%.	1) 92%.
	2) Harvest machine.	2) 100%.	2) 92%.
	3) Job Order.	3) 25%.	3) 92%.

The pieces number of welding stick in used for consecutive ton of product was:

- a. PT. Atmaja Jaya used following welding stick: 0,5 stick for fitting pipe; 10 sticks for oil pump parts, and 3 sticks for backhoe.
- b. PT. Baja Kurnia used 40 welding sticks per ton for pumping oil, part of diesel, hydrant, and part of train.
- c. CV. Karya Hidup Sentosa used 10 kg welding sticks per ton for hand tractor and harvest machine.

### 1.5. Production Facility.

The processing chain of consecutive casting product was:

Starting from scrap or pig iron put into Furnace, then → Moulding → Pouring Open the Brick → Production QC → Shot blasting → Finishing (lathe, grinding, welding, drilling, machining) → QC → Packing → Delivery.

In general said companies have the following production facilities:

- a. Production facilities owned by PT. Atmaja Jaya were : Mixer, Vibrator, Induction, Shot blast, Spray; Lathe machine, Grinder, Powder Coating,
- b. Production facilities owned by PT. Baja Kurnia were : Induction furnace, Spectrometer, Mixer Continue, Molding FD; Treatment Furnace; Lathe machine; CNC machine.
- c. Production facilities owned by CV. Karya Hidup Sentosa at HO were : Molding Machine (FD4, FD3, FD2); Furnace Medium Frequency; Furnace High Frequency; Mixer; Shot blast (Hanger type), Thump blast; Spectrometer & Sand Laboratory whereas at Tuksono Foundry were : Automatic Molding Machine; Furnace medium frequency; Sand mixer; Shot blasting; Shellcore machine; Laboratory facilities (Lab. metallography, Spectrometer, Hardness tester, Microscope metalurgy, Universal sand testing, Permeability tester, Moisture tester, Sieve tester, Clay content tester, Total clay tester).

## 1.6. Sales.

Without specific reason CV. Karya Hidup Sentosa was reluctant to disclose either his yearly turnover or his profit. The others were disclosed their roughly average of last year turnover as follows :

### *PT. Atmaja Jaya.*

Last year turn over	10.088M
Last year gross profit	2.068M
Last year net profit	644M

Note: M = IDR in million.

### *PT. Baja Kurnia.*

Last year turn over	2.600M
Last year gross profit	-
Last year net profit	1.500M

Note: M = IDR in Million

## 1.7. Customer.

1.7.1. Name of consecutive client that buy or order to buy the product of Casting Industries mostly was among 5 to 9 of the following companies :

- 1) Kawai
- 2) Padja
- 3) IMECO (Chevron)
- 4) PT. Bukaka Jakarta
- 5) PT. INKA Madiun
- 6) PT. Yanmar Indonesia.
- 7) PT. Kubota Indonesia
- 8) PT. Mitsubishi Belting Indonesia;
- 9) PT. Mega Andalan Kalasan.

1.7.2. Type of product that has been supplied among other things was:

- 1) Piano Frame
- 2) Fitting Pipe
- 3) Oil Pump Parts.
- 4) Pumping Oil
- 5) Brake Stead
- 6) Parts of diesel engine.
- 7) Exhaust Manifold
- 8) Coupling Flange
- 9) Hospital Equipment Parts.



### **1.8. Human resources development.**

The company provides internal regular training as well as participating in another training conducted by Industrial Office or Association for new employees as well as for existing staff.

At another occasion also be participant on training held by customer.

Furthermore the company also conducted Staff coaching & counseling chaired by supervisor.

### **1.9. Technology Reformation.**

The technology reformationn created by Investment on machinery & part of Laboratory.

In the other side by visiting to advance company in this case to Japan; benchmarking to advance foundry; participated in some training held by outsider.

### **1.10. Membership.**

There were about 15% of the respondents have no affiliate with any association whereas the rest was part of the member of the following association such as :

1. GAMMA (Indonesian Association Unity of Metalwork and Machinery )
2. APLINDO ( Indonesian Industrial Casting Association )
3. ALSINTANI (Indonesian Agricultural Machinery Association )

### **1.11. Public Services.**

The company have asked testing of the product to POLMAN Ceper.

There was about 20 percent of the company has not get any assistant from government institution but the others have participated in the training or seminar conducted by University, or foreign aid such as JICA.

### **1.12. Management Problem**

Part of company has difficulties in implementing of 5S., while the other has difficulties in implementating the industrial culture to employee who has the culture close to farming culture. Beside that the heigh employee turn over will effect to the production activity.

On the hand most of workers have less awareness to safety, less dicipline, and no integrity.

Apart from that sometimes the company comes to cash flow problem causes by the delay of payment after delivery.

In general the company has some problem in marketing, product quality, and price increase of raw material while the sales relatively stagnant.

## 2. Casting Technique Evaluation.

The evaluation score was based on the level of knowledge in processing technique of casting of companies will be given under following calculation:

- In case the respondent did not know or just heard only, the point is 1.
- In case the respondent conceived the content correctly, the point is 3.
- In case the respondent has practiced and introduced to others, the point is 5.

The current evaluation score of the production process of casting shown from the following table:

Table A.2.1. Current evaluation score of Casting Production Process.

	<b>Description</b>	<b>AJ</b>	<b>BK</b>	<b>KHS</b>
1	<b>Basic casting</b>	<b>4</b>	<b>6</b>	<b>8</b>
	Melting metal solidification design	1	3	3
	Balance phase diagram	3	3	5
2	<b>Cast category and uses</b>	<b>6</b>	<b>8</b>	<b>10</b>
	Main material of cast steel	3	5	5
	Main material application	3	3	5
3	<b>Cast Steel production process</b>	<b>3</b>	<b>5</b>	<b>5</b>
	Flow chart production process	3	5	5
4	<b>Special characteristic Carbon steel for welding</b>	<b>7</b>	<b>9</b>	<b>9</b>
	Typical component	3	3	3
	Casting structure	1	3	3
	Mechanical characteristic	3	3	3
5	<b>High manganese steel characteristic</b>	<b>7</b>	<b>13</b>	<b>9</b>
	Typical component	3	5	3
	Casting structure	1	5	3
	Mechanical characteristic	3	3	3
6	<b>Melting furnace and melting method cast steel</b>	<b>9</b>	<b>9</b>	<b>9</b>
	General melting furnace	3	3	3
	Consecutive melting method	3	3	3
	Point control	3	3	3
7	<b>Casting design</b>	<b>8</b>	<b>16</b>	<b>20</b>
	Sprue program design	1	5	5

	Small and Medium product sprue program design	3	5	5
	7 regular design riser standard	1	3	5
	Modulus was.....	3	3	5
<b>8</b>	<b>Molding method</b>	<b>9</b>	<b>9</b>	<b>13</b>
	Cast steel molding process	3	3	5
	Consecutive molding material	3	3	3
	Consecutive point control	3	3	5
<b>9</b>	<b>Heat treatment</b>	<b>9</b>	<b>15</b>	<b>15</b>
	Annealing & Normalizing	6	10	10
	Quenching tempering	3	5	5
<b>10</b>	<b>Finishing product</b>	<b>3</b>	<b>9</b>	<b>13</b>
	Removing burry	1	3	3
	Repair method by welding	2	6	10
<b>11</b>	<b>Inspection method for:</b>	<b>10</b>	<b>14</b>	<b>20</b>
	Surface defect	3	3	5
	Internal defect	1	3	5
	Material	3	5	5
	Dimension précising	3	3	5
<b>12</b>	<b>Factory Management</b>	<b>7</b>	<b>9</b>	<b>13</b>
	5 S	3	3	5
	Standardization	3	3	3
	QC activities (7 tools)	1	3	5
	<b>Total</b>	<b>82</b>	<b>122</b>	<b>144</b>

Note: AJ stand for Atmaja Jaya PT.  
BK stand for Baja Kurnia PT.  
KHS stand for Karya Hidup Sentosa CV.

The evaluation value of respective respondent was under the total score of achievement, and the calculation was as follows:

The total score equal to 34 was categorized as respondent who did not know or just heard only.

The total score equal to 104 was categorized as respondent who conceived the content correctly.

The total score equal to 170 was categorized as respondent has practiced and introduce to others.

To evaluate how far the current level of improvement of the production process in the casting industry, we should compare the achievement score of the previous year of said casting industries prior getting such training and supervision from JICA.

Table A.2.2. Evaluation score of Casting Production Process at the first survey.

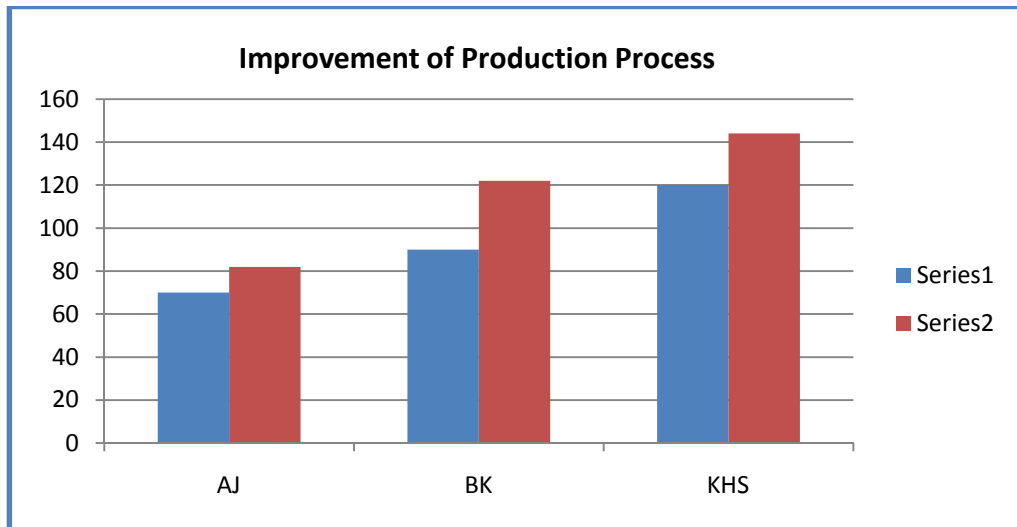
	<b>Description</b>	<b>AJ</b>	<b>BK</b>	<b>KHS</b>
1	<b>Basic Casting</b>	<b>4</b>	<b>6</b>	<b>8</b>
	Melting metal solidification design	3	3	3
	Balance phase diagram	1	3	5
2	<b>_Cast category and uses</b>	<b>8</b>	<b>10</b>	<b>6</b>
	Main material of cast steel	5	5	3
	Main material application	3	5	3
3	<b>Cast Steel production process</b>	<b>3</b>	<b>5</b>	<b>5</b>
	Flow chart production process	3	5	5
4	<b>Special characteristic Carbon steel for welding</b>	<b>5</b>	<b>9</b>	<b>11</b>
	Typical component	1	3	3
	Casting structure	3	3	3
	Mechanical characteristic	1	3	5
5	<b>High manganese steel characteristic</b>	<b>3</b>	<b>9</b>	<b>9</b>
	Typical component	1	3	3
	Casting structure	1	3	3
	Mechanical characteristic	1	3	3
6	<b>Melting furnace and melting method cast steel</b>	<b>13</b>	<b>11</b>	<b>11</b>
	General melting furnace	5	5	5
	Consecutive melting method	5	3	3
	Point control	3	3	3
7	<b>Casting design</b>	<b>4</b>	<b>8</b>	<b>12</b>
	Sprue program design	1	3	3
	Small and Medium product sprue program design	1	3	3
	7 regular design riser standard	1	1	3
	Modulus was.....	1	1	3
8	<b>Molding method</b>	<b>7</b>	<b>9</b>	<b>15</b>
	Cast steel molding process	1	3	5
	Consecutive molding material	3	3	5

	Consecutive point control	3	3	5
<b>9</b>	<b>Heat treatment</b>	<b>3</b>	<b>9</b>	<b>9</b>
	Annealing & Normalizing	2	6	6
	Quenching tempering	1	3	3
<b>10</b>	<b>Finishing product</b>	<b>5</b>	<b>3</b>	<b>9</b>
	Removing burry	3	1	3
	Repair method by welding	2	2	6
<b>11</b>	<b>Inspection method for:</b>	<b>12</b>	<b>8</b>	<b>12</b>
	Surface defect	3	1	3
	Internal defect	3	1	3
	Material	3	3	3
	Dimension précising	3	3	3
<b>12</b>	<b>Factory Management</b>	<b>3</b>	<b>3</b>	<b>15</b>
	5 S	1	1	5
	Standardization	1	1	5
	QC activities (7 tools)	1	1	5
	<b>Total</b>	<b>70</b>	<b>90</b>	<b>120</b>

Note: AJ stand for Atmaja Jaya PT.  
BK stand for Baja Kurnia PT.  
KHS stand for Karya Hidup Sentosa CV.

Based on both evaluation the improvement of technique in the production process of casting industries can be illustrated as seen in the exhibit A.2.

Exhibit A.2



Note: AJ stand for Atmaja Jaya PT.  
 BK stand for Baja Kurnia PT.  
 KHS stand for Karya Hidup Sentosa CV.

## B. Production Management.

### 1. Company Profile.

#### 1.1. General.

The number of companies that have been surveyed in the capacity of production management was as follow:

Type of respondents	Production Management
State Owned Company	1 company
Domestic Private Company	9 companies
Joint Venture Company	1 company
<b>Total</b>	<b>11 companies</b>

#### 1.2. Personnel.

The average number of employees was varied depending on the capital scale of industries, production capacity of the machine and incoming order to produce certain product.

The average number of employees of the 9 Domestic Private Companies, average monthly salary, average term of office, and average year of age shown from the following table :

Table B.1.2.1. Number of employees Domestic Private Companies.

<i>Domestic Private Company</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
Number of employees	7	4	46	6	63
Average monthly salary	4089K	3922K	2444K	2011K	-
Average term of office	8 years	8 years	8 years	8 years	-
Average year of age	33 years	33 years	33 years	33 years	-

Note: K = IDR in thousand.

The number of employees of the State Owned Company, average monthly salary, average term of office, and average year of age shown from the following table:

Table B.1.2.2. Number of Employees State Owned Company.

<i>State Owned Company</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
Number of employees	9	6	97	12	124
Average monthly salary	-	-	-	-	-
Average term of office	5 years	5 years	5 years	5 years	-
Average year of age	28 years	28 years	28 years	28 years	-

Note: K = IDR in thousand.

The number of employees of the Joint Venture Company, total average of employees, average monthly salary, average term of office, and average year of age shown from the following table:

Table B.1.2.3. Number of employees Joint Venture Company.

<i>Joint Venture Company</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
Number of employees	6	1	22	1	29
Average monthly salary	4500K	5000K	3300K	3000K	-
Average term of office	3 years	3 years	3 years	3 years	-
Average year of age	25 years	25 years	25 years	25 years	-

Note: K = IDR in thousand.

So far we also found the labor wage differential among the industries at the consecutive department of the domestic private companies shown from the following table:

Table B.1.2.4. Labor wage differential.

<i>Domestic Private Company</i>	<b>Lowest labor wage</b>	<b>Highest labor wage</b>
Administration	1500K	10000K
Engineer	1700K	6500K
Production	1300K	4000K
Non Production	1000K	3500K

Note: K = IDR in thousand.

On the other side unfortunately we could not find the data of salary of the State Owned Company because he does not want to disclose it. Furthermore we only could present the average salary of the Joint Venture Company as mentioned above.

Basically this kind of industries has important role to reduce unemployment, apart from this need more capital and technical knowledge. The capital invested and the role of companies in reducing unemployment seen as follows:

Table B.1.2.5. Capital Investment and Employment.

<i>Companies</i>	<i>Number of company</i>	<i>Capital Investment</i>	<i>Number of employees</i>
State Owned Company	1	*)	124
Joint Venture Company	1	11000M	30
Domestic Private Company	9	31752M	562

Note: \*) not disclose.

M= IDR million.

In line with the recruitment point of view in the human resources, it was mentioned that the problem arose mostly among other things was one or two of the following caption:

1. Less technical capability of the employee.
2. Difficulties in finding the employee who has expertise and experiences.
3. Difficulties in finding capable employee; the young employee relatively has the instable character. No institution that provide employee suitable with company's requirement.
4. Difficulties in finding employee who has foundry experience.
5. Difficulties in recruiting employee who has diploma or bachelor engineering surrounding Tegal or other area.
6. Limited skilled labor who has experiences. The existing labors were more than 40 years old was difficult to change their habit.
7. The new recruitment employees who have got the training no longer resign.
8. Difficult to find the young employees, mostly prefer to go to Jakarta.



The overall of these industries are expected could absorb unemployment in a significant number, but by the effective capacity utilization as the result of specific training in the production management held by JICA, the company considered to recruit the employee in more effective way. Therefore the current number of people who doing the job at said compaies was drop and seen as follows:

Table B.1.2.6. Current number of employees.

<i>Company's status</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
State Owned Company	9	6	97	12	124
Joint Venture Copany	6	1	22	1	30
Domestic Private Companies	55	32	416	58	561
<b>Total</b>	<b>70</b>	<b>39</b>	<b>535</b>	<b>71</b>	<b>715</b>

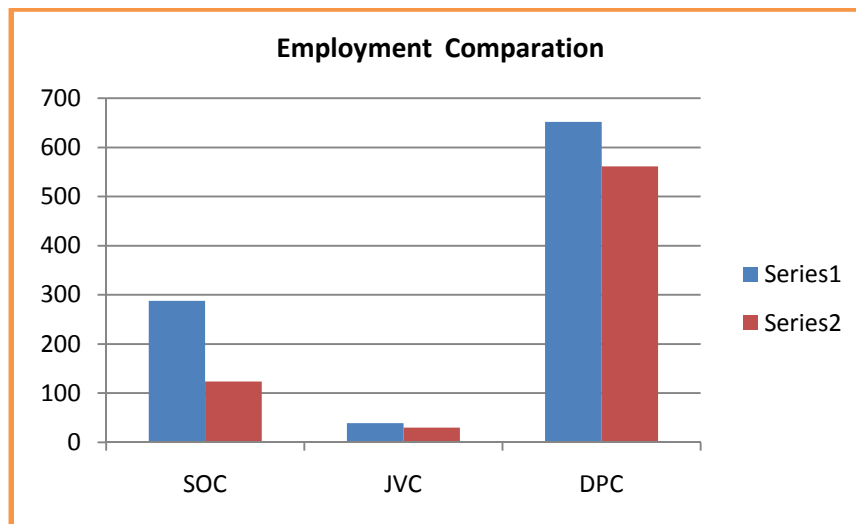
While in the previous year the people who doing the job with the said companies was:

Table B.1.2.7. Number of employees at the first survey.

<i>Company's status</i>	<i>Admin</i>	<i>Engineer</i>	<i>Production</i>	<i>Non Prod.</i>	<i>Total</i>
State Owned Company	10	5	267	6	288
Joint Venture Company	9	2	25	3	39
Domestic Private Companies.	66	35	485	66	652
<b>Total</b>	<b>85</b>	<b>42</b>	<b>777</b>	<b>75</b>	<b>979</b>

Based on that situation the people who doing the job at that period could be illustrated as seen in the exhibit B.1.

Exhibit B.1.



Note: SOC stand for State Owned Company  
 JVC stand for Joint Venture Company.  
 DPC stand for Domestic Private Caompany.

### 1.3. Production.

The main product item, last year product capacity per month, and last year actual product of state owned company, joint venture company, and domestic private companies shown in the following table:

Table B.1.3.1. Main product item of State Owned Company.

<i>Main product item</i>	<i>Last year product capacity per month</i>	<i>Last year actual product</i>
Automotive products	166 ton	900 ton.
Lamp components	-	-
Anode.	100 ton	400 ton

Table B.1.3.2. Main product item of Joint Venture company.

<i>Main product item</i>	<i>Last year product capacity per month</i>	<i>Last year actual product</i>
Tube Assy	20 ton	-
Pipe sub assy	30 ton	-
Tubes	-	-

Table B.1.3.3. Main product item of Domestic Private Companies.

<i>Company</i>	<i>Main product item</i>		<i>Last year product capacity per month</i>	<i>Last year actual product</i>
WKS	1	Stamping components	1.822.800 pc	12.259.800 pc
	2	Machining x Dies comp.	308 pc	2.904 pc
	3	Heavy equipment components	220 pc	1.056 pc
SPE	1	Counter Weight	12.500 kg	150.000 kg.
	2	Canopy	4.500 kg	54.000 kg
	3	Bracket BD.	1.000 kg	12.000 kg
AJP		Grapple, Bucket, Bracket Export	2.194 ton	Komatsu : 235,32 ton Caterpillar : 258,66 ton Others : 175,63 ton
TA	1	Fitting Flange	6,25 ton	18 ton
	2	Part of Shot Blast	11,25 ton	61,32 ton
	3	Pump spare part	7,5 ton	16,56 ton

RAM	1	Bracket chassis	10 - 20 set	120 - 240 set
	2	Sliding Step	20 - 50 set	240 - 600 set
	3	Pump	1 - 2 units	12 - 24 units
PK	1	Bracket	100 - 150 units	600 - 1200 units
	2	Bracket solenoid	100 - 150 units	600 - 1200 units
	3	Steel anchors	100.000 pc	10.800.000 pc
KP	1	Hydrant	200 set	2.040 set
	2	Heavy equipment component	1.000 pc	10.800 pc
MTM		Clamp, Bare base, Cover.	8 - 10 ton	36 - 60 ton
GTU	1	Body Hinge	150 set	1.200 set
	2	Tracker	200 pc	1.800 pc
	3	Oil Tank	300 pc	2.400 pc

For further discussion we take a note that some name here and after will be abbreviated as follows:

WKS = PT. Waja Kamajaya Sentosa.

SPE = PT. Sinar Perkasa Engineering.

AJP = PT. Arkha Jayanti Persada.

TA = PT. Trieka Aimex.

RAM = CV. Rejeki Abadi Makmur.

PK = PT. Prima Karya.

KP = PT. Karya Paduyasa.

MTM = PT. Milako Tehnik Mandiri.

GTU = PT. Gaya Tehnik Utama.

#### 1.4. Efficiency.

The percentage to operate upon product line (each product per line) of State Owned Company was 95%. While the percentage to operate upon product line (each product per line) of Joint Venture Company was 90%.

The percentage of pass product (each product per line) of State Owned Company was 98 % whereas Joint Venture Company reached 99% and for Domestic Private Companies only reached at the average of 92%.

The percentage to operate upon product line (each product per line) and the percentage of pass product (each product per line) of 9 Domestic Private Companies shown in the following table:

Table B.1.4.1. Percentage to operate upon product line and accepted product.

<b>Company</b>	<b>Main product item</b>	<b>% to operate upon product line</b>	<b>% of pass product.</b>
WKS	1) Stamping Component; 2) Machining x Dies component. 3) Heavy equipment component	1) 56%. 2) 56%. 3) 56%.	1) 90%. 2) 90%. 3) 90%.
SPE	1) Counter weight 2) Canopy 3) Bracket BD	1) 80%. 2) 80%. 3) 80%.	1) 80%. 2) 75%. 3) 75%.
AJP	1) Grapple 2) Bucket 3) Bracket Export.	1) 30.52%. 2) 30.52%. 3) 30.52%.	1) 85%. 2) 85%. 3) 85%.
TA	1) Fitting/Flange 2) Shot Blast Parts 3) Pump Spare part	1) 4.25%. 2) 7.65%. 3) 5.1%.	1) 0,93% 2) 5.59% 3) 4.53%
RAM	1) Bracket chassis 2) Sliding Step 3) Pump	Fabrication : 120% Machining : 70%	Fabrication : 100% Machining : 100%
PK	1) Bracket. 2) Bracket solenoid 3) Steel anchors.	1) 70% 2) 70% 3) 100%	1). 95%. 2). 95%. 3).100%.
KP	1) Hydrat 2) Heavy equipment component	1) 70 %. 2) 70%.	1) 90 %. 2) 90%.
MTM	1) Clamp 2) Bare base 3) Cover	1) 60 %. 2) 60%. 3) 60%.	1) 95 %. 2) 95%. 3) 95%.
GTU	1) Body Hinge. 2) Tracker; 3) Oil Tank.	1) 80 %. 2) 80%. 3) 80%.	1) 98 %. 2) 98%. 3) 98%.

In the production process the State Owned Company and Joint Venture Company not require welding, while part of the products produced by Domestic Private Companies that used welding stick were varied, the smallest used 20 stick per month, while the biggest use wire roll up to 500 kg per month.

## 1.5. Production Facility.

The processing chain of consecutive product was:

**Stamping** : Material → Shearing → Blank/forming → Trim → Bending/sparating → Finishing → Delivery.

**Machining** : Material FC → Vertical machining center → Finishing → Check.

**Fabrication** : Material → Cutting Esab → Bending → Welding → Finishing → Quality Control.

Mostly the activities to produce the product rely on manpower. Each company has many kind of tool depend on the production process. In the casting industries they have blast furnace, molding, welder, grinder; while for fabrication industries in general they have computer software for designing the product, bending machine, drill and cutting machine, crane and forklift. Furthermore for machining they have lathe machine, turret , milling machine, milling drill, drill, bandsaw, and gear making.

## 1.6. Sales.

The State Owned Company and the Joint Venture Company were reluctant to disclose the financial figures, while the average of last year turnover, profit from sales, and net profit of the Domestic Private Companies shown in the following table:

Table B.1.6.1. Domestic Private companies turnover.

Average Last year Turnover	13,441M
Average Last year Profit from Sales	2,389M
Average Last year Net Profit	(3,019)M

Note: M = IDR in million.

The average of last year net profit seen a net loss because one of the respondent got big loss of 36,378M, while the others got insignificant profit.

## 1.7. Customer.

1.7.1. The State Owned Company, Joint Venture company, and Domestic Private Companies mostly were as part of a client among the following companies:

1. PT. Komatsu Indonesia.
2. PT. Inti Pantja Press Industry.
3. PT. Astra Daihatsu Motor.;
4. Sakai;
5. Blouscope.
6. PT. HINO.

7. PT.MKM (Mitsubishi).
8. PT. Sumitomo SHI.
9. PT. Kayaba Hydraulic Mfg. Indonesia.
10. PT. Caterpillar Indonesia.
11. PT. Indominco (Contractor).
12. Indonesia Power
13. PT. PERTAMINA;
14. PT. Indah Kiat.
15. PT. Rahayu Sentosa (bus carroserie);
16. PT. Laksana ( bus carroserie);
17. PT. Ocean Buana Line (shipping company).
18. PT. Sanwa Presswork Indonesia;
19. PT. WIKA.
20. Citra Makmur.
21. PT. Sumitomo Indonesia.
22. CV. Damar Bayu.
23. PT. Muncul Surya Prima.
24. PT. Muncul Diamond.

Type of product that has been supplied among other things was:

1. Heavy equipment component;
2. 4-wheel vehicle component.
3. Excavator PC 130/BD/HD.
4. TS200;
5. Roof construction.
6. Intake manifold;
7. Engine components.
8. Tube assy 20 tonne, 30 tonne;
9. Pipe Assy.
10. Tubes.
11. Tube sheet.
12. Flange.
13. Impeller.
14. Bracket chasis;
15. Slide step;
16. Pump and cross joint kopel / krishapel.
17. Bracket.
18. Bracket Solenoid.
19. Steel anchors.
20. Hydrant.
21. Construction parts.
22. Automotive component body of a car.

### **1.8. Human resources development.**

In general the company provides internal training prior to join external training to avoid any cost burden. The companies mostly eager to improve the knowledge of their staff through participating any training provided by government or formal institution like Industrial Office. The training covers motivation and leadership, knowledge improvement in order could satisfy the customer needs.

The training provided by JICA was very important in improving knowledge and could improve the reject ratio to 0% in machining product and 1% in custom product of PT. Waja Kamajaya Sentosa.

In the other side CV. Millako Teknik Mandiri has implemented QC and 7 tools, and has set up a TQM applied group.

Furthermore PT. Sinar Perkasa Engineering could reduce the reject ratio from 25% to 3% within 2 months period, through improvement on cutting system and grinding, as well as replacement of cutting machine by the new one.

### **1.9. Technology Reformation.**

The companies are eager to reform the technology by more active to get technology information from vendor, visiting the technology fair, or doing machinery replacement with the new one based on the company capability.

Currently PT. Gaya Teknik Logam formerly CV. Gaya Teknik Utama has redesigned the machinery layout, and concreted the factory floor as suggested by JICA.

### **1.10. Membership**

Mostly the companies were a member of HINABI and part of them as APLINDO member, GIAMM, KADIN, and YDBA.

### **1.11. Public Services.**

Part of the company has a government assistant through seminar and participated in special course conducted by certain institution. There was a research conducting a prototype in cooperation with Diponegoro University, BPPT Material Unit, Balai Mekanisasi Pertanian. Beside that there ever was a Supervision from JICA and training from Industrial Office.

### **1.12. Management Problem.**

There was some management problems arise and has different characteristic among one to another companies. The problem itself e.g.:

- a) Fluctuation increase of product at sudden.
- b) Price increase of raw material.

- c) Quality control problem because of still using manual system.
- d) Unstable production because of 100% based on job order.
- e) Some Car body customers using different frame vehicle.
- f) 80% purchasing order without down payment.
- g) No payment received when the bill was due.
- h) Frequently accept the job to make prototype (the job not to be continued).
- i) Inventory control problem because of too much to produce small order.
- j) Cash flow problem, because of late payment from contractor.
- k) Engine maintenance Management .
- l) Not yet regularly conduct a good control between input and output.
- m) Less knowledge of employees.
- n) Since 1991 PT. Prima Karya was the supplier of heavy equipment to Komatsu and Caterpillar, but since economic crisis in 2013 the order from Komatsu drop to 20% and no order anymore from Caterpillar.
- o) It is expected that the order will come again as prior to economic crisis.
- p) It is suggested there is any payment order as Letter of Credit.
- q) Still using manual system.
- r) Expecting order not just for heavy equipment, but also for fabrication.
- s) Could get supervision until got an order.

## **2. Production Management Evaluation.**

The evaluation score was based on the level of knowledge in production management practice, and the score will be given under following calculation:

1. In case the respondent did not know or just heard only, the point is 1.
2. In case the respondent conceived the content correctly, the point is 3.
3. In case the respondent has practiced and introduce to others, the point is 5.

Anyhow in particular for “Group QC activity” and “Could translate the company’s Policy”, “Value Added”, and “Productivity Measurement”, the point will be doubled.

To get clear reflection score of the evaluation of respective domestic private companies in production management prior to be averaged let we take a look the score in detail:



Table B.2.1. Current Evaluation score of Domestic Private Companies.

	<b>Evaluation</b>	<b>WKS</b>	<b>SPE</b>	<b>AJP</b>	<b>TA</b>	<b>RAM</b>
<b>1</b>	<b>Improvement at the field.</b>	<b>15</b>	<b>15</b>	<b>9</b>	<b>15</b>	<b>9</b>
	Meaning of 5 S?	5	5	3	5	3
	How to implement it?	5	5	3	5	3
	Evaluation method of implementation result	5	5	3	5	3
<b>2</b>	<b>On site improvement (little group activity)</b>	<b>20</b>	<b>20</b>	<b>12</b>	<b>20</b>	<b>16</b>
	Group QC activity.	10	10	6	10	10
	Summarizing QC activity report.	5	5	3	5	3
	Meeting presentation of QC	5	5	3	5	3
<b>3</b>	<b>Improvement of quality</b>	<b>15</b>	<b>15</b>	<b>11</b>	<b>15</b>	<b>11</b>
	The meaning of QC 7 tools.	5	5	5	5	3
	Utilization of statistic data.	5	5	3	5	3
	Reducing the defect product.	5	5	3	5	5
<b>4</b>	<b>Improvement of production process.</b>	<b>20</b>	<b>20</b>	<b>14</b>	<b>20</b>	<b>16</b>
	7 point of useless	5	5	3	5	3
	Processing without any idle.	5	5	5	5	3
	Line balance process.	5	5	3	5	5
	Shorten the lead time	5	5	3	5	5
<b>5</b>	<b>Machinery Maintenance</b>	<b>9</b>	<b>15</b>	<b>7</b>	<b>15</b>	<b>11</b>
	Machinery operational percentage	3	5	1	5	3
	Self machinery maintenance	3	5	3	5	5
	Machinery maintenance. Avoiding crack.	3	5	3	5	3
<b>6</b>	<b>Improvement of Management System</b>	<b>12</b>	<b>20</b>	<b>12</b>	<b>20</b>	<b>18</b>
	Company's philosophy and vision	3	5	3	5	3
	Translate the company's policy	6	10	6	10	10
	Management system and control	3	5	3	5	5
<b>7</b>	<b>Improvement of Production System</b>	<b>20</b>	<b>16</b>	<b>10</b>	<b>20</b>	<b>14</b>
	Visual control	5	5	3	5	3
	Kanban system	5	5	3	5	5
	Andon and Jidouka	5	3	1	5	1
	Small lot flows in the product line	5	3	3	5	5
<b>8</b>	<b>Improvement of Production System Control.</b>	<b>15</b>	<b>15</b>	<b>9</b>	<b>15</b>	<b>15</b>
	Cost	5	5	1	5	5
	Purchasing and procurement	5	5	3	5	5
	Stock control	5	5	5	5	5
<b>9</b>	<b>Improvement of Management</b>	<b>16</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>
	Value added	10	10	10	10	10
	Productivity measurement	6	10	10	10	10
	<b>Total</b>	<b>142</b>	<b>156</b>	<b>104</b>	<b>160</b>	<b>130</b>

	<b>Evaluation</b>	<b>PK</b>	<b>KP</b>	<b>MTM</b>	<b>GTU</b>
<b>1</b>	<b>Improvement at the field.</b>	<b>13</b>	<b>15</b>	<b>13</b>	<b>13</b>
	Meaning of 5 S?	5	5	3	3
	How to implement it?	5	5	5	5
	Evaluation method of implementation result	3	5	5	5
<b>2</b>	<b>On site improvement (little group activity)</b>	<b>12</b>	<b>20</b>	<b>20</b>	<b>16</b>
	Group QC activity.	6	10	10	6
	Summarizing QC activity report.	3	5	5	5
	Meeting presentation of QC	3	5	5	5
<b>3</b>	<b>Improvement of quality</b>	<b>9</b>	<b>15</b>	<b>15</b>	<b>9</b>
	The meaning of QC 7 tools.	3	5	5	3
	Utilization of statistic data.	3	5	5	3
	Reducing the defect product.	3	5	5	3
<b>4</b>	<b>Improvement of production process.</b>	<b>4</b>	<b>20</b>	<b>12</b>	<b>14</b>
	7 point of useless	1	5	1	3
	Processing without any idle.	1	5	5	5
	Line balance process.	1	5	1	3
	Shorten the lead time	1	5	5	3
<b>5</b>	<b>Machinery Maintenance</b>	<b>9</b>	<b>15</b>	<b>13</b>	<b>9</b>
	Machinery operational percentage	3	5	3	3
	Self machinery maintenance	3	5	5	3
	Machinery maintenance. Avoiding crack.	3	5	5	3
<b>6</b>	<b>Improvement of Management System</b>	<b>12</b>	<b>20</b>	<b>18</b>	<b>16</b>
	Company's philosophy and vision	3	5	5	3
	Translate the company's policy	6	10	10	10
	Management system and control	3	5	3	3
<b>7</b>	<b>Improvement of Production System</b>	<b>6</b>	<b>12</b>	<b>6</b>	<b>14</b>
	Visual control	3	5	3	5
	Kanban system	1	3	1	3
	Andon and Jidouka	1	1	1	3
	Small lot flows in the product line	1	3	1	3
<b>8</b>	<b>Improvement of Production System Control.</b>	<b>9</b>	<b>15</b>	<b>13</b>	<b>13</b>
	Cost	3	5	3	3
	Purchasing and procurement	3	5	5	5
	Stock control	3	5	5	5
<b>9</b>	<b>Improvement of Management</b>	<b>12</b>	<b>20</b>	<b>16</b>	<b>12</b>
	Value added	6	10	6	6
	Productivity measurement	6	10	10	6
	<b>Total</b>	<b>86</b>	<b>152</b>	<b>136</b>	<b>116</b>

Seen from the evaluation point of view it was decided that:

The total score of respondent who did not know or just heard only was equal to 32.

The total score of respondent who conceived the content correctly was equal to 96.

The total score of respondent has practiced and introduce to others was equal to 160.

Based on the above concept therefore it can be taken into decision that among 9 domestic private companies only PT. Prima Karya that the level of knowledge in the production management is still in between just heard and conceived the content correctly.

To evaluate how far the current level of improvement of the production management of said companies, let see the score of the previous year of said companies prior getting such training and supervision from JICA.

Table B.2.2. Evaluation score of Domestic Private Companies at first survey.

	<b>Evaluation</b>	<b>WKS</b>	<b>SPE</b>	<b>AJP</b>	<b>TA</b>	<b>RAM</b>
<b>1</b>	<b>Improvement at the field.</b>	<b>15</b>	<b>13</b>	<b>7</b>	<b>15</b>	<b>3</b>
	Meaning of 5 S?	5	5	3	5	1
	How to implement it?	5	5	3	5	1
	Evaluation method of implementation result	5	3	1	5	1
<b>2</b>	<b>On site improvement (little group activity)</b>	<b>12</b>	<b>18</b>	<b>14</b>	<b>20</b>	<b>16</b>
	Group QC activity.	6	10	6	10	10
	Summarizing QC activity report.	3	5	5	5	3
	Meeting presentation of QC	3	3	3	5	3
<b>3</b>	<b>Improvement of quality</b>	<b>13</b>	<b>15</b>	<b>9</b>	<b>15</b>	<b>9</b>
	The meaning of QC 7 tools.	5	5	3	5	1
	Utilization of statistic data.	3	5	3	5	3
	Reducing the defect product.	5	5	3	5	5
<b>4</b>	<b>Improvement of production process.</b>	<b>12</b>	<b>20</b>	<b>12</b>	<b>20</b>	<b>14</b>
	7 point of useless	3	5	3	5	1
	Processing without any idle.	3	5	3	5	3
	Line balance process.	3	5	3	5	5
	Shorten the lead time	3	5	3	5	5
<b>5</b>	<b>Machinery Maintenance</b>	<b>9</b>	<b>15</b>	<b>9</b>	<b>15</b>	<b>9</b>
	Machinery operational percentage	3	5	3	5	3
	Self machinery maintenance	3	5	3	5	5
	Machinery maintenance. Avoiding crack.	3	5	3	5	1
<b>6</b>	<b>Improvement of Management System</b>	<b>12</b>	<b>20</b>	<b>12</b>	<b>18</b>	<b>14</b>
	Company's philosophy and vision	3	5	3	5	3
	Translate the company's policy	6	10	6	10	6
	Management system and control	3	5	3	3	5

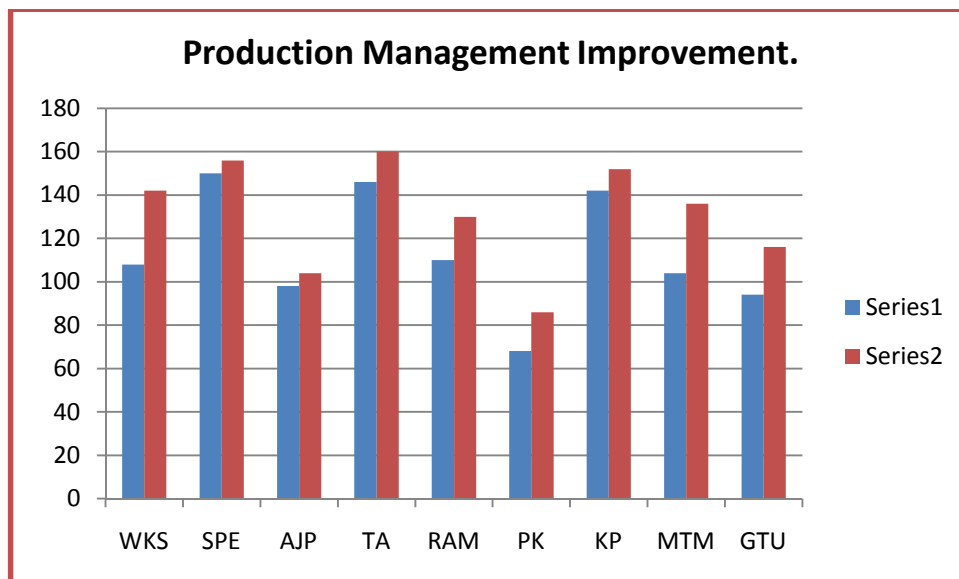
	<b>Evaluation</b>	<b>WKS</b>	<b>SPE</b>	<b>AJP</b>	<b>TA</b>	<b>RAM</b>
<b>7</b>	<b>Improvement of Production System</b>	<b>4</b>	<b>16</b>	<b>6</b>	<b>12</b>	<b>10</b>
	Visual control	1	5	3	5	3
	Kanban system	1	3	1	3	5
	Andon and Jidouka	1	5	1	3	1
	Small lot flows in the product line	1	3	1	1	1
<b>8</b>	<b>Improvement of Production System Control.</b>	<b>15</b>	<b>13</b>	<b>9</b>	<b>15</b>	<b>15</b>
	Cost	5	3	3	5	5
	Purchasing and procurement	5	5	3	5	5
	Stock control	5	5	3	5	5
<b>9</b>	<b>Improvement of Management</b>	<b>16</b>	<b>20</b>	<b>20</b>	<b>16</b>	<b>20</b>
	Value added	10	10	10	6	10
	Productivity measurement	6	10	10	10	10
	<b>Total</b>	<b>108</b>	<b>150</b>	<b>98</b>	<b>146</b>	<b>110</b>

	<b>Evaluation</b>	<b>PK</b>	<b>KP</b>	<b>MTM</b>	<b>GTU</b>
<b>1</b>	<b>Improvement at the field.</b>	<b>9</b>	<b>15</b>	<b>11</b>	<b>11</b>
	Meaning of 5 S?	3	5	3	5
	How to implement it?	3	5	5	5
	Evaluation method of implementation result	3	5	3	1
<b>2</b>	<b>On site improvement (little group activity)</b>	<b>12</b>	<b>20</b>	<b>14</b>	<b>4</b>
	Group QC activity.	6	10	6	2
	Summarizing QC activity report.	3	5	5	1
	Meeting presentation of QC	3	5	3	1
<b>3</b>	<b>Improvement of quality</b>	<b>7</b>	<b>15</b>	<b>13</b>	<b>7</b>
	The meaning of QC 7 tools.	1	5	3	3
	Utilization of statistic data.	3	5	5	1
	Reducing the defect product.	3	5	5	5
<b>4</b>	<b>Improvement of production process.</b>	<b>4</b>	<b>14</b>	<b>10</b>	<b>6</b>
	7 point of useless	1	3	3	1
	Processing without any idle.	1	3	5	1
	Line balance process.	1	5	1	1
	Shorten the lead time	1	3	1	3
<b>5</b>	<b>Machinery Maintenance</b>	<b>7</b>	<b>15</b>	<b>9</b>	<b>7</b>
	Machinery operational percentage	1	5	1	1
	Self machinery maintenance	3	5	3	5
	Machinery maintenance. Avoiding crack.	3	5	5	1

	<b>Evaluation</b>	<b>PK</b>	<b>KP</b>	<b>MTM</b>	<b>GTU</b>
<b>6</b>	<b>Improvement of Management System</b>	<b>12</b>	<b>20</b>	<b>18</b>	<b>20</b>
	Company's philosophy and vision	3	5	3	5
	Translate the company's policy	6	10	10	10
	Management system and control	3	5	5	5
<b>7</b>	<b>Improvement of Production System</b>	<b>8</b>	<b>14</b>	<b>6</b>	<b>4</b>
	Visual control	3	3	3	1
	Kanban system	3	3	1	1
	Andon and Jidouka	1	3	1	1
	Small lot flows in the product line	1	5	1	1
<b>8</b>	<b>Improvement of Production System Control.</b>	<b>5</b>	<b>13</b>	<b>11</b>	<b>15</b>
	Cost	1	5	3	5
	Purchasing and procurement	1	5	3	5
	Stock control	3	3	5	5
<b>9</b>	<b>Improvement of Management</b>	<b>4</b>	<b>16</b>	<b>12</b>	<b>20</b>
	Value added	2	6	6	10
	Productivity measurement	2	10	6	10
	<b>Total</b>	<b>68</b>	<b>142</b>	<b>104</b>	<b>94</b>

Based on the above data the improvement level of production management of domestic private companies can be illustrated as seen in the exhibit B.2.

Exhibit B.2



Based on the above evaluation we make average score of the domestic private companies then to be compared to the score of production management evaluation of state owned company and joint venture company, and the result shown as follows:

Table B.2.3. Comparison of Current Evaluation Score.

	<b>Evaluation</b>	<b>SOC</b>	<b>JVC</b>	<b>DPC</b>
<b>1</b>	<b>Improvement at the field.</b>	<b>15</b>	<b>15</b>	<b>14</b>
	Meaning of 5 S?	5	5	4
	How to implement it?	5	5	5
	Evaluation method of implementation result	5	5	5
<b>2</b>	<b>On site improvement (little group activity)</b>	<b>20</b>	<b>20</b>	<b>17</b>
	Group QC activity.	10	10	9
	Summarizing QC activity report.	5	5	4
	Meeting presentation of QC	5	5	4
<b>3</b>	<b>Improvement of quality</b>	<b>13</b>	<b>15</b>	<b>13</b>
	The meaning of QC 7 tools.	5	5	5
	Utilization of statistic data.	3	5	4
	Reducing the defect product.	5	5	4
<b>4</b>	<b>Improvement of production process.</b>	<b>20</b>	<b>20</b>	<b>16</b>
	7 point of useless	5	5	4
	Processing without any idle.	5	5	4
	Line balance process.	5	5	4
	Shorten the lead time	5	5	4
<b>5</b>	<b>Machinery Maintenance</b>	<b>13</b>	<b>15</b>	<b>12</b>
	Machinery operational percentage	5	5	4
	Self machinery maintenance	3	5	4
	Machinery maintenance. Avoiding crack.	5	5	4
<b>6</b>	<b>Improvement of Management System</b>	<b>20</b>	<b>20</b>	<b>17</b>
	Company's philosophy and vision	5	5	4
	Translate the company's policy	10	10	9
	Management system and control	5	5	4
<b>7</b>	<b>Improvement of Production System</b>	<b>14</b>	<b>16</b>	<b>13</b>
	Visual control	5	5	4
	Kanban system	3	5	4
	Andon and Jidouka	3	3	2
	Small lot flows in the product line	3	3	3

	<b>Evaluation</b>	<b>SOC</b>	<b>JVC</b>	<b>DPC</b>
<b>8</b>	<b>Improvement of Production System Control.</b>	<b>15</b>	<b>15</b>	<b>14</b>
	Cost	5	5	4
	Purchasing and procurement	5	5	5
	Stock control	5	5	5
<b>9</b>	<b>Improvement of Management</b>	<b>20</b>	<b>12</b>	<b>18</b>
	Value added	10	6	9
	Productivity measurement	10	6	9
	<b>Total</b>	<b>150</b>	<b>148</b>	<b>134</b>

Note: SOC stand for State Owned Company.  
JVC stand for Joint Venture Company.  
DPC stand for Domestic Private Company.

Seen from the average score there was a point of 2, this point meant the score in between 1 and 3, so part of them did not know and the other conceived correctly. As another point of 4, it meant that part of them conceived correctly and the other has practiced and introduced to another. Even though for the point of 9, it meant part of them conceived correctly and the other has practiced and introduced to another.

The total score of respondent who did not know or just heard only was equal to 32.  
The total score of respondent who conceived the content correctly was equal to 96.  
The total score of respondent has practiced and introduce to others was equal to 160.

To evaluate how far the current level of improvement of the production management of said companies, let see the score of the previous year of said companies prior getting such training and supervision from JICA.

Table B.2.4. Comparison Evaluation Score at the first survey.

	<b>Evaluation</b>	<b>SOC</b>	<b>JVC</b>	<b>DPC</b>
<b>1</b>	<b>Improvement at the field.</b>	<b>13</b>	<b>9</b>	<b>11</b>
	Meaning of 5 S?	5	3	4
	How to implement it?	5	3	4
	Evaluation method of implementation result	3	3	3
<b>2</b>	<b>On site improvement (little group activity)</b>	<b>20</b>	<b>20</b>	<b>14</b>
	Group QC activity.	10	10	7
	Summarizing QC activity report.	5	5	4
	Meeting presentation of QC	5	5	3

	<b>Evaluation</b>	<b>SOC</b>	<b>JVC</b>	<b>DPC</b>
<b>3</b>	<b>Improvement of quality</b>	<b>15</b>	<b>9</b>	<b>11</b>
	The meaning of QC 7 tools.	5	3	3
	Utilization of statistic data.	5	3	4
	Reducing the defect product.	5	3	4
<b>4</b>	<b>Improvement of production process.</b>	<b>20</b>	<b>16</b>	<b>12</b>
	7 point of useless	5	3	3
	Processing without any idle.	5	5	3
	Line balance process.	5	5	3
	Shorten the lead time	5	3	3
<b>5</b>	<b>Machinery Maintenance</b>	<b>15</b>	<b>15</b>	<b>11</b>
	Machinery operational percentage	5	5	3
	Self machinery maintenance	5	5	4
	Machinery maintenance. Avoiding crack.	5	5	4
<b>6</b>	<b>Improvement of Management System</b>	<b>20</b>	<b>14</b>	<b>16</b>
	Company's philosophy and vision	5	3	4
	Translate the company's policy	10	6	8
	Management system and control	5	5	4
<b>7</b>	<b>Improvement of Production System</b>	<b>14</b>	<b>10</b>	<b>9</b>
	Visual control	5	3	3
	Kanban system	3	5	2
	Andon and Jidouka	3	1	2
	Small lot flows in the product line	3	1	2
<b>8</b>	<b>Improvement of Production System Control.</b>	<b>15</b>	<b>11</b>	<b>12</b>
	Cost	5	3	4
	Purchasing and procurement	5	3	4
	Stock control	5	5	4
<b>9</b>	<b>Improvement of Management</b>	<b>16</b>	<b>12</b>	<b>16</b>
	Value added	6	6	8
	Productivity measurement	10	6	8
	<b>Total</b>	<b>148</b>	<b>116</b>	<b>116</b>

Note: SOC stand for State Owned Company.

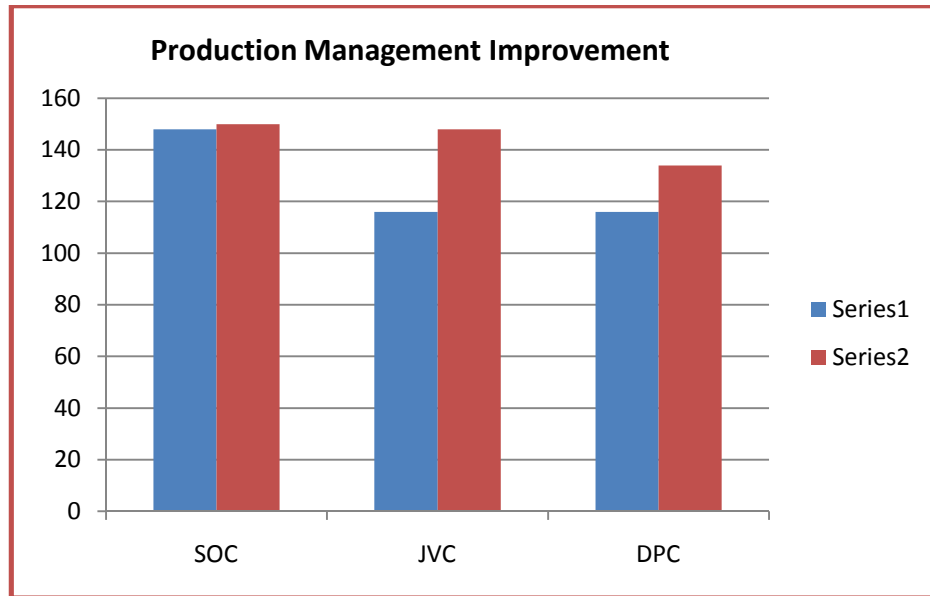
JVC stand for Joint Venture Company.

DPC stand for Domestic Private Company.



Based on the above data the improvement level of production management of said companies can be illustrated as seen in exhibit B.3.

Exhibit B.3.



Note: SOC stand for State Owned Company  
 JVC stand for Joint Venture Company.  
 DPC stand for Domestic Private Caompany.

## VI. Conclusion.

### A. Casting.

1. There was a high salary gap among companies because of the differences between skill labor and unskill labor. In this kind of industries the workers were very loyal and the average term of office was over than 5 years.
2. The casting industries constitute the family business, and run the business through generation to generation and more rely on the experiences.
3. Seen from evaluation score in the field of casting technique, in general has a potential improvement though there is a part of them the total score was still below 96, meant that their knowledge of casting technique not yet fully reach the level of conceived the content correctly. Therefore they have to improve their casting technique knowledge in order could achieve a better result.
4. On the whole the training and supervision conducted by JICA has an important role in improving the knowledge of casting technique. The knowledge in casting technique learned by participants among industries has increased 23% compared to prior to get training and supervision from JICA.

5. In line with the JICA program in providing training and supervision, currently almost 70 % of casting industries have practiced the technique and introduced the knowledge to another.
6. The current economic situation seen that the demand of component of construction machinery tent to drop while the price of raw material increase significantly causes some companies reduce the worker to anticipate the decrease of demand and to maintain the business.

## **B. Production Management.**

1. Human resources was one of the factor that should be solved, such as limited availability of experience expertise, the loyalty of employee, and having good character.
2. The percentage of pass product among industries was quite good and reached above 92%.
3. Komatsu Indonesia is one of the company that has important role to put the order among component industries, nearly 40% of component industries was his client.
4. Seen from evaluation score in the fielf of production management, the score of the companies that got training and supervision from JICA have improved sigificantly and the improvement is about 15%. Their knowledge has reached above 96, it meant that they have practiced and a little bit introduce to others.
5. The current economic situation seen that the demand of component of construction machinery tent to drop while the price of raw material increase significantly causes the industrial enterprises forced to reduce cost burden by laying off part of the employee.

