

***Quality and Productivity Improvement
Experience of JICA's project in Indonesia***



Toru Homma

***Ethiopia-Japan High Level Forum
for Industrial Development
Addis Ababa, 2 June 2009***

Outline

1. Introduction

**2. JICA Project on Supporting Industries
Development for Casting Technology in Indonesia**

3. Related JICA's programme in Indonesia

4. Conclusions

Part 1

1. Introduction

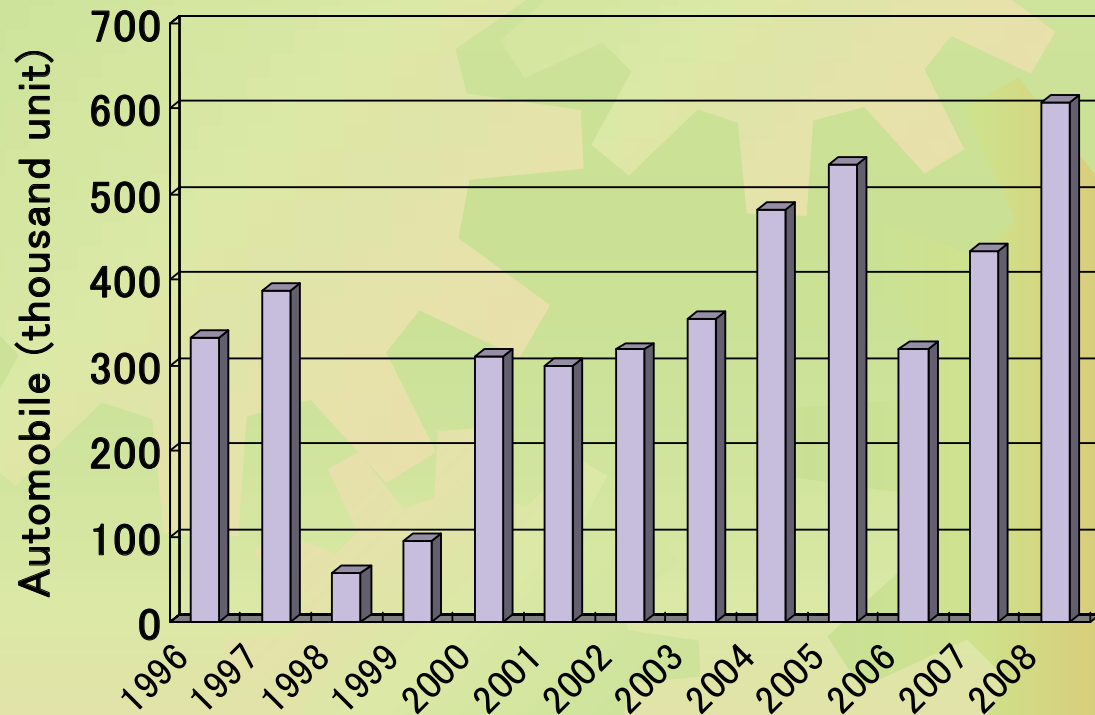
2. JICA Project on Supporting Industries Development for Casting Technology in Indonesia

3. Related JICA's programme in Indonesia

4. Implications and Conclusions

Industries in Indonesia

- ☀ Most severely affected by Asian Economic Crisis in late '90s; and then economic recovery and development
- ☀ Manufacturing sector development to meet 230 mil. population demand
- ☀ FDI-led industrialisation
- ☀ Necessity for supporting industries development

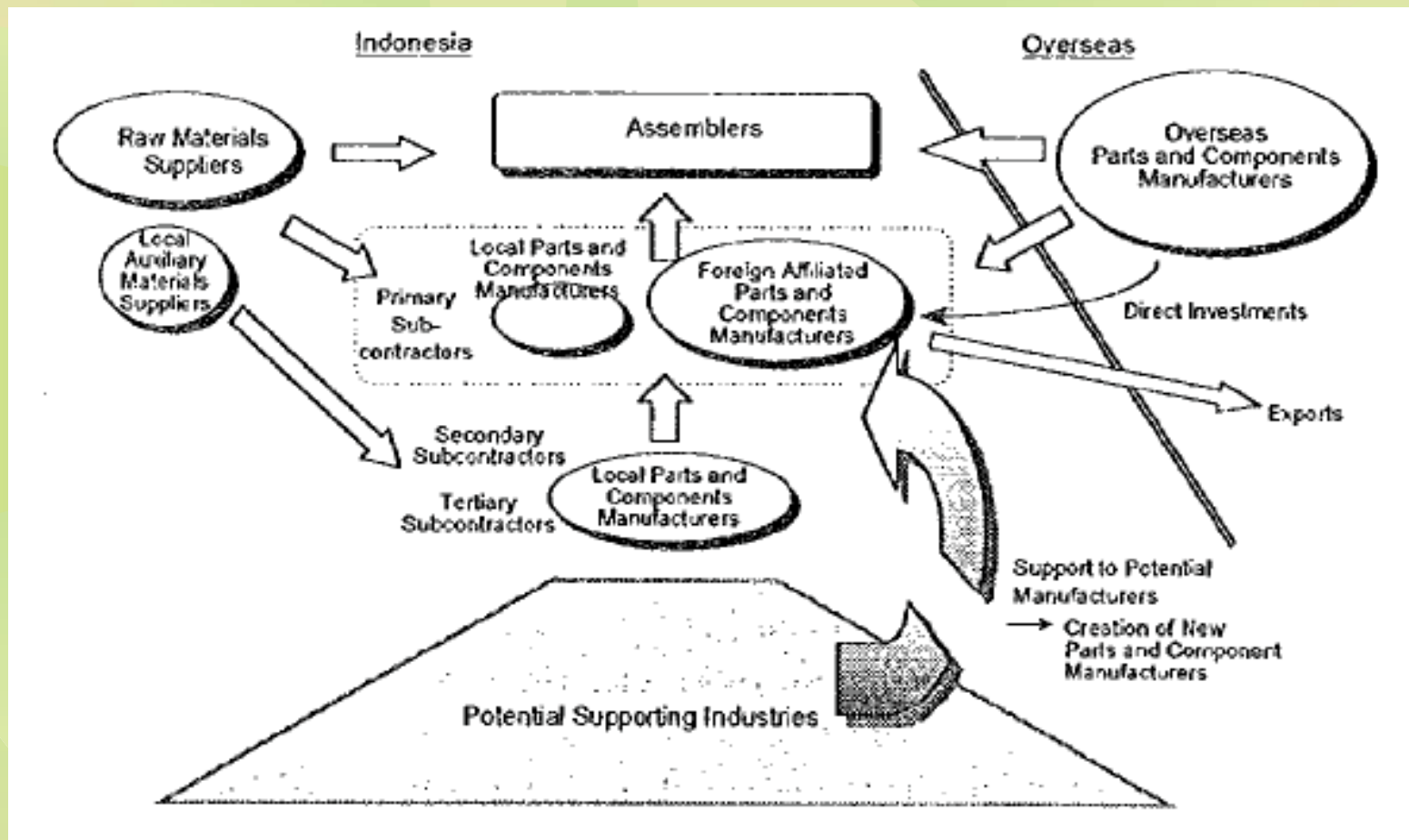


Automobile sales in Indonesia

Supporting Industries

- ☀ Supporting Industries: *“industries which supply various components, parts and materials for assembly makers in such mechanical industries as the automotive, electric and electronics industries”* (Urata, 2000)
- ☀ Key for sound industrial structure and attracting foreign direct investment
- ☀ Could be much broader meaning: supplier for i.e. agricultural machinery, textile machinery and others
- ☀ Metal Industries: core of the supporting industries

Structure of the Supporting Industries in Indonesia



- Assemblers and “Potential” Supporting Industries

(Source: JICA (1997))

Metal Industries

- ☀ Most fundamental manufacturing industries
 - ☀ Metal processing technology...
 - ☀ Casting, Forging, Metal Stamping, Powder Metallurgy
 - ☀ ...and related industries
 - ☀ Mould and Die, Machinery, Heat Treatment
- (Source: Materials Process Technology Center (2009))*
- ☀ Supply parts and components to manufacturing industries such as automobile, machinery and any other industries
 - ☀ Contribute to agricultural development: i.e. agricultural machineries, pumping system, food processing equipment etc.
- ADLI

Quality and Productivity Improvement / Kaizen in these industries

- ☀ Quality and productivity improvement is the key for potential supporting industries / metal industries
- ☀ Should be reliable supplier: Quality, Cost, Delivery
- ☀ Should supply reliable product: durable, safe, constant
- ☀ Etymology of “*Metal*” is “*metallan*” (to search) in old Greek: how difficult to find and make – and now how to control quality

Part 2

1. Introduction

**2. JICA Project on Supporting Industries
Development for Casting Technology in Indonesia**

3. Related JICA's approach in Indonesia

4. Conclusions

Project Outline

- ★ Technical Cooperation Project
- ★ Project Period: 1999-2004 (full project), 2004-2006 (Follow up expert)
- ★ Metal Industries Development Centre (MIDC) and JICA
- ★ Casting Technology (Cast Iron): Casting Design, Pattern making, Moulding, Melting, Examination and Quality Control
- ★ Target client: small and medium scale foundry industries

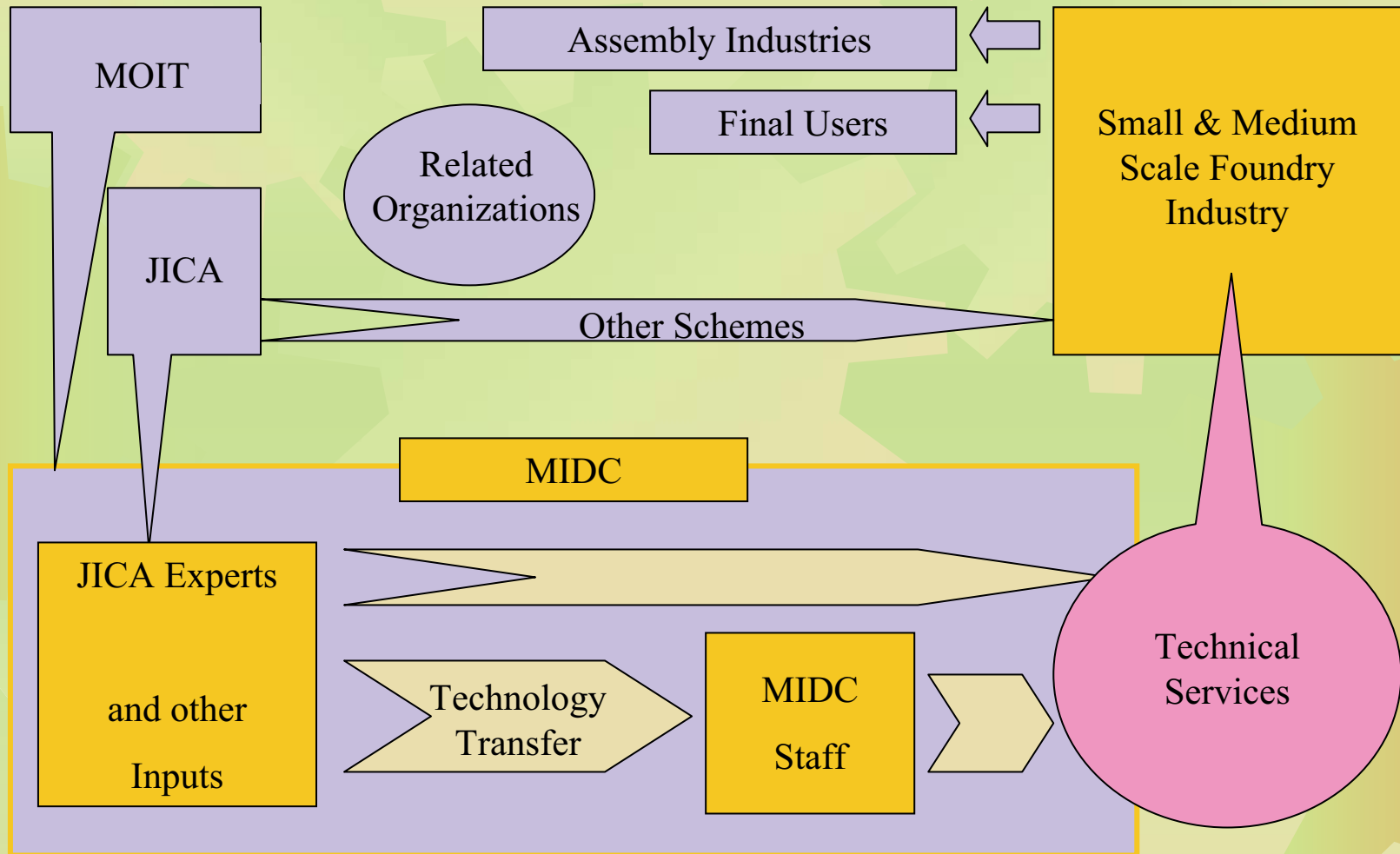


MIDC

- ☀ Metal Industries Development Centre (MIDC) / Institute for Research and Development of Metal and Machinery Industries (IRDMMI)
- ☀ Ministry of Industry (and Trade)
- ☀ Technology: Casting, Machining, Welding, Heat Treatment, Testing and Calibration etc.
- ☀ ISO 9001: 2000 certified (2006): *"MIDC has established and applies a quality management system for Engineering Design, Ferro & Non Ferro Casting, Investment Casting, Machining with Conventional and CNC, Mould and Dies, Agriculture Machineries, Dimension Metrology, Testing for Casting and Machining Products"*



Project Concept



Timeframe

	1 st year	2 nd year	3 rd year	4 th year	5 th year	
Project Set-up	→					
Technology Transfer	■ ■	→				
Prototype Service		■ ■	→			
Extension Services		■ ■	→			
Training Service		☆☆	☆☆	☆	■ ■	→
Seminar	☆	☆	☆	☆	■ ■	→



Technical services

Technology Transfer



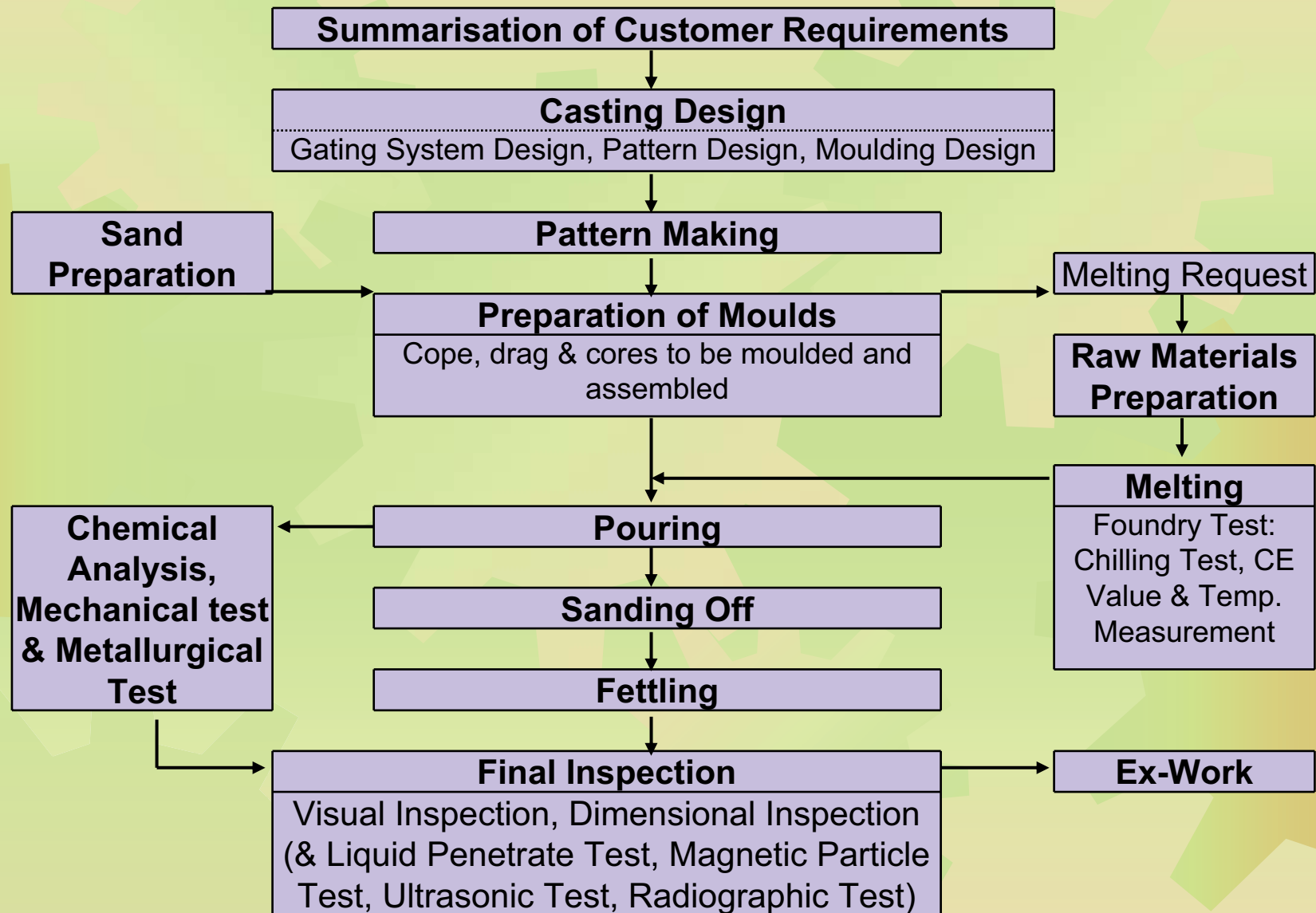
Moulding Technology

Lecture on Melting Theory



(Source: JICA & MIDC (2002))

Casting Production Process



(Source: JICA & MIDC (2002))

Casting Production Process



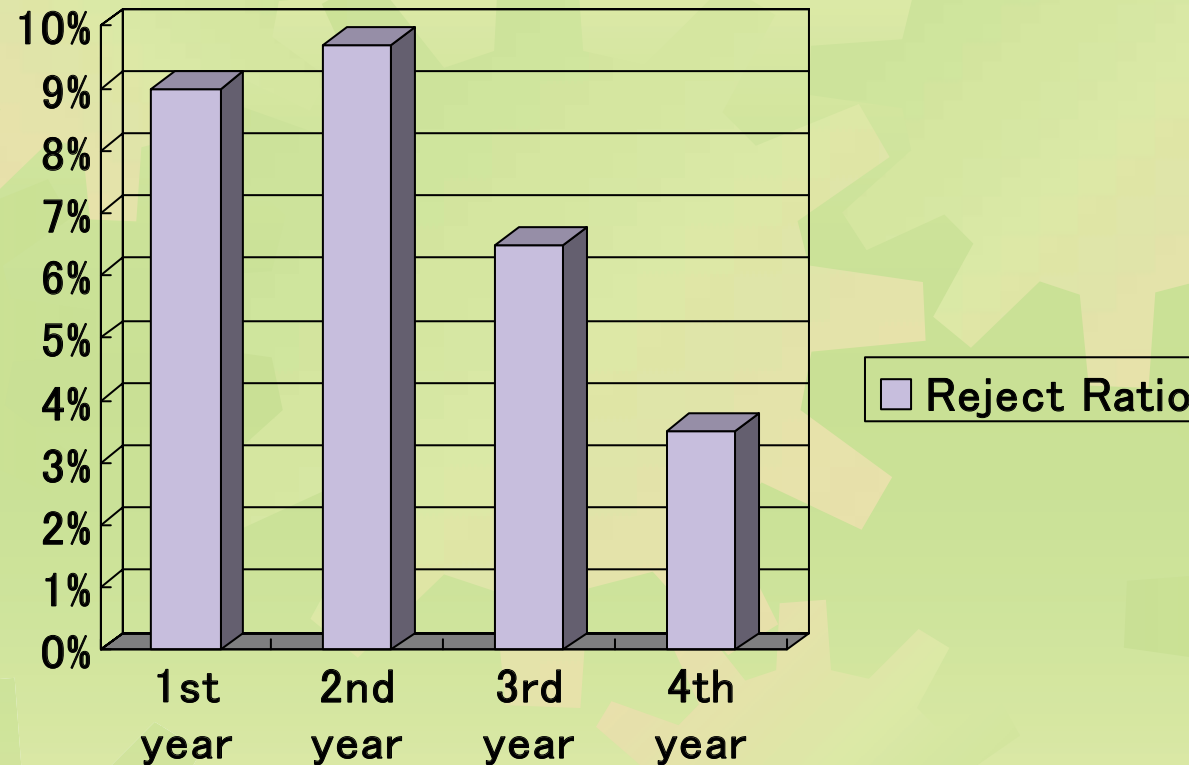
Pouring molten metal into moulds

Casting Products



(Source: JICA & MIDC (2002))

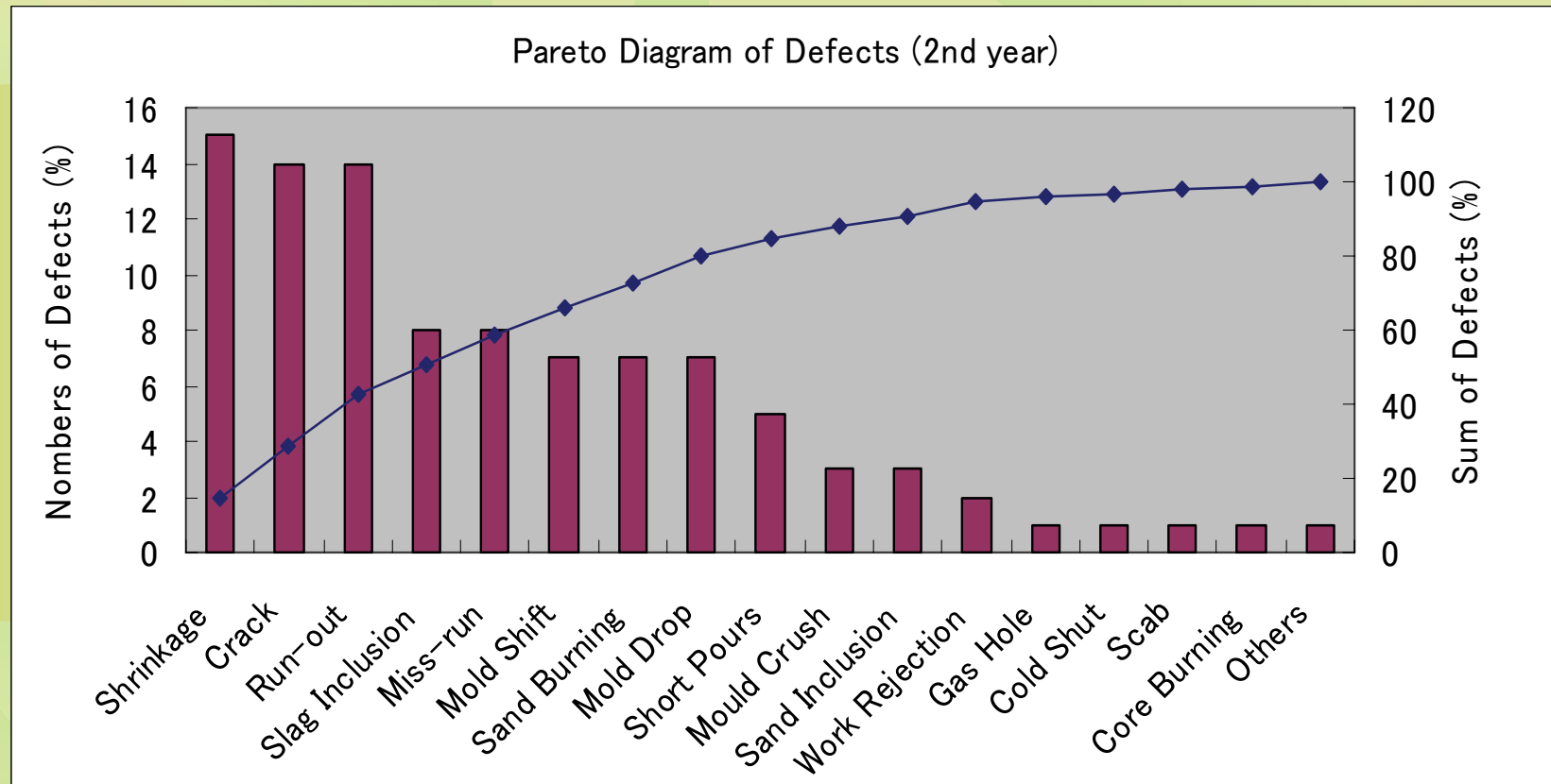
Reject Ratio in MIDC Foundry



- ☀ Reject ratio has been decreased, while required quality level has been increased.

Source: JICA (2003)

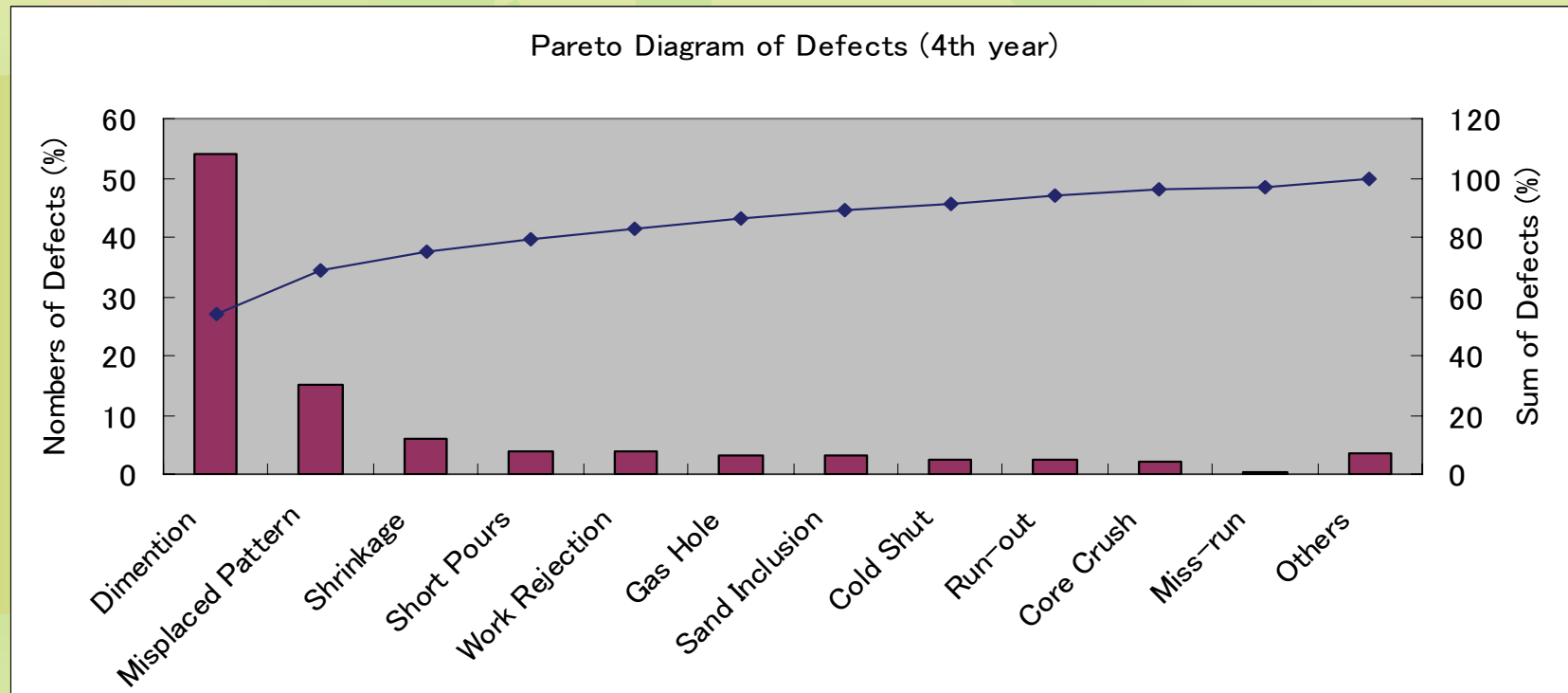
QC - Kaizen Tool: Pareto Diagram of Defects



(Source: JICA (2003))

- ☀ Cause of defects in 2nd year – Shrinkage (inappropriate casting design)

QC - Kaizen Tool: Pareto Diagram of Defects



(Source: JICA (2003))

- ☀ Cause of defects in 4th year –Decrease of shrinkage as a cause of defect

QC - Kaizen Tool:

- Melting time (min/charge) and deviation in 200kg HF highly decreased and met target in 25 months (less than 60 min.)

Table 1 The required melting time (min/charge) in case of 200kgHF

	1 st	4 th	11 th month	16 th month	20 th month	25 th month
40						///
50		//	///	////	//////	//////////
60	/	////////	//////////	//////////	//////////	//////////
70		////////	////////	///	////////	////
80		////	///	////	//	
90			////	/		
100		/		/		
110		/				
120		/				
130	/					
140	//					
150	/					
160						
170						
180						
190						
200	/					
n	7	22	35	35	27	30
x	141.4	72.4	67.4	64.4	62.2	58
σ	36	17.4	11.8	11.9	10.6	8.8

(Source: JICA (2003))

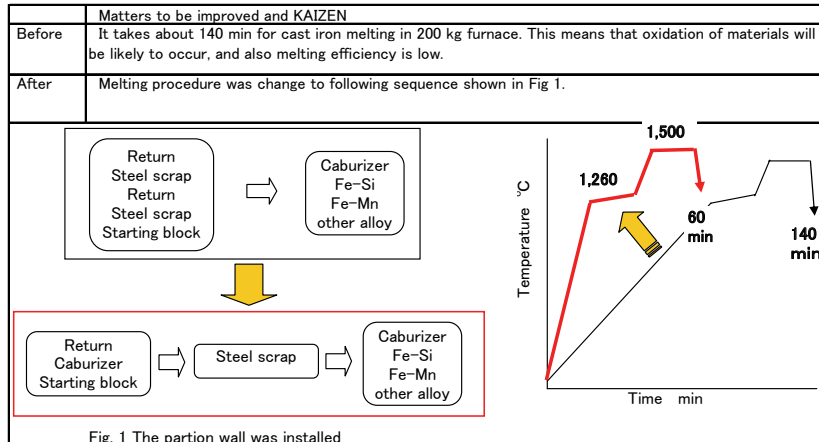
Kaizen in MIDC

KAIZEN 7 : Improving the Melting process at MIDC-2

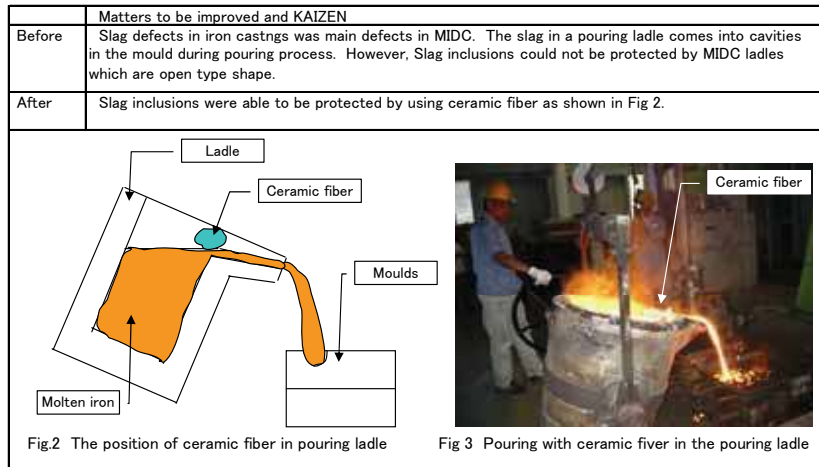
2003. 9 MIDC

1. Improvement (KAIZEN)

(1). Rapid heating and high temperature melting



(2). Decreasing the slag defects in iron castings



2. Effect of KAIZEN

Items	Qualitative Effect	Quantitative Effect
1. Rapid heating and high temperature melting		<ul style="list-style-type: none"> The decrease of casting defects like shrinkage and gas holes The increase of melting efficiency like electric consumption
2. Decreasing the slag defects in iron castings		<ul style="list-style-type: none"> The decrease of slag inclusions

- ☀ A sample of “Kaizen” sheet of MIDC: Improving the melting process
- ☀ Team meeting
- ☀ Voluntary proposals

Source: JICA (2003)

5S in Indonesia – “5K”



5S



Clarification of
safety passages



5S



“Seiton” Inspection tools in good order with name plates

5S



Area for rejected products

Visual Control



Visual control board

Services for SME Foundries



Extension Service in a factory

Training course in MIDC



Services for Client Foundries

Type of Service	Expectation	Satisfaction
Information service (Seminar, Publication etc.)	62%	4.0
Extension service (Visit and consultation)	56%	4.0
Training service (Training at MIDC)	46%	3.8
Trial prototyping service	26%	2.5
(Engineer station service) (out of pjt mission)	(38%)	---
(Testing & Calibration, R&D, ISO) (ditto)	(37%)	3.6
Average (0-5 scale)	---	3.8

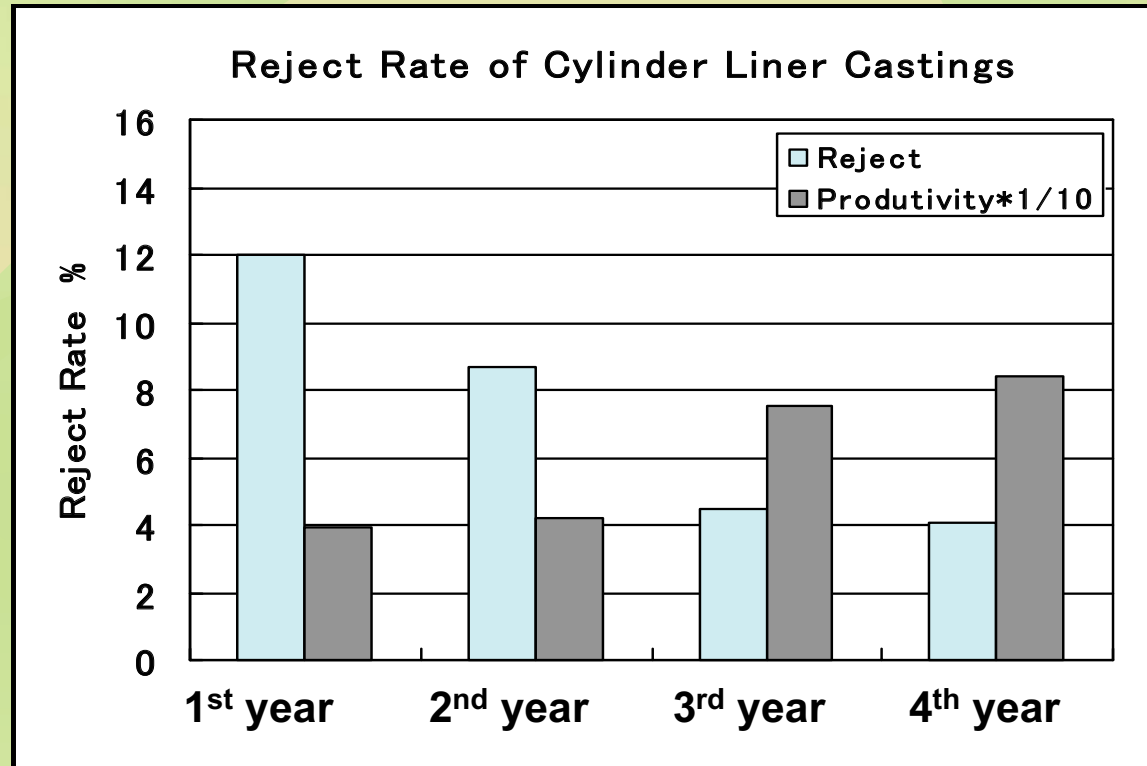
Source: Homma (2002)

Extension Services (Visit and Consultation)

- ☀ visited 71 foundry industries, 12 of which were as identified target companies
- ☀ Visited by a team composed of JICA Experts and MIDC Engineers
- ☀ Diagnosis and practical technical advice
- ☀ Homework and reporting
- ☀ Best practices: dramatic decrease of defect ratio; access to new customers



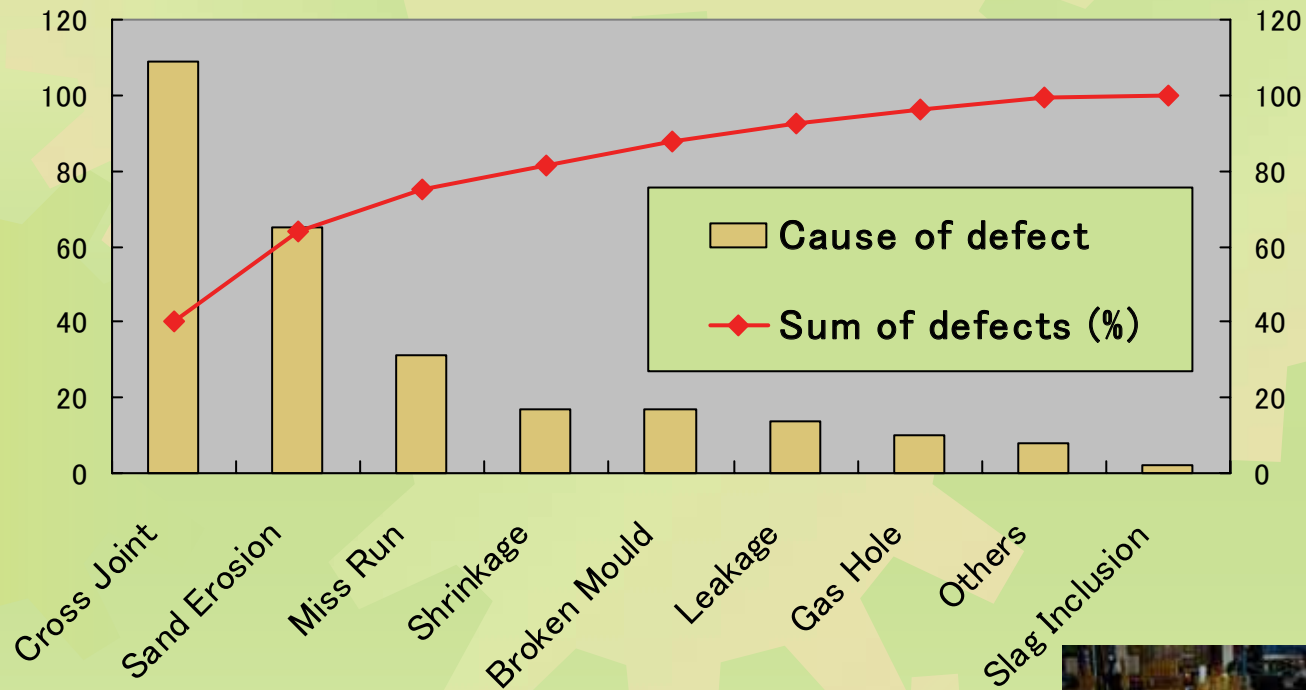
Company A: Cylinder Liner Production



- ☀ Capacity 300T/M, Medium-sized
- ☀ Decreased reject ratio to 1/3
- ☀ Increased productivity to double

Source: JICA and MIDC (2004)

Company A: Cylinder Liner Production

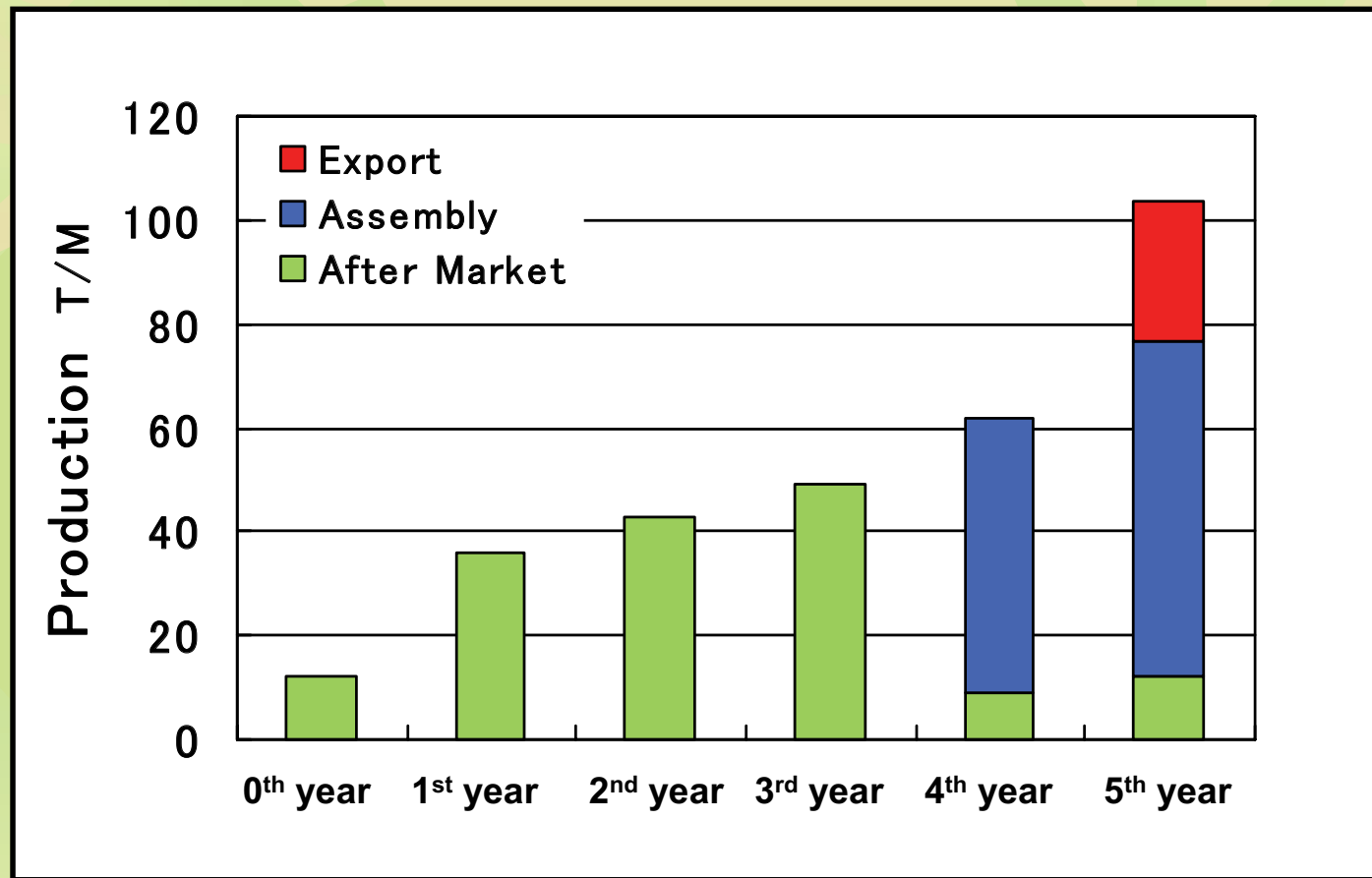


- ☀ Analysis of causes of defect
- ☀ Good record but less usage
- ☀ Advice on full utilisation of data



Source: JICA (2002)

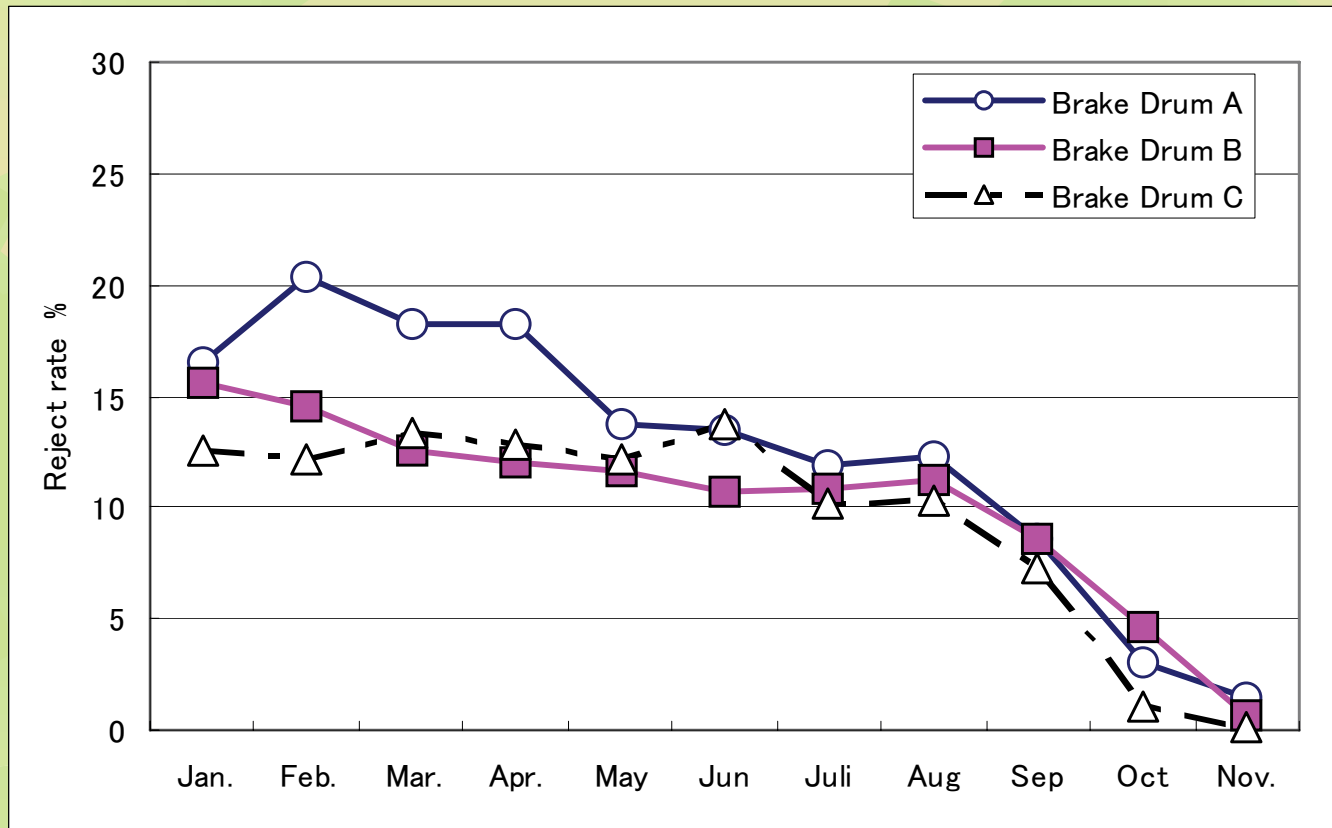
Company A: Cylinder Liner Production



- ☀ Achieved delivery to a Japanese assembler
- ☀ Started export

Source: JICA and MIDC (2004)

Company B: Brake Drum Production



- Medium-scale foundry
- The high reject ratio during the machining process was decreased

Source: JICA and MIDC (2004)

Company C: Brake Drum Production



- Importance of quality control: sieve analysis, sand property etc.
- Target setting
- Improvement of process: sand preparation, pouring etc.
- Reject ratio: 10% -> 5% -> 2%

Source: JICA (2002)

Training Services for SMEs



- ☀ Technical courses which contains quality control: Casting Design, Pattern Making, Sand Preparation and Moulding, Melting
- ☀ Quality Control Course

- ☀ 19 Training courses for 244 Trainees
- ☀ Normally for 3 weeks for 15 trainees





Training Services for Clients

- ✦ Tailor-made training: requested by manufacturing and casting industries including top-level Japanese companies
- ✦ Third Country Training for Ghana on Casting Technology at MIDC based on the experience of the Project (as a part of Asia-Africa cooperation) (2008): Trained 4 personnel (2 from public sector and 2 from private sector)

Other Services for MIDC Clients

- ✦ Prototyping Services: support in developing products and prototyping; in total 260 kinds of products
- ✦ Seminars: 6 times in total 1180 persons; contributed as a forum of foundry engineers
- ✦ International seminar held in Jakarta (speakers from 6 countries)
- ✦ Workshops (Seminars in other cities)
- ✦ Information Services: “Metal Indonesia”, Casting Technology Handbook etc.



Technical services: key messages for quality improvement

- ☀ Get data and fully utilise
 - ☀ Do analysis and reflect to quality improvement
 - ☀ Top management should have a keen awareness of importance of quality and productivity control
 - ☀ Visual Control and Teamwork
 - ☀ Incremental improvement and sustainability
- ☀ A major finding from a quantitative study on impacts of the project based on firm-level evidence (285 firms surveyed including 88 participant firms in the JICA-MIDC project): the technical assistance programme helped local participant firms improve their technology, as the reject ratio was significantly decreased at 10% level, in particular the beneficiaries of extension services (Todo, 2008)

Part 3

1. Introduction

2. JICA Project on Supporting Industries Development
for Casting Technology in Indonesia

3. Related JICA's programme in Indonesia

4. Conclusions



Private Sector Development: SME & Supporting Industries Development Programme of JICA in Indonesia

☀ 1: Supporting Industries Promotion

- ☀ JICA-MIDC Project, Development Study for Supporting Industries Development, Silver Experts for small-scale foundry industries

☀ 2: Local Industries Promotion

- ☀ SME Cluster Development, Design Promotion, Regional Industries Development

☀ 3: SME Human Resources Development

- ☀ Registered SME Management Consultant, SME Training System

☀ As a part of All-Japan Approach

☀ From the viewpoint of quality and productivity improvement



Registered SME Management Consultant (*Shindanshi*) System

- ☀ Government certified management consultant for SMEs: diagnosis, advice and consultation (Ministerial Decree 2006)
- ☀ Japan's model: transferred to Thailand, then fully transferred to Indonesia through JICA projects
- ☀ 250 consultants have been registered in 3 years as "*Shindanshi*" who were qualified as candidates, completed 6 months intensive government training programme and passed examinations



Registered SME Management Consultant (*Shindanshi*) System and Quality/Productivity Improvement

- ☀ “Production Control” (QC, Process Control, IE, Inventory Management etc.) and its practical training in factory are the core of the curriculum (40% of the total time devoted)
- ☀ Providing regional SMEs with managerial and technical advice in all over Indonesia
- ☀ MIDC contributed: as a technical contributor to the training programme; as resource of consultants

Part 4

1. Introduction

2. JICA Project on Supporting Industries Development
for Casting Technology in Indonesia

3. Related JICA's programme in Indonesia

4. Conclusions

IMPLICATIONS AND CONCLUSIONS

- ☀ Quality and productivity improvement: a key for industrial development
- ☀ Team work – participation and cooperation, continuity, comprehensiveness
- ☀ Sustainable effort for quality and productivity improvement – Kaizen: there is no end
- ☀ Advice from veteran engineers who actually experienced history of quality improvement and modernisation of manufacturing industries in Japan



IMPLICATIONS

- ☀ Supply chain – drive for improving quality and productivity in supporting industries *vis-à-vis* clients
- ☀ Supporting industries development as a part of investment climate improvement
- ☀ “NEPAD-OECD Africa Investment Initiative”
- ☀ Private sector development as an engine for sustainable growth and development

Thank you very much.

