



Calendar Year	2004												Responsible person in the Project(*)	Input (*)	Remarks	
	JFY2003			TFY2004						TFY2005						
	1	2	3	4	5	6	7	8	9	10	11	12				
Term of Technical Cooperation  Output 1 The necessary machinery and equipment are provided, installed, operated and maintained properly.  1 The necessary machinery and equipment are provided, installed, operated and maintained properly.  1-1 Make facility refurbishment plan and implement as planned. 1-1-1 Make facility refurbishment plan for technical training, seminars and prototyping service, if necessary. 1-1-2 Implement as planned.  1-2 Provide and install necessary machinery and equipment. 1-2-1 Make the plan of necessary machinery and equipment to be purchased by Japanese side for next year, if necessary. 1-2-2 The plan is approved by Japanese Government. (The plan could be subjected to change under constraints such as budget appropriation.) 1-2-3 Procure and transport the machinery and equipment to the Project site. 1-2-4 Make the plan of necessary machinery and equipment, then purchase as planned by Thai side, if necessary.  1-3 Operate and maintain the machinery and equipment as planned. 1-3-1 Compose operation and maintenance manual. 1-3-2 Operate and maintain machinery and equipment as planned.						JCC										
														CA, LE, PM, TC	JPC, TPC	
														CA, LE, PM, TC	JPC, TPC	
														CA, PM	JPC, LE, TPC, TC, C/P	
														CA, PM	JPC, LE, TPC, TC, C/P	
														PD, PM	LE, TPC, TC, C/P	
														LE, TC	SE, C/P	
														LE, TC	SE, C/P	

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Calendar Year	2004												Responsible person in the Project(*)	Input (*)	Remarks		
	Fiscal Year			TFY2004			JFY2004			TFY2005							
	1	2	3	4	5	6	7	8	9	10	11	12					
Term of Technical Cooperation																	
<p><b>Output 2. Technical capability of the counterpart personnel (hereinafter referred to as "C/P") are upgraded.</b></p> <p>2 Technical capability of the counterpart personnel (hereinafter referred to as "the C/P") are upgraded.</p> <p>2-1 Make plan of technology transfer to the C/P.</p> <p>2-1-1 Formulate Annual Technical Cooperation Program (ATCP) for the next year and review Technical Cooperation Program for 5 years (TCP), if necessary.</p> <p>2-1-2 Approve ATCP and TCP at JCC.</p> <p>2-1-3 Revise ATCP and TCP, if necessary.</p> <p>2-2 Implement technology transfer to the C/P.</p> <p>2-2-1 Prepare teaching material.</p> <p>2-2-2 Implement technology transfer as ATCP.</p> <p>2-2-3 Compile textbooks and necessary documents.</p> <p>2-2-4 Implement echo-training and self training by C/P.</p> <p>2-2-5 Implement C/P training in Japan. (The plan could be subjected to change under constraints such as budget appropriation.)</p> <p>2-3 Monitor and evaluate the result of technology transfer to the C/P.</p> <p>2-3-1 Review monitoring and evaluation method, if necessary.</p> <p>2-3-2 Develop the material for monitoring.</p> <p>2-3-3 Monitor and evaluate the result of technology transfer to the C/P.</p> <p>2-3-4 Share the results of monitoring and evaluation at JCC.</p>																	
															CA, PM	JPC, LE, TPC, TC, C/P	
															CA, PD CA, PD	JPC, LE, PM, TPC, TC JPC, LE, PM, TPC, TC, C/P	
															LE, TC LE, TC LE, TC PM, TC CA, PD	SE, C/P SE, C/P SE, C/P C/P JPC, LE, PM, TPC, TC, C/P	
															CA, LE, SE LE, SE CA, LE, SE	JPC	
															CA, PD	JPC, TPC, TC, C/P JPC, LE, PM, TPC, TC, C/P	

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Calendar Year	2004												Responsible person in the Project(*)	Input (*)	Remarks		
	JFY2003			JFY2004			TFY2004			TFY2005							
	1	2	3	4	5	6	7	8	9	10	11	12					
Term of Technical Cooperation	JCC ▼																
Output 4 Technical information and advisory services as a trial are implemented systematically.																	
<p>4 Technical information and advisory services as a trial are implemented systematically.</p> <p>4-1 Grasp an appropriate perception of present situation of Thai plastic injection mold industry.</p> <p>4-1-1 Visit factory and meet factory personnel at BSID.</p> <p>4-1-2 Conduct factory questionnaire survey.</p> <p>4-1-3 Hold information sessions with industrial associations.</p> <p>4-2 Make plan of trial technical information and advisory services.</p> <p>4-2-1 Accept company's request for technical information and advisory services.</p> <p>-Revise questionnaire, if necessary.</p> <p>-Conduct questionnaire survey and produce analytical report.</p> <p>4-2-2 Make plan of trial technical information and advisory services..</p> <p>-Analyze questionnaire data and choose companies to be visited.</p> <p>-Make the appointment for the initial advisory meeting at BSID.</p> <p>4-3 Implement trial technical information and advisory services.</p> <p>4-3-1 Hold the initial advisory meeting at BSID.</p> <p>4-3-2 Visit factory as planned.</p> <p>4-3-3 Make factory visitation report.</p> <p>4-3-4 Visit any factory, if requested and make factory visitation report on each occasion.</p> <p>4-3 Monitor and evaluate trial technical information and advisory services.</p> <p>4-3-1 Revise the monitoring and evaluation questionnaire of factories visited, if necessary.</p> <p>4-3-2 Conduct questionnaire survey and produce analytical report.</p>																	
															CA, TPC CA, TPC CA, PM	JPC, LE, TC, CP JPC, LE, TC, CP JPC, LE, TPC, TC, CP	
															CA, PM CA, TPC CA, TPC	JPC, LE, TPC, TC, CP TPC, TC, CP, SP JPC, LE, TC LE	
															CA, LE, TPC, TC, CP TPC CA, PM	TC, CP LE, TC, CP	
															CA, TPC PM	JPC, LE, TC, CP TPC, TC, CP, SP	

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Calendar Year	2004												Responsible person in the Project(*)	Input (*)	Remarks
	JFY2003			TFY2004			JFY2004			TFY2005					
	1	2	3	4	5	6	7	8	9	10	11	12			
Term of Technical Cooperation															
Output 5 Trial prototyping service is implemented systematically.															
<p>5 Trail prototyping service is implemented systematically.</p> <p>5-1 Grasp an appropriate perception of present situation of That plastic injection mold industry.</p> <p>5-1-1 Visit factory and meet factory personnel at BSID.</p> <p>5-1-2 Conduct factory questionnaire survey.</p> <p>5-1-3 Hold information sessions with industrial associations.</p> <p>5-2 Make plan of trial prototyping service.</p> <p>5-2-1 Make plan of mold manufacturing service.</p> <p>5-2-2 Make plan of machine sharing service.</p> <p>5-2-3 Assign personnel to administrative work of trial prototyping service.</p> <p>5-2-4 Make plan of SIC Internal prototype mold</p> <p>5-3 Implement trial prototyping service.</p> <p>5-3-1 Notify information of trial prototyping service.</p> <p>5-3-2 Implement trial prototyping service.</p> <p>5-3-3 Design, process and assemble the SIC Internal Mold</p> <p>5-4 Monitor and evaluate trial prototyping service.</p> <p>5-4-1 Revise the monitoring and evaluation questionnaire, if necessary.</p> <p>5-4-2 Conduct questionnaire survey and produce analytical report.</p>															
<p>JCC</p> <p>End of Term</p>															
<p>CA, TPC</p> <p>CA, TPC</p> <p>CA, PM</p> <p>CA, PM</p> <p>PM</p> <p>PM</p> <p>CA, PM</p> <p>CA, PM</p> <p>CA, PM</p> <p>LE, TC</p> <p>CA, PM</p> <p>PM</p>															
<p>JPC, LE, TC, C/P</p> <p>JPC, LE, TC, C/P</p> <p>JPC, LE, TPC, TC, C/P</p> <p>JPC, LE, TPC, TC</p> <p>TPC, TC</p> <p>TPC, TC, C/P, SP</p> <p>JPC, LE, TPC, TC, C/P</p> <p>JPC, LE, TPC, TC, C/P, SP</p> <p>LE, TC, C/P, SP</p> <p>C/P</p> <p>JPC, LE, TPC, TC, C/P</p> <p>TPC, TC, C/P, SP</p>															

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Annex 20 Allocation of the C/P Allocation of the C/P

Name of C/P	1999			2000			2001			2002			2003			2004			Training in Japan Duration (month)	Training Field	Remarks	
	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7				10
Term of Technical Cooperation																						
Term of Technology Transfer																						
1 Administrative C/P																						
(1) Project Director (DG)																						
Dr. Damri Sukhotanong	Nov. 1																		(Transferred)			
Mr. Thamnu Vasinonta																						
Mrs. Sumonman Kalayasiri	Oct. 3																		(Retired)			
Mr. Supat Limpaporn																						
(2) Deputy Project Director (DDG)																						
Mr. Satit Sirirangkamonont	Nov. 1																		(Transferred)			
Mr. Plamode Vidtayasuk	Nov. 23																		(Take over duties)			
Mr. Virat Tандаеchanuat	Oct. 1																		(Retired)			
Mr. Prapat Vanapataksa																						
(3) Project Manager																						
Mr. Nuntapit Nakasarn	Nov. 1																		(Retired)			
Mr. Prapat Vanapataksa	Nov. 20																		(Promoted to DDG)	0.5	Project Management	
Mr. Sirichai Pothitapana	Oct. 1																		(Acting Manager)			
Mr. Saneh Nyomthai																						
(4) Project Coordinator																						
Dr. Pasu Loharjun	Nov. 1																					
Mr. Kittipat Panitaporn	Nov. 1																					
Mr. Panuwat Triyangkulsri	Nov. 1																					
Mr. Prakob Janma																						
(5) Technical Coordinator																						
Mr. Paiboon Tekapan	Nov. 1																					
Mr. Prakob Janma	Nov. 1																					
Mr. Worapong Chinchoksakulchai																						
Mr. Satta Denpradith																						
Mr. Sahas Chumsoongnoen																						

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Annex 20 Allocation of the C/P Allocation of the C/P

Name of C/P	1999			2000			2001			2002			2003			2004			Remarks	
	1	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7		10
2 Technical C/P																				
(1) Mold Design																				
Mr. Sompong Teeracanont			Nov. 1																	
Mr. Chanon Suktayu			Nov. 1																	
*1 Mr. Chairat Keawdoug (NC Programming)			Nov. 1																	
Mr. Paiboon Tekapan			Nov. 1																	
Mr. Worapong Chinchoksakulchai			Nov. 1																	
*1 Mr. Paisal Lhokaew			Nov. 1																	
(2) Mold Processing																				
Mr. Satta Denpradith			Nov. 1																	
Mr. Bantao Wongprachanukul			Nov. 1																	
Mr. Damlong Kratumkhetr			Nov. 1																	
Mr. Sirisak Ritngan			Nov. 1																	
(3) Assembling & Trial Shot																				
Mr. Prakob Jamma			Nov. 1																	
Mr. Sahas Chumsoongnoen			Nov. 1																	
Mr. Preecha Jantath			Nov. 1																	
Mr. Tikumporn Chinnarong			Nov. 1																	
*1 Mr. Pongsak Vongrasametoeng			Nov. 1																	
*1 Mr. Virit Viseshsindh			Nov. 1																	
*1 Mr. Paiboon Chaengsanon			Nov. 1																	
*1 Mr. Taweessit Buamee			Nov. 1																	

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Annex 20 Allocation of the C/P Allocation of the C/P

Name of C/P	1999		2000		2001		2002		2003		2004		Training in Japan		Remarks			
	4	7	10	1	4	7	10	1	4	7	10	1	4	7		10	1	Duration (month)
(4) Networking																		
Mr. Kijja Chongkwanuon (Mr. Worapong Chinchoksakulchai)																		
(5) Factory relation																		
Mr. Ummart Teerapongpipat																		
Mr. Chanchai Ungpinitpong																		

Note: \_\_\_\_\_ Allocated ..... Training in Japan  
 \*1: These C/P are given a status as the supporting staff.

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## Annex 21 Number of participant of meeting

## Weekly meeting

Year	No.	Date	Thai side	Japanese side	Secretary	Total
1999	1	Nov. 15	5	4	3	12
	2	Nov. 22	5	4	3	12
	3	Nov. 29	5	4	5	14
	4	Dec. 7	6	4	4	14
	5	Dec. 20	6	4	4	14
	6	Dec. 27	3	3	4	10
2000	1	Jan. 10	5	2	5	12
	2	Jan. 17	7	4	5	16
	3	Jan. 31	5	3	4	12
	4	Feb. 8	6	3	3	12
	5	Feb. 14	4	4	2	10
	6	Feb. 23	2	4	4	10
	7	Feb. 28	7	4	3	14
	8	Feb. 6	4	4	3	11
	9	Mar. 13	3	3	2	8
	10	Mar. 20	4	4	3	11
	11	Mar. 27	4	4	5	13
	12	Apr. 3	5	3	2	10
	13	Apr. 10	6	2	2	10
	14	May 1	5	4	3	12
	15	May 8	2	3	2	7
	16	May 22	3	5	2	10
	17	May 29	2	5	3	10
	18	Jun. 5	4	5	4	13
	19	Jun. 12	3	5	3	11
	20	Jun. 19	3	5	3	11
	21	Jun. 26	4	5	2	11
	22	Jul. 10	4	5	4	13
	23	Jul. 24	5	5	2	12
	24	Jul. 31	5	5	3	13
	25	Aug. 7	4	5	5	14
	26	Aug. 21	4	4	5	13
	27	Aug. 28	4	5	5	14
	28	Sep. 4	4	5	2	11
	29	Sep. 25	2	5	3	10
	30	Oct. 2	3	4	4	11
	31	Oct. 9	4	4	3	11
	32	Oct. 16	3	4	4	11
	33	Oct. 30	3	5	2	10
	34	Nov. 6	3	4	2	9
	35	Nov. 17	4	3	2	9
	36	Nov. 27	3	4	2	9
	37	Dec. 12	4	4	2	10
	38	Dec. 19	4	4	1	9
2001	1	Jan. 8	6	5	3	14
	2	Jan. 29	4	5	3	12
	3	Feb. 5	4	5	1	10
	4	Feb. 12	4	5	2	11
	5	Feb. 19	2	4	1	7
	6	Mar. 5	4	4	3	11
	7	Mar. 19	4	4	2	10

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## Weekly meeting

Year	No.	Date	Thai side	Japanese side	Secretary	Total
	8	Mar. 26	5	4	3	12
	9	Apr. 2	3	3	1	7
	10	Apr. 9	4	3	2	9
	11	Apr. 23	2	2	2	6
	12	Apr. 30	3	4	2	9
	13	May 14	5	5	2	12
	14	May 21	2	5	2	9
	15	May 28	3	4	2	9
	16	Jun. 4	2	5	1	8
	17	Jun. 11	5	5	1	11
	18	Jun. 18	5	3	2	10
	19	Jun. 25	5	5	1	11
	20	Jul. 2	2	4	1	7
	21	Jul. 10	3	4	1	8
	22	Jul. 23	4	4	1	9
	23	Jul. 30	3	2	1	6
	24	Aug. 6	3	3	2	8
	25	Aug. 13	3	5	2	10
	26	Aug. 20	3	5	2	10
	27	Sep. 3	6	4	2	12
	28	Sep. 10	3	5	2	10
	29	Sep. 17	6	5	2	13
	30	Oct. 1	5	5	2	12
	31	Oct. 8	3	4	1	8
	32	Oct. 15	3	4	2	9
	33	Oct. 29	4	6	2	12
	34	Nov. 5	5	6	2	13
	35	Nov. 19	5	6	2	13
	36	Nov. 26	3	5	2	10
	37	Dec. 3	8	5	2	15
	38	Dec. 17	5	5	2	12
	39	Dec. 24	3	4	2	9
2002	1	Jan. 7	6	5	2	13
	2	Jan. 21	4	5	2	11
	3	Jan. 28	5	4	2	11
	4	Feb. 11	4	4	1	9
	5	Mar. 4	5	4	1	10
	6	Mar. 25	5	5	2	12
	7	Apr. 1	5	5	2	12
	8	Apr. 22	3	5	2	10
	9	Apr. 30	5	5	1	11
	10	Jun. 24	4	4	2	10
	11	Jul. 1	2	5	2	9
	12	Jul. 8	2	5	1	8
	13	Aug. 5	3	5	2	10
	14	Aug. 19	4	6	2	12
	15	Sep. 2	5	6	1	12
	16	Oct. 21	4	2	2	8
	17	Nov. 25	3	4	1	8
	18	Dec. 2	5	4	2	11
2003	1	Mar. 31	4	4	4	12
	2	Dec. 11	1	1	2	4
	3	Dec. 16	3	7	10	10

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2004	1	Jan. 30	6	4	2	12
	2	Apr. 28	1	1	2	4
	3	May 28	17	5	4	26

Monthly meeting

Year	No.	Date	Thai side	Japanese side	Total
2000	1	Dec. 26	12	5	17
2001	1	Jan. 31	11	5	16
	2	Feb. 28	9	5	14
	3	Mar. 30	11	4	15
	4	Apr. 27	10	4	14
	5	May 31	8	5	13
	6	Jun. 29	11	4	15
	7	Jul. 27	10	4	14
	8	Aug. 31	9	5	14
	9	Sep. 28	11	5	16
	10	Oct. 31	12	5	17
	11	Nov. 30	9	5	14
	12	Dec. 26	9	5	14
2002	1	Jan. 31	12	5	17
	2	Feb. 28	10	5	15
	3	Mar. 29	11	5	16
	4	Apr. 30	9	5	14
	5	Jul. 9	8	4	12
	6	Aug. 29	9	5	14
	7	Sep. 27	10	5	15
	8	Oct. 31	15	6	21
2003	1	Jan. 21	17	8	25

JCC Meeting

Year	No.	Date	Thai side	Japanese side	Total
2000	1	Jun. 8	19	10	29
	2	Nov. 23	16	9	25
2001	3	Jun. 21	19	10	29
	4	Dec. 13	21	11	32
2002	5	Jul. 30	17	11	28
2003	6	Jan. 28	21	11	32
2003	7	Jul. 16	21	11	32
2003	8	Dec. 23	18	9	27

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Annex 22 Number of Publicity (Brochures, Periodicals, etc.)

PUBLICITY

No.	Subject	Delivery date	Total	Balance	Location
1	Brochures 1st version	September 2000	3,000	57	SIC Office
2	Suppliment	September 2000	3,000	49	SIC Office
3	Brochures 2st version	October 2001	3,000	49	SIC Office
4	SIC homepage	October 2001			<a href="http://www.smethai.net/sicproject">www.smethai.net/sicproject</a>

EXHIBITION

No.	Subject	Date	Participant	Brochure	Location
1	TIPF Mold and Die Thailand	October 26-29, 2000	20,253	2,000	BITEC Bangna
2	METALEX	October 8-11, 2001	>40,000	2,000	BITEC Bangna
3	TIPF Mold and Die Thailand	October 24-27, 2002	12,091	500	BITEC Bangna
4	Inter Plas & Inter Mold 2003	June 6-9, 2003	~36,000	100	BITEC Bangna

TELEVISION, REDIO, NEWSPAPER, PUBLISH

No.	Subject	Date	Location
1	Banner in Industrial Clinic	November 16, 2000	Television Channel 11
2	Television Broadcast	November 5, 2000	Television Channel 5, 11
3	Radio Interview Director-General of DIP and President of TDIA	November, 2000	FM 101
4	Technology for Plastic Mold Injection (Mr. Prapat & Dr. Ikeuchi)	November 18, 2002	Television Channel 11
5	Overview of Industry in Thailand (Dr. Jun Ikeuchi)	April-May, 2004	Newsletter of BSID the 1st year, the 1st Vol.

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Annex 24 Monitoring and Evaluation Sheet  
Field: Design—Group  
Expert in Charge: Mr. J. Ono

Subjects	Counter part					
	Mr.Paiboon	Mr.Warapong	Mr.Paisal	Mr.Chanon	Mr.Sompong	Mr.Preecha
1) Fundamentals of Mold Design						
Forming methods of plastics	4	4	3	4	4	?
Name and function of mold components	3	3	3	3	3	?
Runner and Gate basic configuration	3	3	3	4	4	?
Action Method of under cut part	3	3	3	3	3	?
Method of Ejector	3	3	3	4	4	?
Cooling system	3	3	3	4	4	?
2) CAD/CAE Operation						
Solid modeling	4	3	3	4	4	?
Parametric modeling	4	3	3	3	3	?
Making of molding requirement	3	3	3	3	3	?
Mold Design function	3	3	2	4	4	?
Mold Flow	3	3	*	3	3	?
3) Education						
Basic Mold Design Course	3	3	*	4	4	?
Basic CAD Course	4	4	3	4	4	2
Parametric CAD Course	4	4	*	3	3	?
C/MoldDesign Course	3	3	*	4	4	?
Experimental 3D Design Course (PenTray)	4	3	*	4	4	?
Experimental 3D Design Course (AlarmClock)	0	0	0	0	0	0
Experimental 3D Design Course (Telephone)	4	3	*	4	4	?

Level=0: Technology transfer is not started

- 1: Counterpart personnel can perform the job under experts' instruction.
- 2: Counterpart personnel can perform the job with experts' advice.
- 3: Counterpart personnel can perform the job by themselves.
- 4: Counterpart personnel can instruct others.

\*: It is not possible to evaluate because he hardly comes. Mr.Paisal became the supporting staff in October, 2003.  
?: Mr.Preecha just came to the design group in April, 2004, and does not evaluate.

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Evaluation Comments

1) Mr. Paiboon

He acted as a group leader including teaching to other people when Japanese expert was not in CAD room. CAD knowledge and his modeling ability are also very high.

His help as the interpreter at the technology transfer and to translate of the training materials is very useful for the project.

2) Mr. Warapong

He explains very well in the training course. . Character as the instructor is best.

Recently, he seems to be busy for the meeting of management. However, I want him to use more time to operate CAD.

3) Mr. Paisal

He has been to Japan for the CAD training . He has hardly come to the project after he had appointed the member of welding group. Therefore, the project made him to be supporting staff.

4) Mr. Chanon

He had hardly used CAD for three years.

However, he could understand 3D design and CAD operation fastest in the design group.

5) Mr. Sompong

He had hardly used CAD for three years.

He is a man who makes efforts. Always, he is training by himself.

6) Mr. Preecha

He has just transferred from the assembly group in April. He is studying Basic CAD, Modeling by using various drawings. I want him to continue the current effort to catch up another C/P ahead.



Samkh

Annex 24 Monitoring and Evaluation Sheet  
Field : Processing Group  
Expert in Charge: Mr.T.Yoshio

17-May-2004

Subject	Counter part			
	Mr.Satta CNC-M/C	Mr.Bantao CNC-M/C	Mr.Sirisak W-EDM	Mr.Damrong EDM
1) Fundamentals of Processing				
Cutting theory	4	4	4	4
Fundamentals of Machinery	4	4	4	4
Inspection and measurement	3.5	3.5	3.5	3.5
Planning and scheduling processing	3.5	3.5	3.5	3.5
Quality control	3.5	3.5	3.5	3.5
2) Operation and function of processing machinery				
Operation and function of conventional Machinery	4	4	4	4
Operation of NC Machinery	4	4	4	4
Operation of CNC Machinery	4	4	4	4
CAM/CNC operation and programming	3	4	4	4
CAD operation for processing	2	4	3	3
Machine maintenance	3.5	3.5	2	2
Tooling management	3	3.5	3.5	3.5
Measuring tool management	3.5	3	3	3.5
Measuring tool management	3.5	3.5	3.5	3.5
3) Education				
Fundamental processing lecture	4	4	4	4
Fundamental CNC programming lecture	4	4	4	4
Basic 3D CAM (Experience of 3D CAM)	1	4	4	4
Advanced CAM (Effective Technique on 3D CAD/CAM)	Unfinished	3.5	1	1
Electrode CAM (Making electrodes with 3D CAD/CAM)	Unfinished	Unfinished	Unfinished	Unfinished
	Unfinished	Unfinished	Unfinished	Unfinished

- Level=
- 0: Technology transfer is not started
  - 1: Counterpart personnel can perform the job under expert' instruction.
  - 2: Counterpart personnel can perform the job with experts' advice.
  - 3: Counterpart personnel can perform the job by themselves.
  - 4: Counterpart personnel can instruct others.

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Evolution Comments

1) Mr.Satta

He is the best lecturer in our counter part. He can manage the mood of his lecture well.  
His technique of using M/C is also excellent. He knows how he manage the accuracy by making full use of CNC functions.

2) Mr.Damrong

He takes in charge of EDM machine. His specialty is not only EDM but also good at using all conventional machines(Grinding/Lathe/Milling) very well.  
Especially he can do spontaneous experiment to find the best condition and solve some problem by himself.  
I hope him to continue that investigation.

3) Mr.Sirisak

He takes in charge of Wire-EDM machine and uses its control software well.  
He also has knowledge about CNC programming for CNC lathe.  
But we don't have CNC Lathe, so he can't exercise his ability.

4) Mr.Bantao

He is the key person of processing group.  
His skill and knowledge about processing are the best in processing group, especially using CAD/CAM system.  
Recently, almost every processing works in our project depend on his performance, so he always very busy. ..  
He want to study about CAD/CAM more detail but he have no time study.  
I hope him to teach the other counter part about CAD/CAM system.

Samle

Annex 24 Monitoring and Evaluation Sheet

Fi Assembling and Trial shot

Expert in charge N.Ishizaki

17-Jun.-2004

Subject		Specialty		Counter part	
		Mr.Prakob	Mr.Preecha	Mr.Sahas	Mr.Tikumporn
1) Fundamentals of Mold assembling and Trial shot					
Polishing	To understand the basic knowledge for Mold polishing		4	4	4
	To master the order to polish mold smoothly		4	4	4
Assembling	To understand the structure and the name of parts of mold		4	4	4
	To understand the assembling drawing of mold		4	4	4
I/J molding	To understand kinds and characteristics of molding materials		4	4	4
	To understand the structure and the various functions of injection molding machine and to master how to use it		4	4	4
Maintenance	To understand the attached equipment and master the usage		4	4	4
	To understand the maintenance and the management of mold		4	4	4
	To put ability of the checking mold and the repairing mold		4	4	4
2) Application skill of Mold assembling and Trial shot					
Polishing	How to polish the corner (R-part) and edge		4	4	4
	How to polish the mirror-polishing		4	4	4
Assembling	To master the assembling way for each different part		4	4	4
	To understand and to master the order of assembling mold		4	4	4
I/J molding	To understand the content of injecting trouble and the measure		3	4	4
	To master how to use the crane and how to set the mold		4	4	3
	To experience the operating the injection machine and the attached equipment and the way of the trial molding		4	4	4
Maintenance	To be able to take mold apart and assemble it easily		3	4	3
	To repair the mold by welding		4	4	4
3) Education			2	4	3
Polishing	Lecture and Exercise				
Assembling	Lecture and Exercise		4	4	4
I/J molding	Lecture and Exercise		4	4	4
Maintenance	Lecture and Exercise		3	4	4
Level = 1	C/P personnel can perform the job under expert' instruction .		Unfinished	Unfinished	Unfinished
3	C/P personnel can perform the job by themselves .		Unfinished	Unfinished	Unfinished
	2 C/P personnel can perform the job with experts' advice .		Unfinished	Unfinished	Unfinished
	4 C/P personnel can instruct others .		Unfinished	Unfinished	Unfinished

Saneh

Evolution Comment

Mr.Prakob

: He mainly manages the project in work-shop A . He is too busy to come doing operation .  
: He has mastered the fundamental skill, but not experience so much with the application skill .  
: He transferred to the design group from this work .

Mr.Preecha

: He is a leader in this group and has mastered whole skill and technology in mold assembling and trial shot field .  
: What he should do is to experience plastic injection molding .

Mr.Sahas

: He has transferred to this group since January in 2003 .

Mr.Tikumpon

: He is a quick learner and already mastered the fundamental skill . All he has to do is just to experience .



*Sameli*

Progress Record of Completed 『Target Mold』

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Countermeasure	Problem	Countermeasure	
<b>Pen tray</b>  <b>Purpose</b> 1. To master the basic structure of a two-plate vertical split mold 2. To learn about thickness and the basic shapes of rib and boss 3. To understand the importance of polishing the mold surface	<ul style="list-style-type: none"> <li>- Create ejector pin, sleeve</li> <li>- Cooling pipe, System</li> <li>- Sprue bush</li> <li>- Locate ring</li> <li>- Runner</li> <li>- Guide bushes, guide pins</li> </ul>	<ul style="list-style-type: none"> <li>- Ejector hole is big so that flash after Injection</li> <li>- Ejector plate cannot move because ejector guide and ejector bush to tilted</li> <li>- The hold of ejector pin was ellipse</li> </ul>	<ul style="list-style-type: none"> <li>- Did not repair</li> <li>- Machine to enlarge the hole</li> <li>- Change spring to be Stronger</li> </ul>	<ul style="list-style-type: none"> <li>- Burn</li> <li>- Bari was occurred near gate</li> </ul>	<ul style="list-style-type: none"> <li>- Enlarge gas vent</li> <li>- Repair the elliptic part by welding and finishing</li> </ul>	
<b>Mold Evaluation</b>	<ul style="list-style-type: none"> <li>- This mold was simple one that attached important to polish and there was no big problem .</li> <li>- The condition of polishing was about same level that was molded by using mold made in Japan.</li> </ul>					

*Samih*

Progress Record of Completed 『Target Mold』

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Countermeasure	Problem	Countermeasure	
<p>2 Front Case for Alarm Clock</p> <p><b>Purpose</b>                      1. To master the applicable structure of a two-plate vertical split mold and partial undercutting                      2. To learn fabrication of simple curve shapes and cutting</p>	<ul style="list-style-type: none"> <li>- Under Cut, Draft Angle</li> <li>- Parting surface</li> <li>- Mold base</li> <li>- Core pin</li> <li>- Slide</li> <li>- Runner gate</li> <li>- Positioning ejector pin, ejector sleeve, ejector guid pin/ejector guide base</li> <li>- Cooling pipe</li> <li>- Holding part screw</li> <li>- Mold weight</li> <li>- 2D Drawing</li> </ul>	<ul style="list-style-type: none"> <li>- Accuracy of processing the slide was bad</li> </ul>		<ul style="list-style-type: none"> <li>- Flash at slide</li> <li>- Weld line was occurred at the hold of the product</li> </ul>	<ul style="list-style-type: none"> <li>- Welded and machined again</li> <li>- Make ditches at gas vent of Oshikiri - pin</li> </ul>	
<b>Mold Evaluation</b>	<ul style="list-style-type: none"> <li>- This mold was side - gate type and was not special problem for shaping.</li> <li>- The side of this mold was under - cut by slide system that the core sided with an angular pin.</li> <li>- The work to put together the slide was not good.</li> </ul>					

*Sanek*





Progress Record of Completed [Target Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Countermeasure	Problem	Countermeasure	
<b>4</b> Upper case for Telephone  Purpose 1. To master the fabrication process of an exterior appearance oriented mold 2. To learn about improving core shape ( which - strongly core shape affects appearance), cavity insertion, polishing of glossy surfaces, and undercutting of core	- Positioning ejector pin, ejector sleeve	- Slide core mistook so that flashed after Injection	- Weld and machine again	- Slant core mistook so that flashed after Injection	- Welded and machined again	
	- Cooling System	- Short center pin (Standard parts) have a problem sink mark after injection	- Change	- Sink mark was occurred after injection due to short center pin	- Changed center pin again	
	- Ejector System			- Cooling system was leak	- Change size O-ring	
				- Runner unild not take off	- Repaired the part of under cut by removed polishes again	
				- topped hold of runner was under - cut	- Welded the part of the problem and finished again	
				- Bari occurred at pate of loose core		
<b>Mold Evaluation</b>	- It was the first experience for C/P to make a mold with loose - core and side ending cut system ( Oshikiri ). - Carcerning to the Oshikiri bari did not occur					

*Santh*

Progress Record of Completed [Target Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Countermeasure	Problem	Countermeasure	
5 Camera Body	<ul style="list-style-type: none"> <li>- Check the import model data</li> <li>- Positioning the ejector pins</li> <li>- Pocketing &amp; cutter making</li> <li>- Slide core making</li> <li>- Cooling system</li> <li>- Sprit core &amp; cavity</li> </ul>	<ul style="list-style-type: none"> <li>- Some Insert core diagonally opposite</li> <li>- Tap was tilt</li> <li>- The accuracy of processing is low</li> <li>- The accuracy of position of ejector pin is bad</li> </ul>	<ul style="list-style-type: none"> <li>- Enlarge insert to be bigger</li> <li>- Change size Insert core again</li> <li>- New Tap</li> <li>- Modified the position by machining</li> </ul>	<ul style="list-style-type: none"> <li>- Piece is flash because Insert Slide mistook</li> <li>- Ejecter plate don't to move if C</li> <li>- temperature &gt;= 60</li> <li>- Bari occurred at the part to put together</li> </ul>	<ul style="list-style-type: none"> <li>- Weld and machined again</li> <li>- Enlarge ejecter pin to be bigger</li> <li>- Change spring to be stronger</li> <li>- Welding and re-polishing</li> </ul>	
Mold Evaluation	<ul style="list-style-type: none"> <li>- This mold was a good sample for processing ( M/C, EDM and W - EDM ) and finishing process.</li> <li>- Because it in the mold that should machine precisely and put together carefully.</li> <li>- There occurred various problem in the first trial.</li> <li>- It was completed after the third trial.</li> </ul>					

*Sanku*

Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Problem	Countermeasure	Problem	Countermeasure	Problem	Countermeasure
6 Name card case	-A little Draft angle because	- Did not repair			- White mark after injection because Embose too rough	- Did not repair
	Embose too rough skin				skin and little draft angle	
	<b>Important Points to Learn</b>					
	- Design					
	- Auto CAD 2D					
	- Runner Gate					
	- Locate Ring					
	- Stripper Plate & Ejector pin					
<b>Mold Evaluation</b>		- This mold was the first prototyping mold. - Production design was also designed by C/P. after the first trial C/P changed design insert. - It took time much until completing - However it was good experience for C/P.				

*Samuel*

Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Countermeasure	Problem	Countermeasure	
7 Name card body	<ul style="list-style-type: none"> <li>- Design</li> <li>- Auto CAD 2D</li> <li>- Runner Gate</li> <li>- Locate Ring</li> <li>- Stripper Plate &amp; Ejector pin</li> </ul>	<ul style="list-style-type: none"> <li>- Thic of piece don't regularly</li> </ul>	<ul style="list-style-type: none"> <li>- Change core insert</li> </ul>	<ul style="list-style-type: none"> <li>- Small unable to put business card</li> </ul>	<ul style="list-style-type: none"> <li>- Change Mold and Insert</li> </ul>	
Mold Evaluation	<ul style="list-style-type: none"> <li>- This mold was the first prototyping mold.</li> <li>- Production design was also designed by C/P. after the first trial C/P changed design insert.</li> <li>- Is took time much until completing</li> <li>- However it was good experience for C/P.</li> </ul>					

Sanele >

Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Problem	Countermeasure	Problem	Countermeasure	Problem	Countermeasure
Medicine box	- A little parting lock	- Change parting lock to be bigger	- Big stripper plate flash	- Machined new material	- Traus parency was bad	- Polished again
	- unable to draw stripper runner	- Supplement roller lock	- after injection			
	- plate					
	- have no roller lock between core plate and stripper plate					
	<b>Important Points to Learn</b>					
	- Using stripper ejector system					
	- Cooling system					
<b>Mold Evaluation</b>	- This mold was the third prototyping mold. - The way of removing the product was stripper - type. - The structure of the mold was not difficult , but it spent much time to polish whole surface of the box and ribs.					

Sanuk 20

Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Problem	Countermeasure	Problem	Countermeasure	Problem	Countermeasure
9 Multi-Usage	- Screw position at core side diagonally opposite (off-set) 1mm	- Change point	- Miss the position of ejector hold	- Adjust the position (enlarge ejector hold)	- None	- None
	<b>Important Points to Learn</b> - Using ejector pin system - Cooling system					
Mold Evaluation	- This mold was one for polishing technical training course. - Mold - base is set in the 20 ton injection machine and then cavity and core part could remove and change independently. - Therefore, the various type of sample to polish can use by changing the cavity and core. - There was no problem in making mold					

Santh

Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Countermeasure	Problem	Countermeasure	
10 CD Case 1 (Case)	<ul style="list-style-type: none"> <li>- Under Cut, Draft Angle</li> <li>- Parting Surface</li> <li>- Mold Base Insert</li> <li>- Loose Core, Core Insert</li> <li>- Working Rail &amp; Support Plate</li> <li>- Runner Gate</li> <li>- Positioning Sleeve</li> <li>- Positioning the Ejector pin</li> <li>- Cooling Pipe</li> <li>- Holding Part Screw</li> <li>- Mold Weight</li> <li>- 2D Part List</li> </ul>	<ul style="list-style-type: none"> <li>- Interference tool holder and broke the part (Core insert)</li> </ul>	<ul style="list-style-type: none"> <li>- Welding and re-machining</li> </ul>			
Mold Evaluation						

Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Important Points to Learn	Problem	Problem	Countermeasure	Problem	Countermeasure
11 CD Case2 (Holder)	<ul style="list-style-type: none"> <li>- Under Cut, Draft Angle</li> <li>- Parting Surface</li> <li>- Mold Base Insert</li> <li>- Loose Core , Core Insert</li> <li>- Working Rail &amp; Support Plate</li> <li>- Runner Gate</li> <li>- Positioning Sleeve</li> <li>- Positioning the Ejector pin</li> <li>- Cooling Pipe</li> <li>- Holding Part Screw</li> <li>- Mold Weight</li> <li>- 2D Part List</li> </ul>					
Mold Evaluation						

*Santhi*



Progress Record of Completed [Internal Prototyping Mold]

Name of Mold	Design		Processing		Ass'y & Trial shot	
	Problem	Problem	Problem	Countermeasure	Problem	Countermeasure
12 CD Case 3 (Opener)	<ul style="list-style-type: none"> <li>- Under Cut, Draft Angle</li> <li>- Parting Surface</li> <li>- Mold Base Insert</li> <li>- Loose Core, Core Insert</li> <li>- Working Rail &amp; Support Plate</li> <li>- Runner Gate</li> <li>- Positioning Sleeve</li> <li>- Positioning the Ejector pin</li> <li>- Cooling Pipe</li> <li>- Holding Part Screw</li> <li>- Mold Weight</li> <li>- 2D Part List</li> </ul>					
Mold Evaluation						

Sanuki

Annex 26 List of Manuals, Textbooks and Materials Prepare by Japanese Experts

No.	Subject	Qty.	Remark	Place
1	(7) Under cut	1	Lecture for C/P, Pilot training course	Design Room
2	B Forming Methods	1	Lecture for C/P, Pilot training course	Design Room
3	Calculation of vending	1	Lecture for C/P, Pilot training course	Design Room
4	Content	1	Lecture for C/P, Pilot training course	Design Room
5	Design Standards	1	Lecture for C/P, Pilot training course	Design Room
6	Fundamental of steel for mold	1	Lecture for C/P, Pilot training course	Design Room
7	Mold specification sheet	1	Lecture for C/P, Pilot training course	Design Room
8	Mold specification sheet 2	1	Lecture for C/P, Pilot training course	Design Room
9	Name and fuction of components	1	Lecture for C/P, Pilot training course	Design Room
10	Name and fuction of molded products	1	Lecture for C/P, Pilot training course	Design Room
11	Oiwa 0-0.1-(5)-A-(B) revised	1	Lecture for C/P, Pilot training course	Design Room
12	Oiwa 0-0.1-(5)-A-(A) revised	1	Lecture for C/P, Pilot training course	Design Room
13	The heat-exchange system	1	Lecture for C/P, Pilot training course	Design Room
14	(1) Primary injection mold & what is a mold	1	Lecture for C/P, Pilot training course	Design Room
15	A types and characteristics	1	Lecture for C/P, Pilot training course	Design Room
16	Calutation formula for mold	1	Lecture for C/P, Pilot training course	Design Room
17	Design of molded product	1	Lecture for C/P, Pilot training course	Design Room
18	Dimensional accuracy	1	Lecture for C/P, Pilot training course	Design Room
19	Injection Mold design format	1	Lecture for C/P, Pilot training course	Design Room
20	Name and fuction of mold elements	1	Lecture for C/P, Pilot training course	Design Room
21	Plastic Injection Mold	1	Lecture for C/P, Pilot training course	Design Room
22	EGG	1	Lecture for C/P, Pilot training course	Design Room
23	FIG1 Compressing Forming	1	Lecture for C/P, Pilot training course	Design Room
24	FIG2 Transfer Forming	1	Lecture for C/P, Pilot training course	Design Room
25	FIG3 Injection Molding	1	Lecture for C/P, Pilot training course	Design Room
26	FIG4 Hollow Molding	1	Lecture for C/P, Pilot training course	Design Room
27	FIG5 Injection Hollow Molding	1	Lecture for C/P, Pilot training course	Design Room
28	FIG6 Extrusion Molding	1	Lecture for C/P, Pilot training course	Design Room
29	FIG6 Thermo Forming	1	Lecture for C/P, Pilot training course	Design Room
30	Chocolate	1	Lecture for C/P, Pilot training course	Design Room
<b>Animation</b>				
31	2 Plate Indined core	1	Lecture for C/P, Pilot training course	Design Room
32	2 Plate Type P	1	Lecture for C/P, Pilot training course	Design Room
33	2 Plate Type side gate	1	Lecture for C/P, Pilot training course	Design Room
34	2 Plate Submarine	1	Lecture for C/P, Pilot training course	Design Room
35	2 Plate type EP sleeve	1	Lecture for C/P, Pilot training course	Design Room
36	2 Plate Type stripper plate	1	Lecture for C/P, Pilot training course	Design Room
37	3 Plate Type	1	Lecture for C/P, Pilot training course	Design Room
38	Movable side slide block	1	Lecture for C/P, Pilot training course	Design Room
39	Hot runner	1	Lecture for C/P, Pilot training course	Design Room
40	Stationary side slide black	1	Lecture for C/P, Pilot training course	Design Room
<b>Assembling and Trail shot</b>				
<b>Fudamentals of Plastic injection molding</b>				
41	0-0.1-(5)-a-(a) (1) Outline of Plastic injection molding	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	(2) Outline of injection molding machine			
42	0-0.1-(5)-a-(b) (3) Outline of Injection molding machine	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
43	0-0.4-(2)-a-(a)(b)( (4) Main factors of Plastic injectin molding	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
44	0-0.4-(2)-b-(a)(b)( (5) Mainly imprtant principles of Plastic injectin moldi	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
<b>Fundamental of Polishing, Finishing, Assembling</b>				
45	3-3.1-(1)(2)(3)-1 Fundamentals of Finishing	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
46	3-3.1-(1)(2)(3)-2 Finishing procedure	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
47	3-3.1-(1)(2)(3)-3 Finishing application	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
48	3-3.2-(1) Mold assembling - Assembling of Pen tray mold	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
49	3-3.2-(1) Mold assembling - Disassemble of Pen tray mold	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
50	3-3.2-(1) Mold assembling - Finishing of Pen tray mold	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
51	3-3.2-(1) Mold assembling - Polishing of Pen tray mold	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
52	3-3.2-(1)-a.b Mold assembling 1. General	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
53	3-3.2-(1)-a.b Mold assembling 2. Each mold parts	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
54	3-3.2-(1)-a.b Mold assembling 3. Contacting of Parting surface	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
<b>Basic knowledge for Plastic injection molding</b>				
55	3-3.2-(2)-a-(a) (1) Function of Injection molding machine	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	Function of Mold clamping unit			
	Function of Ejection unit			
56	3-3.2-(2)-b (2) Function of Injection molding machine	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	Function of Injection unit			
	How to clean Plasticizing cylinder			

Sanche

Annex 26 List of Manuals, Textbooks and Materials Prepare by Japanese Experts

No.	Subject	Qty.	Remark	Place
57	3-3.2-(2)-c (3) Preparation of Plastic material resin for Molding Kinds of Material dryer General of Material drying condition	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
58	3-3.2-(2)-d (4) Calculating and Setting parameters of each Mold. Conditions Kinds of necessary parameters Calculation of each parameters Setting of each parameters	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
59	3-3.2-(2)-e-2 (6) Mold temperature device Kinds of Mold temperature devices Function and meaning of Mold temperature	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
60	3-3.3-(1) (7) Preparation of Injection molding Confirm about Mold Confirm about Molding product Confirm about Molding machine	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	(8) Confirm about Molding conditions Confirm about each molding condition parameter Setting to the other Molding machine conditions	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
61	3-3.3-(8) Mold evaluation General 1 Processing evaluation 2 Function evaluation 3 Final evaluation	1 1 1	Lecture for C/P for A & T, Pilot training cc Lecture for C/P for A & T, Pilot training cc Lecture for C/P for A & T, Pilot training cc	Assembling Room Assembling Room Assembling Room
62	3-3.3-(8)-2 Confirmation of Mold specification The chart of Mold specification	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
63	3-3.3-(9)-1-a.b.c Molding products evaluation	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
64	3-3.3-(9)-2 (10) Molding defects & Trouble shooting The chart of Molding product defect	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
65	3-3.3-(9)-3 (11) Counterplan for Molding product defect The chart of Counterplan for Molding product defect	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
66	3-3.6-(1)(2)(3)-1 Molding machine - Maintenance & Inspection	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
67	3-3.6-(1)(2)(3)-2 Molding machine Table for Maintenance & Instruction procedure	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	<b>Application Knowledge for Plastic injection molding</b>			
68	Application - Molding Filling process in the injection molding	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
69	Kind of material for plastic injection mold	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	<b>List of Text by Short term expert (Asahi seiki Kougyou Co.,Ltd)</b>			
70	Polishing basic manual	1	Lecture for C/P for A & T, Pilot training cc	Assembling Room
	<b>Manual for Equipment</b>			
71	NISSEI, Molding machine	1	Instruction manual for A & T	Assembling Room
72	MATSUI, Mold temperature control system	1	Operation instruction for A & T	Assembling Room
73	KANNETSU, Water less system	1	Instruction manual for A & T	Assembling Room
74	Japan techo industry, YOZO Welding system	1	Operation instruction for A & T	Assembling Room
75	MINITOR, Polishing equipment	1	Instruction manual for A & T	Assembling Room
	<b>Processing</b>			
76	Text (11/99-5/00) Machining	1	Lecture for C/P for Processing	Processing Room
77	Reference Processing	1	References for Text	Processing Room
78	Reference Lathe Machine	1	References for Text & First Lecture for C/P	Processing Room
79	Reference NC Processing Flipping Curriculum TGI Curriculum Die Casting (Vocabulary)	1	References for Text	Processing Room
80	Reference Processing References Production Control Daido Steel 5S	1 1	Machine Team Manual References for Text	Processing Room Processing Room
81	Reference Processing	1	References (provided by JICA)	Processing Room
82	Text for First lecture	1	Text for lecture	Processing Room
83	Original Text, Curriculum & Questionnaire	1	Text for lecture	Processing Room
84	Original Text	1	Text for lecture	Processing Room
85	EDM W/DEM Text	1	Lecture by Short-term Expert	Processing Room
86	Design & Processing, Hand-on Training	1	Original IK	Processing Room
87	Text for Second Lecture	1	Text for lecture	Processing Room
88	Plastic Mold Quality standard and Global Market November 30, 2000	1	Lecture text for Pilot Training course	Processing Room
89	Pilot training course & Participant Questionnaire	1	Lecture text for Pilot Training course	Processing Room

Sanche



Annex 27 List of Manuals, Textbooks and Materials Developed by Thai C/Ps

No.	Subject	Qty.	Remark	Place
	2 <sup>nd</sup> training course			
1	Mold design			
	Process Plastic Industrial Process			
	Plastic Materials	1	Lecture for C/P, Pilot training course	Design Room
	Type of Mold and Parts	1	Lecture for C/P, Pilot training course	Design Room
	Insert Materials	1	Lecture for C/P, Pilot training course	Design Room
	Product Design	1	Lecture for C/P, Pilot training course	Design Room
	Runner and Gate	1	Lecture for C/P, Pilot training course	Design Room
	Ejector System	1	Lecture for C/P, Pilot training course	Design Room
	Cooling System	1	Lecture for C/P, Pilot training course	Design Room
	Defect and Resolution	1	Lecture for C/P, Pilot training course	Design Room
2	Mold Processing			
	Planning for Mold and Die	1	Lecture for C/P, Pilot training course	Processing Room
	Processing Machines	1	Lecture for C/P, Pilot training course	Processing Room
	Cutting Condition	1	Lecture for C/P, Pilot training course	Processing Room
	Cutting Condition Formula	1	Lecture for C/P, Pilot training course	Processing Room
	Measurement	1	Lecture for C/P, Pilot training course	Processing Room
	NC Program	1	Lecture for C/P, Pilot training course	Processing Room
	CNC Milling Operation	1	Operation for C/P, Pilot training course	Processing Room
	EDM Sinking Operation	1	Operation for C/P, Pilot training course	Processing Room
	W/EDM Cutting Operation	1	Operation for C/P, Pilot training course	Processing Room
3	Assembly & Trail Shot			
	Fundamentals of Finishing	1	Lecture for C/P, Pilot training course	Assembling Room
	Finishing Procedure	1	Lecture for C/P, Pilot training course	Assembling Room
	Finishing Application	1	Lecture for C/P, Pilot training course	Assembling Room
	Mold Assemble, Assembling of Pen Tray Mold	1	Lecture for C/P, Pilot training course	Assembling Room
	Mold Assemble, Finishing of Pen Tray Mold	1	Lecture for C/P, Pilot training course	Assembling Room
	Mold Assemble, Polishing of Pen Tray Mold	1	Lecture for C/P, Pilot training course	Assembling Room
	Mold Assembling, Pen Tray Disassy	1	Lecture for C/P, Pilot training course	Assembling Room
	Assembling and Polishing Operation	1	Operation for C/P, Pilot training course	Assembling Room
	Injection Molding	1	Operation for C/P, Pilot training course	Assembling Room
	3 <sup>rd</sup> training course			
	Basic of CAD/CUES	1	Lecture for C/P, Pilot training course	Design Room
	Drafting	1	Lecture for C/P, Pilot training course	Design Room
	Surface modeling	1	Lecture for C/P, Pilot training course	Design Room
	Solid modeling	1	Lecture for C/P, Pilot training course	Design Room
	4 <sup>th</sup> training course			
1	Mold Processing			
	Die making Process in the age of CNC Machining	1	Lecture for C/P, Pilot training course	Processing Room
	Electro Processing	1	Lecture for C/P, Pilot training course	Processing Room
	Metal Material	1	Lecture for C/P, Pilot training course	Processing Room
	Measurement	1	Lecture for C/P, Pilot training course	Processing Room
	Face Milling Cutter	1	Lecture for C/P, Pilot training course	Processing Room
	Machine controll by CNC system	1	Lecture for C/P, Pilot training course	Processing Room
	Machining center	1	Operation for C/P, Pilot training course	Processing Room
	EDM	1	Operation for C/P, Pilot training course	Processing Room
	Wire cut EDM	1	Operation for C/P, Pilot training course	Processing Room
2	Mold Assembly			
	Fundamentals of Plastic Injection Molding	1	Lecture for C/P, Pilot training course	Assembling Room
	Injection Molding system	1	Lecture for C/P, Pilot training course	Assembling Room
	Basic Knowledge for Plastic Injection Molding	1	Lecture for C/P, Pilot training course	Assembling Room
	Component for Plastic injection	1	Lecture for C/P, Pilot training course	Assembling Room
	Principles for Plastic injection	1	Lecture for C/P, Pilot training course	Assembling Room
	Duty of Plastic Injector	1	Lecture for C/P, Pilot training course	Assembling Room
	Coat Plastic for Plastic injection	1	Lecture for C/P, Pilot training course	Assembling Room
	Calculate and set the condition for Plastic injection	1	Lecture for C/P, Pilot training course	Assembling Room
	Temperature controll equipment of Mold	1	Lecture for C/P, Pilot training course	Assembling Room
	Prepare before injection	1	Lecture for C/P, Pilot training course	Assembling Room
	Check inject condition	1	Lecture for C/P, Pilot training course	Assembling Room
	Mold Assembly of parts	1	Operation for C/P, Pilot training course	Assembling Room
	Fundamentals of Finishing	1	Operation for C/P, Pilot training course	Assembling Room
3	MOLD DESIGN			
	Forming method of plastic	1	Lecture for C/P, Pilot training course	Design Room
	Plastic materials	1	Lecture for C/P, Pilot training course	Design Room
	Knowledge for made and Plastic injection	1	Lecture for C/P, Pilot training course	Design Room
	Material for Molding (Steel)	1	Lecture for C/P, Pilot training course	Design Room
	Runner system	1	Lecture for C/P, Pilot training course	Design Room
	Runnerless Mold	1	Lecture for C/P, Pilot training course	Design Room
	Type of gate	1	Lecture for C/P, Pilot training course	Design Room
	Ejection of the Product	1	Lecture for C/P, Pilot training course	Design Room
	Product Having an External undercut	1	Lecture for C/P, Pilot training course	Design Room
	Plastic Ejection Plastic flow	1	Lecture for C/P, Pilot training course	Design Room
	Principle of design for Plastic injection	1	Lecture for C/P, Pilot training course	Design Room
	Pasting Line and Mold Facing	1	Lecture for C/P, Pilot training course	Design Room
	Dimension and deformation Mold	1	Lecture for C/P, Pilot training course	Design Room
	Problem and solution	1	Lecture for C/P, Pilot training course	Design Room

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## Annex 28-1 Record of Technical Trainings and Seminars Conducted by the Project

### Technical Training Course

Training and seminar are considered as the major activities of the project. At first, BSID's staff or counterparts have been divided into 3 groups based on technological areas namely Mold Design, Mold Processing, and Assembly & Trial Shot. Each group has then obtained technology transfer from both long-term and short-term dispatched experts, and also joined the OJT courses in Japan, each of which lasted for an average of 3 months (see Annex 28-2 for more details). After gaining a great deal of knowledge and experiences, the counterparts have attempted to deliver these 3 fields of technology mentioned earlier to the personnel working in mold and die industry, with an assistance of dispatched experts. The pilot training courses comprising of Basic Knowledge of Mold Design, Basic Mold Processing, and Basic Mold Assembling & Trial Shot were established since June 2001. However, these three courses emphasized mostly on theories, and therefore two more practical courses including Mold Processing and Assembly & Trial Shot were added in early 2002. The Basic CAD course, using CADCEUS V6.2F to support computerized mold design and drawing, and the Basic Mold Polishing course were also introduced later on. Thus, by the end of 2002, there were totally 7 courses. In 2003, the basic curricula were additionally developed, and so some other courses employing more advance equipment were created. These include Basic 3D CAM and how to use Machining Center, EDM and Wirecut EDM for Mold Processing. As for Mold Design group, there were Parametric CAD and 3D Mold Design, while Assembly & Trial Shot group introduced Plastic Injection course. At least 15 courses in total were targeted.

The pilot training courses established in 2001 were arranged 4 times with 50 trainees in total. In addition, the counterparts conducted the training totally 13 times with 226 trainees in 2002, and totally 12 times with 90 trainees in 2003.

For the second half of the year 2003 (July to December), 7 training curriculum were provided to the industry, as shown in the table below. They were intended for technicians and engineers who worked in factories less than 2 years of experience in respective skills.



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Course	Duration	Participants
1. 3 D Mold design	July 28 - August 1, 2003	13 persons
2. Parametric CAD	September 1 – 4, 2003	10 persons
3. Basic CAD	October 13 - 16, 2003	5 persons
4. Plastic injection	November 4 – 7, 2003	10 persons
5. Basic CAM	November 6 – 7, 2003	2 persons
6. Basic CAM	December 2 – 4, 2003	4 persons
7. Mold processing	December 15 – 19, 2003	12 persons

For 3D Mold Design course, 76.92% of the participants have had experiences in mold designing and most of them (11 out of 13) got bachelor degree or above. They agree that the course subject is suitable and up to date (score 4.08/5.00, 5 = exceptionally good). The instructors teach fairly well (score ranged from 3.85 - 3.97/5.00). However, they suggest that the instructors should explain more in details on hard topics. They said they could use the knowledge and techniques learned in class to transfer to their colleagues at their companies.

For Parametric CAD, the score of the course subject is 3.83/5.00 and the score for the instructors range from 4.17 to 4.22 out of 5.00. Some of the comment are:

- These should be a manual or hand out for the trainees in order to understand the subject better.
- The technique learned in class can be adapted to my work and very useful for both 2D and 3D designing.
- The techniques can reduce the design time.

For Basic CAD, the score of the course subject is quite high (4.50), as well as the score for the instructors, ranged from 4.27 to 4.63. The trainees agree that the course is good and the knowledge can be adapted to their works.

For plastic injection course, 66.67% of the trainees have had experiences on plastic injection. The score of the course subject is 4.44/5.00 and the score for the instructors ranges from 3.85 to 4.42. Some of the comments are:

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- In theory part, there should be video or pictures as examples to make the section more interesting.
- Comparing the time spent and the knowledge received, this course is very useful. This (plastic injection) is one of the best choices to start up a company.

For Basic CAM, the score of the course subject is 4.16/5.00 and the score for the instructors ranges from 4.11 - 4.33. As we can see from the scores; people like this course. However, they think that the time is too short to comprehend the use of the machine.

In 2004, the final year of the project, two more courses were developed, and therefore there were totally 17 courses. Nine courses have already been carried out during January - May 2004, and there were totally 157 trainees. The remaining ones are Basic 3D CAM, Advance CAM, Electrode CAM and Maintenance. Please see Annex 28-2 for more details.





No.	Course	Duration	Participant
	Pilot Training Course		
	2001		
1	Basic of Mold Design	June 10 -July 1, 2001	15 persons
2	Basic of Mold Processing	June 11 -July 2, 2001	10 persons
3	Basic of Mold Assembling and Trial Shot	June 13 -July 5, 2001	15 persons
	2002		
4	Basic of Mold Design	June 10 -July 1, 2002	28 persons
5	Basic of Mold Processing	June 11 -July 3, 2002	24 persons
6	Basic of Mold Assembling and Trial Shot	June 13 -July 5, 2002	26 persons
7	Basic CAD	October 15 -18, 2002	10 persons
		October 21-22, 2002	
8	Basic of Mold Design	December 11-13, 2002	14 persons
9	Basic CAD	December 16-20, 2002	14 persons
10	Basic of Mold Processing	December 11-20, 2002	9 persons
11	Basic of Mold Polishing	December 11-20, 2002	10 persons
	2003		
12	Basic CAD	March 18-21, 2003	7 persons, C/P 4
13	Basic CAD	April 1-4, 2003	4 persons
14	Basic of Mold Assembling	May 27-30, 2003	5 persons
15	Basic of Mold Processing	June 16-20, 2003	9 persons
16	3 D Mold design	July 28 - August 1, 2003	13 persons
17	Parametric CAD	September 1-4, 2003	10 persons
18	Basic CAD	October 13 - 16, 2003	5 persons
19	Plastic Injection	November 4-7, 2003	10 persons
20	Basic CAM	November 6-7, 2003	2 persons
21	Basic CAM	December 2-4, 2003	4 persons
22	Mold Processing	December 15-19, 2003	12 persons
	2004		
23	Parametric	February 3-6, 2004	8 persons
24	Mold Design	February 23-27, 2004	11 persons
25	Experiment 3D	March 15-19, 2004	5 persons
26	Mold Processing	March 25-31, 2004	7 persons
27	Trial Shot/NISSEI 700 FN(360ton)	March 25-31, 2004	60 persons
28	Basic Knowledge of Mold Design	April 27-30, 2004	11 persons
29	Polishing	April 26-30, 2004	11 persons
30	Fundamental CNC Seminar	May 11-14, 2004	30 persons
31	Plastic Injection	May 20-28, 2004	14 persons
	Executive Seminar		
1	Plastic Mold Quality Standard and Golbal Market	November 30, 2000	
2	- What it takes to become a leading Mold manufacturing company - Current situation of Plastic Injection Mold manufacturing in China	November 1, 2001	130 persons
3	- Recent Situation of Mold Industry and Technical Trends from the Standpoint of the Global View - Problems Expectation of Thai Mold Industry from the View of Automotive Industry	November 5, 2002	116 persons
4	- Introduction of 3D Mold Design - Current Situation, Applications and Future Trends of High Speed Milling Technologies	November 20, 2003	110 persons

## Annex 29-1 Progress of Technical Information and Advisory Services Conducted by the Project

In 2002, SIC Project aimed at providing advisory services to 19 firms, 10 firms applied for services through Thai Die and Mold Industries Association (TDIA) and 9 firms applied directly to BSID. Most of them were plastic injection mold makers for electrical/electronics parts, auto-part makers, cosmetic-container manufacturers. From January to May, 12 firms had been visited. From June to December, 2002, Japanese experts and Thai staff had already accomplished the mission as requested from 14 firms and had visited academic institutions as well as governmental office, totally 26 firms which is more than expected.

The tasks that had already done can be concluded as follows

1. Improvement in manufacturing management to reduce delivery time
2. Selections of materials making mold parts such as core, cavity, etc. and method to use insert materials
3. Polishing techniques and mold maintenance
4. Injection Techniques with various kinds of plastic such as ABS, PS, etc.
5. Defects analysis and elimination occurring in manufacturing process such as flashing, scratching, bending, weld line, etc.
6. Consultancy and advisory services in operating CNC, CNC profile grinding machine, etc.

Japanese experts have visited Vocational Institution and industry in Nakorn- Ratchasrima to evaluate the possibility of expanding project's activities and building up technical networks in this area, utilizing existing equipment and facilities efficiently.

Since July 2003, the SIC advisory unit has served the industry for 26 times. Examples of the companies and academic institutes that obtained the advisory services are:

- Institute of Skill Development
- Sarayuth Machine Work Co.,Ltd.
- Triumph Engineering Co.,Ltd.
- MCI Mold Co.,Ltd.
- Microtek Products Co.,Ltd.
- Rajamangala Institute of Technology

- Daisin Co.,Ltd.
- Surin Technical College
- Siam Nissan Karnchanaburi Co.,Ltd.
- and many more.

The services emphasize on giving advises on plastic injection techniques, mold and part machining, mold and die maintenance which can be summarized as follows:

1. To improve and modify the plastic injection conditions to get consistent quality products.
2. To maintain and fix mold and die.
3. To improve and fix equipment and machinery producing molds and dies.
4. To solve the problems encountered in making gears to remedy abnormal sound and non – alignment of gears after using them.
5. To give advice a how to operate CNC machines, grinding machines and how to do programming and G-code writing.
6. To control mold and die manufacturing process and machining process of machinery parts to make high quality products.

The next page is the complete example of our advisory service.

*Date:* August 1, 2003

*Time:* 10.45 – 12.30 AM.

*Company:* Wuttiwan Co.,Ltd.

*Address:* 225 M.1 Mitrtaphab rd., Banphai, Khonkan 40110

*Tel:* 0-4327-4227-8

*Type of Business:* producing plastic injection mold

*Machines:* Injection molding machine (50 tons, 80 tons), Milling machine, Lathe machine,  
Grinding machine, Injection machine, Drilling machine

*Overview of the problems:*

All the machines are quite old and small. None of them use CNC in controlling linear scale. The technicians have a small amount of knowledge in using the machines.

*Problem and Solve:*



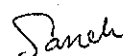
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1. In manufacturing multiple core – cavity in one piece, the parts are not identical  
Solve : Reference point is not exact, must fix to 1 point
2. Air bent is incorrect and not enough  
Solve : The air bent must be in linear shape with 10 µm deep and use cutter in making it
3. The iron made core – cavity is strong enough, corroded after a long use.  
Solve : Use Iron stainless grade M 300 or other kind of Iron (grade M 238, M 202)
4. Spinning rate and cutting speed are not suitable to the work.  
Solve : Use formulas in calculating feeding rate, cutting speed, and so on.
5. Machines give high allowance, not in linear scale.  
Solve : Must check the setting of the machine and use the machine with low allowance when producing high precision parts.

So far, the advisory service has been provided to 87 clients which are the mould-making manufacturer and academic institutes - 17 clients have been served this year from January 2004 to May 2004. As the target point of the service is 20-client a year, the output of this year, therefore, could be possible to achieve the target by the end of October 2004 which is the last year of SIC-project.

The most of our clients this year would be categorized into 4 industries which are 1) automotive-part 2) electronic component 3) mould-making for plastic product and 4) plastic injection such as plastic bottle and cosmetic container etc. The more information could be found in the enclosed annex 30. Hereunder are examples of our clients this year.

- Top Trend manufacturing Co.,Ltd.
- PVS Plastic Co.,Ltd.
- Automative Mold Technology Co.,Ltd.
- SIM Electric Group Co.,Ltd.
- Decha Panich Finishing Net Factory Ltd.
- Thai-Australian Technical College
- Rachamongkol Institute of Technology, Khonkean



- Surin Skill Development Centre
- and many more

The services carried on this year are focused on the problem solving technique of production process, mould and part machining, mould polishing, mould assembling, plastic injection process, and process improvement which could be summarized as following topics :

- The machining technique for  $< 10 \mu\text{m}$  tolerance production. The using of cutting tools in according with the machine specification and the alignment technique had been advised.
- The operating technique of Machining Centre, EDM, Wire cut M/C, and grinding M/C.
- The G-code programming.
- The applying of jig and fixture in order of higher production rate.
- The maintenance technique of machines and equipments.
- The mould design technique particularly on gating design which may results on the defects inside the product.
- The parameter conditioning and monitoring technique of plastic injection machine in order of higher production efficiency such as pressure adjusting, and cooling system monitoring.



Annex 29-2 Record of Technical Information Conducted  
by the Project and Advisory Services Conducted by the Project

Date	Name of factory	Content of the work	Problem	Researchers
Jun. 13, 01	Selaya Industrial Co.,Ltd.	Injection molding (Automotive, Electronic, Toys) ( Plastic Molding )	-Basic of design -Plan of producing -Analysis and solve of problem	1. Mr. Otsuka 2. Mr. Oiwa 3. Mr. Sirichai 4. Mr. Prakob 5. Mr. Chairat 6. Mr. Umnart
Jun. 27, 01	Precision Interplas Co.,Ltd.	Injection molding, mold making (Electronic part, Automotive part, souvenir) ( Plastic Molding )	-Organization Chart -Lay-out of Machine -Design -Old Machinery	1. Dr. Ikeuchi 2. Mr. Otsuka 3. Mr. Seki 4. Mr. Chairat 5. Mr. Satta 6. Miss Kun
Jul. 8, 01	NIPPO Co.,Ltd.	Injection molding, mold making ( Plastic Molding )	-Know-how of processing and polishing	1. Mr. Otsuka 2. Mr. Seki 3. Mr. Oiwa 4. Mr. Chairat 5. Mr. Virit 6. Mr. Bantao
Jul. 18, 01	BK Industrial Co.,Ltd.	Injection molding, mold making ( Plastic Molding )	-Determine Parting Line -Determine shrink -Kind of Gate -Kind of remove -Cooling system -Size of insert -Size of Mold Base	1. Mr. Otsuka 2. Mr. Seki 3. Mr. Chanon 4. Mr. Sirisak
Jul. 25, 01	Jiem Cosmetic Co.,Ltd.	Injection molding, mold making ( Plastic Molding )	-Handle Tool Material -Injection condition	1. Dr. Ikeuchi 2. Mr. Otsuka 3. Mr. Oiwa 4. Mr. Prakob 5. Mr. Worapong 6. Mr. Satta 7. Mr. Chairat 8. Mr. Chandeej
Aug. 8, 01	Rienthal Interplas Co.,Ltd.	Injection mold ( Plastic Mold )	-Process of Injection -Way to set the machine	1. Dr. Ikeuchi 2. Mr. Otsuka 3. Mr. Seki 4. Mr. Damrong 5. Mr. Chanon 6. Mr. Amnart
Aug. 22, 01	GD Plas and Mold Co.,Ltd.	Injection molding ( Plastic Molding )	-Injection condition	1. Dr. Ikeuchi 2. Mr. Otsuka 3. Mr. Oiwa 4. Mr. Palboon 5. Mr. Chairat 6. Mr. Sompong
Aug. 24, 01	Farsight Sahakid Co.,Ltd.	Injection molding, mold making ( Plastic Molding )	-Injection condition	1. Mr. Otsuka 2. Mr. Oiwa 3. Mr. Sahas 4. Mr. Bantao 5. Mr. Chairat
Nov. 10, 01	Learkuj Plastic Co.,Ltd.	Injection molding ( Plastic Molding )	-Lack of knowledge in plastic injection and maintenance machinery	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Oiwa 4. Mr. Preecha 5. Mr. Damrong 6. Mr. Chairat
Feb. 6, 02	Farsight Sahakid Co.,Ltd.	Plug ( Plastic Molding )	-Injection Problem of Weldline of Connecting Wire	1. Mr. Oiwa 2. Mr. Prakob 3. Mr. Preecha 4. Mr. Sahas 5. Mr. Virit
Feb. 20, 02	Choke Namchai Co.,Ltd.	Press die for automobile parts ( Pless Mold )	-Machining Process of Stamping Die of Automobile	1. Mr. Seki 2. Mr. Thanate 3. Mr. Amnart
Feb. 27, 02	LP Plast Co.,Ltd.	Electric parts for automobile and electric appliances ( Plastic Molding )	-How to manage for QC	1. Mr. Oiwa 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Preecha 5. Mr. Sahas 6. Mr. Amnart
Mar. 13, 02	Yeoheng Co.,Ltd.	Medicine press machine ( Machinery )	-How to use machine for make good parts of Press M/C of medicine	1. Mr. Seki 2. Mr. Prakob 3. Mr. Satta 4. Mr. Charnchai
Mar. 13, 02	Jiem Cosmetic Co.,Ltd.	Mold for cosmetic packing ( Plastic Mold )	-How to make cavity of mold by EDM or by Milling and other equipment	1. Mr. Seki 2. Mr. Prakob 3. Mr. Satta 4. Mr. Charnchai
Apr. 10, 02	SCG-Thailand Co.,Ltd.	Valve ( Forging Mold )	-Forging Process -Make letter on mold by EDM -Cooling of Die Forging	1. Mr. Seki 2. Mr. Satta 3. Mr. Damrong 4. Mr. Bantao 5. Miss Kun
Apr. 24, 02	Precise Engineering	Mold for make Jig & Fixture and Forging parts of machine ( Forging Mold )	-How to make insert part -Assembly of mold -How to make Electrode for EDM	1. Mr. Seki 2. Mr. Prakob 3. Mr. Satta 4. Mr. Damrong 5. Mr. Bantao 6. Mr. Sirisak
May 8, 02	Krungthai Plaspec Co.,Ltd.	Bicycle Part ( Plastic Molding )	-Mold design -Mold materials application	1. Mr. Otsuka 2. Mr. Prakob 3. Mr. Chanon 4. Mr. Chairat 5. Mr. Sompong 6. Mr. Wuthichai

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Date	Name of factory	Content of the work	Problem	Researchers
May 15, 02	A.K.P. Technology Ltd.	Electrical Part ( Plastic Mold )	-Mold design	1. Mr. Otsuka 2. Mr. Prakob 3. Mr. Chairat 4. Mr. Chanon 5. Mr. Somporn 6. Mr. Panuwat
May 22, 02	G.L. Pack Co.,Ltd.	Cosmetic Packing Part ( Plastic Molding )	-Injection problem -Mold design for cosmetic packaging	1. Mr. Oiwa 2. Mr. Prakob 3. Mr. Preecha 4. Mr. Sahas 5. Mr. Amnart
May 29, 02	S.C.N. Metal Works Co.,Ltd.	Lamp of Motorcycle ( Plastic Molding )	-Defect of Weldline	1. Mr. Oiwa 2. Mr. Prakob 3. Mr. Preecha 4. Mr. Sahas 5. Mr. Amnart
Jul. 12, 02	Thai Alloy Association Co.,Ltd.	Foundry ( Foundry Mold )	-Heat Treatment of the Mold	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Piboon
Aug. 14, 02	Chalam Industrv	Plastic Injection Molding ( Plastic Molding )	-How to control the schedule of machine -How to control the dimension of drawing -How to operate the new machining center -How to adjust the molding product defect	1. Mr. Seki 2. Mr. Oiwa 3. Mr. Sirichai 4. Mr. Satta 5. Mr. Bantao 6. Mr. Dumrong 7. Mr. Sirisak 8. Mr. Virit 9. Mr. Amnart
Aug. 28, 02	Thai Yanagawa Co.,Ltd.	Die cast & forging plastic mold	-How to use high speed machine	1. Mr. Seki
Sep. 4, 02	Korat Plastic Part Co.,Ltd.	Printer housing and structure parts etc. ( Plastic Molding )	-The warp in the molding products	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Oiwa 4. Mr. Ono 5. Mr. Uchida 6. Mr. Sirichai 7. Mr. Prakob 8. Mr. Worapong 9. Mr. Bantao
Sep. 4, 02	Shonan Gosei (Thailand)Co.,Ltd.	Automotive parts	-Maintenance of Mold	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Oiwa 4. Mr. Ono 5. Mr. Uchida 6. Mr. Sirichai 7. Mr. Prakob 8. Mr. Worapong 9. Mr. Bantao
Sep. 5, 02	Nakornratchasima Rachamongkol Institute	Technical Training ( University Institute )	-Develop to Technical Training Course	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Oiwa 4. Mr. Ono 5. Mr. Uchida 6. Mr. Sirichai 7. Mr. Prakob 8. Mr. Worapong 9. Mr. Bantao
Sep. 5, 02	Chockchai Karnchang	Parts of Tractker ( Machinery )	-How to make the universal joint	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Oiwa 4. Mr. Ono 5. Mr. Uchida 6. Mr. Sirichai 7. Mr. Prakob 8. Mr. Worapong 9. Mr. Bantao
Oct. 3, 02	Thai Inoac Mold Co.,Ltd.	Automotive parts (plastic Mold)	-Survey of the Present Situation	1. Mr. Ono
Oct. 4, 02	Reangwa Standard Industry Co., Ltd.	Plastic Injection Molding & Design ( Plastic Molding )	-Molding Condition Management of the factory	1. Mr. Otsuka 2. Mr. Oiwa
Oct. 8, 02	Thai Stanley Electric Public Co., Ltd.	Injection Molding ( Plastic Molding )	-Survey of the Present Situation	1. Mr. Ono
Oct. 10, 02	Reangwa Standard Industry Co., Ltd.	Plastic Injection Molding & Design ( Plastic Molding )	-Molding Condition Management of the factory	1. Mr. Otsuka 2. Mr. Oiwa
Oct. 31, 02	Surin Technical College	Technical Training Center ( University Institute )	-Discussion about the skill development	1. Mr. Oiwa 2. Mr. Prakob 3. Mr. Sahas 4. Mr. Virit
Oct. 31, 02	Kitpinen Products Co.,Ltd.	Plastic Injection Molding ( Plastic Molding )	-Advice for the molding condition	1. Mr. Oiwa 2. Mr. Prakob 3. Mr. Sahas 4. Mr. Virit
Nov. 11, 02	Takao (Thailand) Co.,Ltd.	Press Mold (Press Mold)	-Managing	1. Dr. Ikeuchi
Nov. 11, 02	Thai Stanley Electric Public Co.,Ltd.	Injection Molding	-Managing	1. Dr. Ikeuchi
Nov. 11, 02	ARRK Corporation (Thailand) Ltd.	Injection Mold	-Managing	1. Dr. Ikeuchi
Feb. 19, 03	Hitachi Consumer Products,Ltd.	Plastic Injection Molding		1. Dr. Ikeuchi 2. Mr. Ishizaki 3. Mr. Prakob 4. Mr. Sahas 5. Mr. Preecha 6. Mr. Tikumporn
Feb. 25, 03	National Metal and Materials Technology Center	R&D and Technical Training Center ( University Institute )		1. Dr. Ikeuchi 2. Mr. Uchida 3. Mr. Sirichai 4. Mr. Wanrop
Mar. 13, 03	Gear Industry Co.,Ltd.	Gear Production for Agro-machinaries and Tractors ( Machinery )	-Gear Wheel noisy	1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Satta 5. Mr. Dumrong 6. Mr. Bantao 7. Mr. Sirisak

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Date	Name of factory	Content of the work	Problem	Researchers
Mar. 19, 03	PAN Group (1) PF Intertech CO.,LTD (2) EDC (3) PONTEX	Injection Molding (Shoe base) ( Plastic Molding )	-Modification of Injection Machine	1. Dr. Ikeuchi 2. Mr. Ishizaki 3. Mr. Sirichai 4. Mr. Prakob 5. Mr. Sahas 6. Mr. Preecha 7. Mr. Tikumporn
Apr. 29, 03	Siam paining Stt Industry	Mold Check, Water Supply Fan ( Machinaly )		1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakop 4. Mr. Bantao
May 12, 03	Rachamangala Technology Institute, Nakornrachasima	Visit Facility and Discussion ( University Institute )	-Find to co-operate the institute to make public-relation and activities for SME in North-East Region	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Sirichai 4. Mr. Prakob 5. Mr. Satta 6. Mr. Bantao
May 13, 03	Daichi Alloy Co.,Ltd.	Machining of Motorcycle wheel after die casting ( Machinaly )	-Checking machining operatio for reducing production time	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Sirichai 4. Mr. Prakob 5. Mr. Satta 6. Mr. Bantao
May 13, 03	SK Mold Ltd.	Plastic Injection by orders for toy, electric appliance parts ( Plastic Molding )	-Mold repairing and maintenance	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Sirichai 4. Mr. Prakob 5. Mr. Satta 6. Mr. Bantao
May 14, 03	CCI Ltd.	Produce of agromachineries parts, heavy machinery parts, hydraulic piston ( Machinaly )	-CNC operation program writhing	1. Dr. Ikeuchi 2. Mr. Seki 3. Mr. Sirichai 4. Mr. Prakob 5. Mr. Satta 6. Mr. Bantao
May 29, 03	Siam Pains Co.,Ltd.	Water supply fan cuts and valves ( Machinaly )	-Finishing products by machining	1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao
Jun. 3, 03	PCS Co.,Ltd.	Automobile parts ( Machinaly )	-Study machining operation & heat treatment of products	1. Mr. Sirichai 2. Dr. Pasu 3. Mr. Prakob 4. Mr. Wallop
Jun. 3, 03	Rukchai Workshop	Rubber Mold and extrusion machine ( Rubber Mold )	-Machining operatiton	1. Mr. Sirichai 2. Dr. Pasu 3. Mr. Prakob 4. Mr. Wallop
Jun. 5, 03	Korat Seicum Coled.	Study Pren Die & Die Cast Mold for Automobile parts ( Die - Cast )	-Mold making	1. Mr. Sirichai 2. Dr. Pasu 3. Mr. Prakob 4. Mr. Wallop
Jul. 2,03	Institute for skill Development Region 4	Discussion of Technical Training Course ( University Institute )		1. Mr. Ishizaki 2. Mr. Seki 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Tikumporn
Jul. 2,03	Sarayuth Machine Work Co.,Ltd.	Control the Tools and Safty Control ( Machinaly )	-Mind of Savety Control is low	1. Mr. Ishizaki 2. Mr. Seki 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Tikumporn
Jul. 2,03	Finesse Flower co.,Ltd.	Production of Artificail Flowers ( Plastic Molding )		1. Mr. Ishizaki 2. Mr. Seki 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Tikumporn
Jul. 3,03	Triumph Engineering Co.,Ltd	Production of Machine for Apariculture ( Machinaly )	- Control of Mist of Milling Oil	1. Mr. Ishizaki 2. Mr. Seki 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Tikumporn
Jul. 3,03	Institute for skill Development Region 4	Discussion of Technical Training Course ( University Institute )		1. Mr. Ishizaki 2. Mr. Seki 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Tikumporn
Jul. 11,03	T.Krunghai Industries Co.,Ltd.	Autometric Port of Plastics ( Plastic Mold )	-Not speacil	1. Mr. Ono 2. Mr. Paiboon 3. Mr. Warapong 4. Mr. Chanon 5. Mr. Sompong 6. Mr. Paisal 7. Mr. Tikumporn
Jul. 11,03	MCI Mould C.,Ltd.	Genector ( Plastic Mold )		1. Mr. Ono 2. Mr. Paiboon 3. Mr. Warapong 4. Mr. Chanon 5. Mr. Sompong 6. Mr. Paisal
Jul. 11,03	Microtek Products Co.,Ltd.	Engineering Plastic ( Plastic Molding )		1. Mr. Ono 2. Mr. Paiboon 3. Mr. Warapong 4. Mr. Chanon 5. Mr. Sompong 6. Mr. Paisal

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Date	Name of factory	Content of the work	Problem	Researchers
Jul. 28. 03	Rajamangala Institute of Technology	Technical Training Course of Processing ( University Institute )		1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak
Jul. 29. 03	Daisin Co.,Ltd.	AI -Die Cast Motorovcle ( Die - Cast )		1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Yoshio 4. Mr. Prapat 5. Mr. Sirichai 6. Mr. Prakob 7. Mr. Satta 8. Mr. Bantao 9. Mr. Sirisak
Jul. 30. 03	Industrial Promotion Center Region 5	Curriculum of Technical Training Course ( University Institute )		1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Yoshio 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Prakob
Jul. 31. 03	Khon kaen Institute for Skill Developm	Technicak Training Course ( University Institute )	-Machine Center	1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Yoshio 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Prakob
Jul. 31. 03	Manun Karn Chang	Gear ( Machinaly )	-Mainternac of Machine	1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Yoshio 6. Mr. Sirisak 7. Mr. Prakob
Aug.1. 03	Permpoon Patana Industry Co., Ltd	Cotton Bar ( Plastic Molding )	-Bend of the Bar	1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Yoshio 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Prakob
Aug.1. 03	Vuthiwan Co., Ltd.	Mold for the cotton bar ( Plastic Mold )	-How to set the tool	1. Mr. Ikeuchi 2. Mr. Seki 3. Mr. Yoshio 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Prakob
Aug.17.03	Surin Technical Colledge	Technical Training of Mold ( University Institute )		1. Mr. Ikeuchi 2. Mr. Ishizaki 3. Mr. Prakob 4. Mr. Precha 5. Mr. Sahat 6. Mr. Tikumporn
Aug.18.03	Buochai Plastic Industrian Co.,Ltd.	Poliesther Box ( Plastic Molding )		1. Mr. Ikeuchi 2. Mr. Ishizaki 3. Mr. Prakob 4. Mr. Precha 5. Mr. Sahat 6. Mr. Tikumporn
Aug.19.03	Flower Associate Co.,Ltd.	Plastic Flower ( Plastic Mold & Molding )	-Business (low teach)	1. Mr. Ikeuchi 2. Mr. Ishizaki 3. Mr. Prakob 4. Mr. Precha 5. Mr. Sahat 6. Mr. Tikumporn
Aug.19.03	Kitpinan Product Company	Plastic parts for sanirary Wall ( Plastic Molding )	-Mainternanc of Machine	1. Mr. Ikeuchi 2. Mr. Ishizaki 3. Mr. Prakob 4. Mr. Precha 5. Mr. Sahat 6. Mr. Tikumporn
Sep.1.03	Siam Nissan Kernchanaburi Co.,Ltd.	Fabricate of plastice blow Machine ( Machinaly )	-Searel of joint - venture	1. Mr. Yoshio 2. Mr. Satta 3. Mr. Sirisek 4. Mr. Bantao 7. Mr. Anuwat
Oct. 27.03	Kelang Ceramic Industry	Ceramic tile		1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Anuwat
Oct. 28.03	Nothern Industry Promotion Center	Technical Training ( University Institute )	-Mainternanc of Machine	1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Anuwat
Oct. 28.03	S. Goro Work Co.	Malce tool edege ( Machinaly )	-Layout of Machine	1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Anuwat
Oct. 28.03	Samveak sanambin Engineering	Machining of bar ( Machinaly )	-Old Machine	1. Mr. Seki 2. Mr. Sirichai 3. Mr. Prakob 4. Mr. Satta 5. Mr. Bantao 6. Mr. Sirisak 7. Mr. Anuwat

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Date	Name of factory	Content of the work	Problem	Researchers
Oct.29.03	Lumphun Plaspack Co.	Al Mold for blow and injection (Blow : Mold ( 90% ) Plastic Injection Mold ( 10 % )		1. Mr. Seki
				2. Mr. Sirichai
				3. Mr. Prakob
				4. Mr. Satta
				5. Mr. Bantao
				6. Mr. Sirisak
Oct.29.03	Lanna Lumphun Precision Co.	Electric parts of Plastic ( Plastic Molding )	-Maintenance of Mold	7. Mr. Anuwat
				1. Mr. Seki
				2. Mr. Sirichai
				3. Mr. Prakob
				4. Mr. Satta
				5. Mr. Bantao
Oct.30.03	Changmai Gear	Processing of Gear ( Machinery )	-Formula for Machining gear	6. Mr. Sirisak
				7. Mr. Anuwat
				1. Mr. Seki
				2. Mr. Sirichai
				3. Mr. Prakob
				4. Mr. Satta
Oct.30.03	Changmai Metal System Co.	Machining Equipment for Hospital ( Machinery )		5. Mr. Bantao
				6. Mr. Sirisak
				7. Mr. Anuwat
				1. Mr. Seki
				2. Mr. Sirichai
				3. Mr. Prakob
Nov. 13.03	MITR. Engineering Co.,Ltd	Press Mold ( Press Mold )	-Machining Center	4. Mr. Satta
				5. Mr. Bantao
				6. Mr. Sirisak
				7. Miss. Jureerut
				1. Mr. Matsuoka
				2. Mr. Ikeuchi
Nov. 13.03	Factory Max Co., Ltd.	Fixed Ball Endmill	-CNC Machining Operation	3. Mr. Yoshio
				4. Mr. Satta
				5. Mr. Bantao
				6. Mr. Sirisak
				7. Miss. Jureerut
				1. Mr. Matsuoka
Nov.14.03	ARRK Thailand Co.,Ltd.	Injection Automobile ( Plastic Mold )	-Machining Operation	2. Mr. Ikeuchi
				3. Mr. Yoshio
				4. Mr. Satta
				5. Mr. Bantao
				6. Mr. Sirisak
				7. Miss. Jureerut
Nov.14.03	Thai Stanrey Co.,Ltd.	Lamp and Automobile Lamp ( Plastic Mold )	-Software.CADCEuS CAM TOOL	1. Mr. Matsuoka
				2. Mr. Ikeuchi
				3. Mr. Yoshio
				4. Mr. Satta
				5. Mr. Bantao
				6. Mr. Sirisak
Nov.14.03	Sodick Thailand Co.,Ltd.	Wire Cut ( Machinery )	-Machining Opeation	7. Miss. Jureerut
				1. Mr. Matsuoka
				2. Mr. Ikeuchi
				3. Mr. Yoshio
				4. Mr. Satta
				5. Mr. Bantao
Nov.14.03	KDT Kvoido Die - Works Thailand Co.,L	Mold and Aluminium ( Extrusion Mold )	-Wire Cut Operation	6. Mr. Sirisak
				7. Miss. Jureerut
				1. Mr. Matsuoka
				2. Mr. Ikeuchi
				3. Mr. Yoshio
				4. Mr. Satta
Jan. 26.04	Thai - Austrain technical College	Survey of technical Training ( University Institute )		5. Mr. Bantao
				6. Mr. Sirisak
				7. Miss. Jureerut
				1. Mr. Ishizaki
				2. Mr. Prakob
				3. Mr. Precha
Jan. 26.04	Top trend Manufacturing Co.,Ltd.	Cosmetic Case or Cad ( Plastic Molding )	- Injection	4. Mr. Sahat
				5. Mr. Tikumporn
				6. Mr. Uchida
				1. Mr. Ishizaki
				2. Mr. Prakob
				3. Mr. Precha
Jan. 27.04	PVS Plastic Co., Ltd.	Electric Part and Sundry Good ( Plastic Molding )	- Maintenance	4. Mr. Sahat
				5. Mr. Tikumporn
				6. Mr. Uchida
				1. Mr. Ishizaki
				2. Mr. Prakob
				3. Mr. Precha
Jan. 27.04	Nawa Plastic industries Co.,Ltd.	Plumbing Parts ( Plastic Molding )		4. Mr. Sahat
				5. Mr. Tikumporn
				6. Mr. Uchida
				1. Mr. Ishizaki
				2. Mr. Prakob
				3. Mr. Precha
Jan.28.04	Automotive Mold Technology Co.,Ltd.	Automotive Part ( Plastic Mold )		4. Mr. Sahat
				5. Mr. Tikumporn
				6. Mr. Uchida
				1. Mr. Ishizaki
				2. Mr. Prakob
				3. Mr. Precha
Feb. 24.04	Raiamangala Institute of Technology	Technical Training ( University Institute )	- Check Injection Machine	4. Mr. Sahat
				5. Mr. Tikumporn
				6. Mr. Uchida
				1. Mr. Ishizaki
				2. Mr. Prakob
				3. Mr. Sahat
				4. Mr. Tikumporn

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Date	Name of factory	Content of the work	Problem	Researchers
Feb. 25.04	Rajamangala Institute of Technology	Technical Training ( University Institute )	- Check Injection Machine	1. Mr. Ishizaki 2. Mr. Prakob 3. Mr. Sahat 4. Mr. Tikumporn
Feb. 26.04	Surin Skill Development Center	Technical Training ( University Institute )	- Check Injection Machine	1. Mr. Ishizaki 2. Mr. Prakob 3. Mr. Sahat 4. Mr. Tikumporn
Feb. 27.04	Region Center DIP In Bureerum	Technical Training ( University Institute )		1. Mr. Ishizaki 2. Mr. Prakob 3. Mr. Sahat 4. Mr. Tikumporn
Mar. 10.04	Rajamangala Institute of Technology	Technical Training ( University Institute )		1. Mr. Yoshio 2. Mr. Satta 3. Mr. Bantao 4. Mr. Sirisak 5. Mr. Prakob
Mar. 11.04	Decha Panich Fishing net Factory Ltd.	Fishing net ( Plastic Molding )	- Maintenance Injection Machine	1. Mr. Yoshio 2. Mr. Satta 3. Mr. Bantao 4. Mr. Sirisak 5. Mr. Prakob
Mar. 11.04	Sakluwan Chang	Automotive Part ( Machinery )	- Introduction Machine	1. Mr. Yoshio 2. Mr. Satta 3. Mr. Bantao 4. Mr. Sirisak 5. Mr. Prakob
Mar. 11.04	Sim Electric Group Co., Ltd.	Swivel Bord ( Machinery )	- Maintenance Machine	1. Mr. Yoshio 2. Mr. Satta 3. Mr. Bantao 4. Mr. Sirisak 5. Mr. Prakob
Mar. 12.04	INK Nongkai Plastic	Bottle Blow ( Plastic Molding )	- Introduce the used Machine	1. Mr. Yoshio 2. Mr. Satta 3. Mr. Bantao 4. Mr. Sirisak 5. Mr. Prakob
May. 11.04	Vuthiwan Company Limited	Mold and Machine for Making Cotton Bud	CNC Milling for make Cotton bud	1. Mr. Ikeuchi 2. Mr. Prakob
May. 11.04	Perm Poon Patana Industrv Company	Injection Molding of the Case for Cotton Bud	Injection of the Case for Cotton bud	1. Mr. Ikeuchi 2. Mr. Prakob
May. 13.04	GTV Doll	Product Trailer, Repair train Box ( Machine )		1. Mr. Satta 2. Mr. Dumrong 3. Mr. Bantao 4. Mr. Sirisak
May. 13.04	E- San Plastics	Plastic Recycle Blow Mold ( Plastic Molding )	Lack of Plastic to be Recycle Need to Increase Production	1. Mr. Satta 2. Mr. Dumrong 3. Mr. Bantao 4. Mr. Sirisak
May. 14.04	Sittichai Lathe	Hydroric Press	Lack of Budget to make Hydroric Press Machine	1. Mr. Satta 2. Mr. Dumrong 3. Mr. Bantao 4. Mr. Sirisak
May. 24.04	Mold Master Manufacturing Co., Ltd.	Design	How to manage the design office	1. Mr. Ono 2. Mr. Palboon 3. Mr. Warapong 4. Mr. Chanon 5. Mr. Sompong
May. 25.04	Top trend Manufacturing Co., Ltd.	Molding cosmetic case and making the mold for cosmetic	Injection of cosmetic case	1. Mr. Ono 2. Mr. Palboon 3. Mr. Warapong 4. Mr. Chanon 5. Mr. Sompong
May. 26.04	Reangwa Standard Industry Co., Ltd.	Molding daily	Mainternace of mold	1. Mr. Ono 2. Mr. Palboon 3. Mr. Warapong 4. Mr. Chanon 5. Mr. Sompong

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## Annex 30-1 Progress of Prototyping Services Conducted by the Project

In 2002, SIC has already provided prototyping services for 57 firms. For the first half year (January to June), SIC gave the service to 19 firms and the last half year (July to December) gave the service to 38 firms. Example of a company receiving prototyping services from BSID with supervision from project expert.

### 1. Chalam industrial Co.,Ltd.

- Mold parts include core and cavity, size 40x50mm. 1 piece.

### 2. T.R.Machine and Engineering Co.,Ltd.

- Master model forming of shoe with size of 300x130x50 mm. by using machining center (V55)

### 3. Takai

- Machine Core, Cavity size 450x500x60 mm. for mold parts and electrode 2 pieces, size 50x50 mm.

### 4. Kitipan Product Co.,Ltd.

- Making mold parts including making insert, core and cavity with size of 300x350x25 mm.

### 5. Chulalongkorn University

- Making prototype for Fatigue testing machine parts with precision less than 10 micron

### 6. LSTP Industrial Co., Ltd.


- Making brass mold for sanitary ware, size 350x160x60 mm.

### 7. Kasetsart University

- Making spark EDM for electrode graphite using automobile parts forming, size 30x30x30 cm.

### 8. X-Tack Co. Ltd.

- Machine die base 650x800 on CNC milling machine with table size of 800x1250



In 2003, SIC has already provided prototyping services for 38 times from January to June (12 firms). Example of company receiving prototyping services from BSID with supervision from project expert are :

1. Siam paini Co.,Ltd.

- Milling 1 piece
- Core 1 piece
- Mold maintenance 1 pieces
- CNC

2. National Science and Technology Development Agency

- Gear bon processing

3. Extact Co.,Ltd.

- Graphite processing for electrode machining 8 pieces
- Electrode machining (repair) 2 pieces

4. Chalam industry Co.,Ltd.

- Wire- cut for plastic injection mold 21 pieces
- EDM spark 4 pieces with precision 10 micron

5. Thaikriptech Co.,Ltd.

- Wire-cut die zip plate 26 pieces with precision 10 micron

6. King's Mongkut University of Technology Thonburi

- Machining part

7. Lopburi Collage

- Clamp of injection mold

8. Kitipan Product Co.,Ltd.

- EDM plastic mold 2 pieces

9. Chulalongkorn University

- Milling 2 pieces and hole



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Since January 2004, the prototyping service has been provided 13 times in total for 2 organisations which are 1) The Iron Institute and 2) Rungreang Wire-Cut Precision Co.,Ltd. (details are stated in the enclosed document.)

1) Iron Institute :

- The Milling M/C had been used for the production of 45 pieces of the tensile testing machine part.
- The Wire-Cut M/C had been used for preparing the specimen for composition analysis.

2) Rungreang Wire-Cut Precision Co.,Ltd.

The Wire-Cut M/C and EDM had been used for

- The part of stamping-die 30 pieces (size 30x30x40 mm)
- The die press

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## Annex 30-2 Record of Prototyping Service Conducted by The Project

※This list is only for the partial processing service

No.	Date	Name of Company	Supported by Expert	Kind of work	SIC Machine
<b>2000</b>					
1	Apr. 25, 2000	Extact Co., Ltd.		Milling Machine 1 set	
2	May 26, 2000	Extact Co., Ltd.		Milling Machine 2 sets	
3	Jun. 26, 2000	Extact Co., Ltd.		Machine 3 sets	
4	Aug. 8, 2000	Extact Co., Ltd.		Milling Die Forging 2 sets	
5	Nov. 16, 2000	Extact Co., Ltd.		Machine	
6	Dec. 6, 2000	Extact Co., Ltd.		Machine center 2 sets	
7	Dec. 12, 2000	Kasem Bandit University		Machining 50 Pieces	
8	Dec. 12, 2000	U.I. Engineering		Wire cut SCM 440 4 pieces	W
9	Dec. 19, 2000	Kasem Bandit University		Machining for trial pressure 80 pieces, Crashing 78 pieces	
<b>2001</b>					
1	Jan. 10, 2001	Extact Co., Ltd.		Machine 6 pieces	
2	Jan. 16, 2001	Kasem Bandit University		Machining for crashing trial 25 pieces	
3	Jan. 17, 2001	Kijpinan Products Co., Ltd.		Cutting Bar 2 pieces, Spowking 1 piece	
4	Jan. 19, 2001	University of Technology Mahanakorn		Cutting 550c	
5	Jan. 19, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
6	Jan. 26, 2001	Kasem Bandit University		Wire cut 26 pieces	W
7	Jan. 26, 2001	Kasem Bandit University		Wire cut 13 pieces	W
8	Jan. 29, 2001	Kasem Bandit University		Cutting parts 11 pieces	
9	Jan. 29, 2001	Kijpinan Products Co., Ltd.	✓	Sparking	E
10	Feb. 2, 2001	Kasem Bandit University		Machining trial part	
11	Feb. 2, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
12	Feb. 13, 2001	Chulalongkorn University		Compact tension 6 pieces	W
13	Feb. 20, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
14	Feb. 2, 2001	Chulalongkorn University		Dynamometer	W
15	Feb. 26, 2001	Kasem Bandit University		Machining Parts 16 parts	
16	Mar. 7, 2001	Extact Co., Ltd.		Machine Parts 6 pieces	
17	Mar. 20, 2001	World Alliance Motor Ltd.	✓	Mold	
18	Mar. 26, 2001	Kijpinan Products Co., Ltd.	✓	Fixing Mold	NC
19	Mar. 30, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
20	Apr. 3, 2001	Kijpinan Products Co., Ltd.	✓	EDM 1 piece	E
21	Apr. 4, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
22	Apr. 23, 2001	Kasem Bandit University		Machine metal part D2 16 pieces	
23	Apr. 24, 2001	Chulalongkorn University		Machining parts 8 pieces	W
24	Apr. 24, 2001	Kijpinan Products Co., Ltd.	✓	Machining Mold	NC
25	Apr. 27, 2001	Tang Sia Ping Lohakij		Manual for CNC Mazak M5	
26	May 14, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
27	May 17, 2001	Kitpinan Products Limited	✓	EDM 1 piece	E
28	May 21, 2001	Mr. Viboon Charamtaya	✓	Spark Plug	E
29	Jun. 7, 2001	Precision Manufacturing Co., Ltd.		Mold Parts 6 pieces	
30	Jun. 12, 2001	Extact Co., Ltd.		Machine Parts 2 pieces	
31	Jun. 22, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
32	Jun. 29, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
33	Jul. 2, 2001	Extact Co., Ltd.		Machine Parts 2 pieces	
34	Jul. 2, 2001	Kasem Bandit University		Machining & Wire cut 51 pieces	
35	Jul. 2, 2001	Kasem Bandit University		Machining & Wire cut 51 pieces	
36	Jul. 17, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
37	Aug. 7, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	

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No.	Date	Name of Company	Supported by Expert	Kind of work	SIC Machine
38	Aug. 22, 2001	Kijpinan Products Co., Ltd.	✓	EDM 1 piece	E
39	Aug. 22, 2001	Chulalongkorn University	✓	Wire cut 12 pieces	W
40	Sep. 12, 2001	Advance Packaging Products Co., Ltd.	✓	Milling	NC
41	Oct. 3, 2001	Extact Co., Ltd.		Machine Parts 4 pieces	
42	Nov. 2, 2001	Extact Co., Ltd.		Machine Program 2 pieces	
43	Nov. 20, 2001	Extact Co., Ltd.	✓	Die Base 1 pieces	
			✓	Machine Program 2 pieces	
44	Dec. 14, 2001	Extact Co., Ltd.		Die Base 1 pieces	
45	Dec. 20, 2001	Extact Co., Ltd.	✓	Machine Parts 4 pieces	
46	Dec. 26, 2001	Extact Co., Ltd.	✓	Machine Die Base 1 pieces	
			✓	Machine Die Base 1 pieces	
2002					
47	Jan. 21, 2002	Handicraft Development Institute, Choneburi		Parts' erosion for assembling	
48	Jan. 25, 2002	Chulalongkorn University		Wire cut part	W
49	Jan. 28, 2002	Extact Co., Ltd.	✓	Machine Program 2 pieces	
50	Feb. 25, 2002	Kasem Bandit University		Die Base 2 pieces	
51	Mar. 14, 2002	Extact Co., Ltd.	✓	Trial part 22 pieces	
52	Mar. 27, 2002	Faculty of Engineer Chulalongkorn University	✓	Machining bronze 10 pieces	
53	Apr. 12, 2002	Chulalongkorn University	✓	Machining	
54	May 10, 2002	Extact Co., Ltd.		Milling & Wire cut 13 pieces	M
55	May 15, 2002	Ocean Plastic Intertrade	✓	Machining 2 pieces	
56	May 17, 2002	Extact Co., Ltd.	✓	Eroding Alumimium Plate 1 piece	NC
57	May 28, 2002	Chulalongkorn University	✓	Machining 1 piece	
58	May 28, 2002	Chulalongkorn University	✓	Machining & Wire cut 3 pieces	M, W
59	May 29, 2002	JNT Industrial Co., Ltd.	✓	Milling 3 pieces	M
60	Jun. 9, 2002	Extact Co., Ltd.	✓	Wire cut (Training)	W
61	Jun. 10, 2002	Chulalongkorn University	✓	Machine base 2 pieces	
62	Jun. 17, 2002	Chulalongkorn University	✓	Milling 8 pieces	M
63	Jun. 25, 2002	Chulalongkorn University	✓	Milling & Turning 8 pieces	M
64	Jun. 25, 2002	Krung Thai Plaspak Co., Ltd	✓	Wire cut 1 piece	W
65	Jul. 5, 2002	Chulalongkorn University	✓	Wire cut 15 pieces	W
66	Jul. 9, 2002	Xtract Co., Ltd.	✓	Machining Base 2 pieces	
67	Jul. 16, 2002	BCP Group		Machining by Lathe	
68	Jul. 29, 2002	Chulalongkorn University		Reaming 13 mm.	
69	Jul. 29, 2002	Kitpinan Products Limited	✓	EDM 1 piece	E
70	Jul. 30, 2002	Xtract Co., Ltd.	✓	Machining 1 piece	
71	Jul. 31, 2002	Chaophraya Mold & Spray Mark Partnership	✓	Wire cut	W
72	Aug. 5, 2002	Xtract Co., Ltd.		Machining 1 piece	
73	Aug. 5, 2002	Chulalongkorn University		Wire cut 10 pieces	W
74	Aug. 9, 2002	Xtract Co., Ltd.	✓	Electrod Repair 1 piece	
75	Aug. 9, 2002	Xtract Co., Ltd.	✓	Machining Die Base 1 piece	
76	Aug. 19, 2002	T. Krungthai Industry Co., Ltd	✓	Machining	
77	Aug. 26, 2002	LSTP Industry Co., Ltd.	✓	Machine Insert Core, Insert Cavi	NC
78	Aug. 30, 2002	Chalam Industry Co., Ltd.		Machining	NC
79	Aug. 30, 2002	Chulam Industry Co., Ltd.		Spark parts of Mold	
80	Sep. 11, 2002	Chulalongkorn University		Milling & Drill 1 piece	M
81	Sep. 11, 2002	Chulalongkorn University		Lathe 13 pieces	

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No.	Date	Name of Company	Supported by Expert	Kind of work	SIC Machine
80	Sep. 12, 2002	Chalam Industry Co., Ltd.	✓	Wire cut	W
81	Sep. 13, 2002	TR Machine & Engineering Partnership		Machine Electrode	NC
82	Sep. 17, 2002	TR Machine & Engineering Partnership	✓	Machine Electrode	NC
83	Sep. 23, 2002	Xtract Co., Ltd.	✓	Machining 2 pieces	
84	Sep. 27, 2002	TR Machine & Engineering Partnership	✓	Machining Master Model	NC
85	Sep. 27, 2002	Chalam Industry Co., Ltd.		Mold Sparking 2 pieces	E
86	Sep. 30, 2002	Chulalongkorn University		Drill 2 pieces	
87	Oct. 2, 2002	TR Machine & Engineering Partnership	✓	Machine Electrode 2 pieces	NC
88	Oct. 22, 2002	TR Machine & Engineering Partnership	✓	Machining Electrode 1 piece	NC
89	Oct. 24, 2002	Chulalongkorn University		Milling & Lathe 6 pieces	M
90	Oct. 24, 2002	Chalam Industry Co., Ltd.	✓	EDM 1 piece	E
91	Oct. 25, 2002	Siam Taimani Co., Ltd.		Milling & Lathe 1 set	NC
92	Oct. 25, 2002	Siam Painy Co., Ltd.		Slice and Milling 1set	NC
93	Oct. 29, 2002	Takai Co., Ltd.	✓	Machining 4 pieces	NC
94	Oct. 30, 2002	Chulalongkorn University		Milling & Lathe 13 pieces	M
95	Oct. 31, 2002	Xtract Co., Ltd.	✓	Machine Electrode 6 pieces	
96	Nov. 8, 2002	Modern Technology	✓	Advisory Service for CNC	
97	Nov. 13, 2002	Industrial Product Technology Research and Development Institute		EDM	E
98	Nov. 14, 2002	Chalam Industry Co., Ltd.	✓	Wire cut	W
99	Nov. 15, 2002	Kitpinan Product Co.,Ltd.	✓	Machining & Wire cut 2 pieces	W,NC
100	Nov. 18, 2002	Xtract Co., Ltd.	✓	Electrode Machine 3 pieces	NC
101	Nov. 22, 2002	Xtract Co., Ltd.	✓	Electrode Machine 2 pieces	NC
102	Nov. 25, 2002	Chulalongkorn University		Lathe	
103	Nov. 26, 2002	Chulalongkorn University	✓	Wire cut 13 pieces	M,W
104	Dec. 4, 2002	Xtract Co., Ltd.		Electrode 1 piece	NC
105	Dec. 8, 2002	Xtract Co., Ltd.		Electrode Machining 3 pieces	NC
106	Dec. 16, 2002	Xtract Co., Ltd.	✓	Modify Electrode 1 piece	
2003					
107	Jan. 8, 2003	Extact Co., Ltd.		Electrode 3 pieces	
108	Jan. 20, 2003	Siam Painy Co., Ltd.	✓	CNC	NC
109	Jan. 22, 2003	Extact Co., Ltd.		Electrode(Repair) 2 pieces Electrode(Machine) 2 pieces	NC NC
110	Jan. 24, 2003	Chulalongkorn University	✓	Milling & hole	M
111	Jan. 30, 2003	Iron Institute		300 x 40 x 25 mm. 4 pieces	
112	Feb. 4, 2003	Kitpinan Product Co.,Ltd.	✓	EDM Plastic Mold 1 piece	E
113	Feb. 10, 2003	Chalam Industry Co.,Ltd.	✓	EDM Spark 1 piece	E
114	Feb. 12, 2003	Extact Co.,Ltd.		Machining 1piece	
115	Feb. 14, 2003	Chulalongkorn Univesity	✓	Milling & Hole	M
116	Feb. 14, 2003	Thaikiptech Co.,Ltd.	✓	Die Plate 1 piece	W
117	Feb. 14, 2003	Siam Paini Co.,Ltd.	✓	Milling 1piece, Core 1 piece, Repair mold 1 piece	NC
118	Feb. 18, 2003	Thaikriptech Co.,Ltd.	✓	Wire cut die zip plate	W

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No.	Date	Name of Company	Supported by Expert	Kind of work	SIC Machine
119	Feb. 18, 2003	Kingmongkut Technology	✓	Machining parts	W
		Thonburi University			
120	Feb. 19, 2003	Extact Co.,Ltd.	✓	Machining electrode 1 piece	NC
121	Feb. 20, 2003	Kitpinan Product Co.,Ltd.	✓	EDM mold 1piece	E
122	Feb. 21, 2003	Chulalongkorn University	✓	Milling 2 pieces	M
123	Feb 24, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut die plate	W
124	Mar. 10, 2003	Chalam Industry Co.,Ltd.	✓	Wire cut 4 pieces	W
125	Mar. 14, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 4 pieces	W
126	Mar. 24, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 3 pieces	W
127	Mar. 27, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 4 pieces	W
128	Mar. 31, 2003	Yingsak Co.,Ltd.		Advisory service	
129	Apr. 1, 2003	Iron Institute	✓	Wire cut 1 piece	W
130	Apr. 4, 2003	Sport Technoloty Co.,Ltd.		Request advisory service	
131	Apr. 3, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 6 pieces	W
132	Apr. 8, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 3 pieces	W
133	Apr. 11, 2003	Chalam Industry Co.,Ltd.	✓	Spark 3 Molds	E
134	Apr. 17, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 2 pieces	W
135	Apr. 17, 2003	Chalam Industry Co.,Ltd.	✓	Spark 2 Molds	E
136	Apr. 23, 2003	Mr. Sunthon Runwong		Reaming valve	
137	May 9, 2003	Thaikripteck Co.,Ltd.	✓	Wire cut 4 pieces	W
138	May 9, 2003	Chalam Industry Co.,Ltd.	✓	Wire cut 2 pieces	W
139	May 20, 2003	Mr. Sunthon Runwong		Lathe 4 pieces	
140	May 21, 2003	Lopburi Collage		Clamp of injection mold	
141	Jun. 9, 2003	Chalam Industry Co.,Ltd.	✓	Wire cut 1piece	W
142	Jun. 9, 2003	Extact Co.,Ltd.	✓	Electrode machining 2 pieces	NC
143	Jun. 18, 2003	Chalam Industry Co.,Ltd.	✓	Wire cut 14 pieces	W
144	Jun. 18, 2003	Extact Co.,Ltd.	✓	Electrode machining 2 pieces	NC
145	Jul. 2, 2003	Thai Kripteck Co.,Ltd.	✓	Wire cut 8 pieces	W
146	Jul. 11,2003	Thai Kripteck Co.,Ltd.	✓	Wire cut 6 pieces	W
147	Jul. 28, 2003	Wire cut Precision Center	✓	Machine center	W
		Co., Ltd.			
148	Aug. 22, 2003	Iron Institute of Thailand	✓	Wire cut Roller 1 piece	W
149	Aug. 28, 2003	Extact Co., Ltd.	✓	Electrode Machine 1 piece	M
150	Sep. 12, 2003	Iron Institute	✓	Wire cut 4 pieces	W
151	Sep. 18, 2003	Thai Kripteck Co.,Ltd.	✓	Wire cut 2 pieces	W
152	Sep. 30, 2003	Top Hightech (Thailand)	✓	Machining	NC
		Co., Ltd.			
153	Oct. 8, 2003	Kitpinan Product Co.,Ltd.	✓	Wire cut hole	W
154	Oct. 29, 2003	Mr. Wichien Aranchaiya	✓	Wire cut 1 piece	W
155	Dec. 1, 2003	Rungreang Wire-cut Precision		Wire cut & Drill	
156	Dec. 16, 2003	Rungreang Wire-cut Precision		Milling & Electrode 40 pieces	
	2004				
157	Jan. 28, 2004	Rungreang Wire-cut Precision		Wire cut	W
158	Feb. 9, 2004	Rungreang Wire-cut Precision		Wire cut	W
159	Feb. 26, 2004	Rungreang Wire-cut Precision		Wire cut	W
160	Feb. 27, 2004	Rungreang Wire-cut Precision		EDM	E
161	Feb. 27, 2004	Iron Institute		Milling	M
162	Mar. 4, 2004	Rungreang Wire-cut Precision		Wire cut	W

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No.	Date	Name of Company	Supported by Expert	Kind of work	SIC Machine
163	Mar. 8, 2004	Rungreang Wire-cut Precision		Wire cut	W
164	Mar. 16, 2004	Iron Institute		Wire cut	W
165	Mar. 21, 2004	Rungreang Wire-cut Precision		EDM	E
166	Mar. 24, 2004	Rungreang Wire-cut Precision		Wire cut 1 piece	W
167	Mar. 28, 2004	Iron Institute		Milling	M
168	Apr. 22, 2004	Iron Institute		Wire cut	W
169	Apr. 26, 2004	Iron Institute		Milling	M

NC : Machining Center

M : Milling Machine

W : Wire-cut

E : EDM

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## Summary of Questionnaire Survey for Technical Training Course

### 1. Over view

The attached paper showed the results of questionnaire of participants for each technical training course. According to the results the average point of each course is more than three. It means that participants fundamentally satisfied the course.

### 2. There were many suggestions and comments

Many participants wanted the longer period for most courses. Particularly they requested more time for operation. There are some difficult problem but we are going to solve them next course.

Show the representative suggestion

#### (1) Design group

Lecturer should have provided more example to demonstrate.

Textbook should have more example.

Question and answer of problems should have been added in appendix

The subject matter should have been provided more.

He should be improved clearness in word of speech and lecture training preparation.

BSID should make document for important part.

Should be made training documents in Thai for more knowledge and understanding.

#### (2) Processing group

BSID should provide the course that relate with this course in order to understand more about the operation

The training should have been deeper and the duration should have been longer

BSID should receive the order of making plastic mold from outside and accept staff of those company joining every step of making mold

This course is not enough period in operational part and the participants should be less than this course about 3 person in each group, it's better.

They should have more suggestion of operational technics both theory and operation.

They should have modern tools & machines.

Should be more preparation.

#### (3) Assy/Trial Shot group

Some instructors should show more real situation as the example.

There should be more clear examples.

Instructors should explain only necessary part which can apply to the real work..

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## Summary of Questionnaire Survey for Technical Training Course

No.	Subject	Name of Technical Training Course																				
		2001			2002					2003				2004								
		Basic of Mold Design	Basic of Mold Processing	Basic of Mold Assembling and Trial Shot	Basic of Mold Design	Basic CAD	Basic of Mold Design	Basic CAD	Basic of Mold Processing	Basic of Mold Polishing	Basic CAD	Basic of Mold Assembling	Basic of Mold Processing	Plastic Injection	Parametric	Mold Design	Experiment 3D	Mold Processing	Polishing			
1	Update and suitable of course	-	-	-	3.27	3.50	4.00	3.89	3.45	4.00	4.29	4.00	3.72	4.40	4.13	3.78	-	-	-			
2	Quality of document	3.18	3.10	3.00	3.50	3.50	3.71	3.56	3.73	3.58	4.43	3.86	3.36	4.00	3.88	4.22	-	-	-			
3	Period for training	2.55	2.40	2.60	3.09	3.21	3.29	3.67	3.45	3.00	3.29	4.00	3.36	3.80	4.25	3.33	-	-	-			
4	Clearness of the matter	3.73	3.60	3.50	3.64	3.57	4.00	-	3.82	-	4.14	4.20	-	4.40	3.75	4.22	-	-	-			
5	The matter suitable to the course	3.91	3.60	3.50	3.68	3.71	4.29	-	4.18	-	4.43	4.20	-	4.60	3.88	4.56	-	-	-			
6	The matter useful to you and your company	3.82	3.90	3.80	3.59	3.64	4.00	-	4.00	-	4.43	4.40	-	4.60	4.00	4.33	3.38	4.20	3.75	3.86	4.56	
7	The course increase your knowledge and ability	3.73	3.60	3.80	3.91	3.86	4.29	-	4.36	-	4.57	4.60	-	4.40	4.38	4.67	3.38	4.10	4.00	4.00	4.00	4.44
	Average	3.49	3.37	3.37	3.53	3.57	3.94	3.71	3.86	3.53	4.23	4.18	3.48	4.31	4.04	4.16	3.38	4.15	3.88	3.88	3.93	4.50

Remarks:

- 5: Very good
- 4: Fairly Good
- 3: Good
- 2: Bad
- 1: Very Bad

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## Summary of Questionnaire Survey Evaluation Results of the Technical Training Course

Course Code	Content/Software/Machine	2001.00		2002.00		2003.00				2004.00			
		Jun-Jul	Jun-Jul	Jun-Jul	Oct-Dec	Jan-Mar	Apl-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apl-Jun	Jul-Sep	Oct-Dec
Design 01	Basic Knowledge of Mold Design	3.49	3.53	3.56						xx			
D/CAD 11	Basic CAD/CADCEUS		3.71/3.53	3.48	xx								
D/CAD 12	Parametric CAD/CADCEUS						xx			3.38			
D/CAD 13	3D Mold Design/CADCEUS									3.88			
D/CAD 21	Experimental 3D Design/Pen Tray						xx						
D/CAD 22	Experimental 3D Design/Alarm Clock												
D/CAD 23	Experimental 3D Design/Telephone									4.15			
Processing 01	Fundamental Processing Seminar	3.37	3.57	4.23			4.04						
Processing 02	Fundamental CNC Seminar	+	+	+			+						
P/CAM 11	Processing/Operation/M/C/EDM										xx		
P/CAM 12	Advanced CAM/Craft Mill									3.93			
P/CAM 21	Basic 3D CAM/Craft Mill												
P/CAM 22	Electrode CAM										xx/xx		
Assy/Shot 11	Polishing		3.94	4.18								4.50	
Assy/Shot 21	Assembly	+					4.31						
Assy/Shot 31	Trial Shot	+	3.37										
Assy/Shot 41	Maintenance											4.16	xx/xx

✦ : Implemented as one continuous course

Remarks: 5; very good, 4; fairly good, 3; good, 2; bad, 1; very bad

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Annex 32 Monitoring and Evaluation Plan

Name of the Project	SIC-Tool and Mold Technology Development Project in the Kingdom of Thailand		
Duration of Cooperation	November 1st, 1999 to October 31st, 2004		
Study Team	Final Evaluation Team		
Period of the Study	June 2nd, 2004 to June 19th, 2004		
Division in Charge	Small and Medium Enterprise Team, Group1 (Economic Policy and Private Sector Development), Economic Development Department	Staff in Charge	Etsuji Yoshimura

I Activities and Contents of the Project

The activities and contents of the Project are shown in the following Charts for Project Planning and Management:

- 1 Project Design Matrix (PDM)
- 2 Plan of Operations (PO)
- 3 Annual Plan of Operations (APO)
- 4 Technical Cooperation Program (TCP)
- 5 Annual Technical Cooperation Program (ATCP)

II Monitoring and Evaluation System

1 Monitoring  
The following monitoring is scheduled to be held during the cooperation period:

(1) Periodical Monitoring  
The periodical monitoring is to be implemented, the contents of which are to be discussed on the occasion of regular meetings in the Project, such as Weekly and Monthly Meeting to be implemented by Chief Advisor, Project Coordinator, other experts as well as Thai Project Director, Deputy Project Director, Project Manager, Assistant Project Coordinator and Technical C/P.

(2) Monitoring  
Monitoring will be done every six (6) months by the Project. The results will be presented to the Joint Coordinating Committee (JCC) and distributed to the organizations concerned and/or personnel involved in the Project.

2 Evaluation  
Final Evaluation of the Project is conducted jointly by the two Governments through JICA and Thai authorities concerned during last six(6) months of the cooperation term in order to examine the level of achievement as stipulated in the R/D. JICA dispatches the final evaluation team in Spring, 2004. In any manner, any evaluation should be jointly implemented by both sides and the outcome should be submitted and reported at the JCC in the form of Joint Evaluation Report and are to be signed by both sides, if possible.

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## Annex 32 Monitoring and Evaluation Plan

## III Schedule for Monitoring and Evaluation

Date	Monitoring or/ Evaluation and other related activities	In charge of Implementation	Reporting
July 1999	Signing of the R/D	Project Design Team The Thai side	R/D, M/M
November 1999	Commencement of the Project		
June 2000	Monitoring (1)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
November 2000	Monitoring (2)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
June 2001	Monitoring (3)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
December 2001	Monitoring (4)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
June 2002	Mid-term Evaluation	Mid-term Evaluation Team The Thai C/P  to be confirmed by JCC members	JER & M/M for Joint Evaluation team, Monitoring Report
July 2002	Monitoring (5)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
January 2003	Monitoring (6)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
July 2003	Monitoring (7)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report
December 2003	Monitoring (8)	Japanese experts The Thai C/P  to be confirmed by JCC members	M/M at JCC, Monitoring Report

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Annex 32 Monitoring and Evaluation Plan

June 2004	The Final Evaluation Monitoring (9)	Joint Final Evaluation Team Japanese experts The Thai C/P  to be confirmed by JCC members	Joint Evaluation Report, M/M at JCC, Monitoring Report
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IV Criteria and Item for Monitoring and Evaluation

<p>1 Criteria and Item for Monitoring</p> <ul style="list-style-type: none"> <li>(1) PDM (Project Design Matrix)</li> <li>(2) PO (Plan of Operations) and APO (Annual Plan of Operations)</li> <li>(3) TCP (Technical Cooperation Program) and ATCP (Annual Technical Cooperation Program)</li> <li>(4) Monitoring and Evaluation Sheet</li> <li>(5) Progress Report of Technical Cooperation Project</li> <li>(6) Others if necessary</li> </ul> <p style="padding-left: 40px;">If technology transfer does not progress as planned, the Project will study the interior/exterior factors to hamper, take necessary countermeasures and will revise the plan.</p> <p>2 Criteria and Item for Final Evaluation</p> <p style="padding-left: 40px;">Criteria and Item for Final Evaluation are prepared by the Project based on the Evaluation Grid.</p>
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# General Monitoring and Evaluation (in accordance with PDM)

Project Name: SIC-Tool and Mold Technology Development Project in the Kingdom of Thailand  
 Duration: November 1, 1999 - October 31, 2004  
 Thai Side Implementing Agency: Bureau of Supporting Industries Development (BSID), Department of Industrial Promotion, Ministry of Industry  
 Japanese Side Implementing Agency: Japan International Cooperation Agency (JICA)  
 Target Group: Thai Plastic Tool and Mold Industries

## Achievement of Outputs (from January to June in 2004)

Outputs	Indicators	Target in this term	Achievements in this term	Reasons if planned targets wouldn't been satisfied
0 The Project operation unit will be enhanced.	0-1 C/Ps are allocated as planned. 0-2 Budget is adequately allocated to the local cost of the Project. 0-3 Committees and the Project management meetings are held periodically.	C/Ps are allocated as planned. Budget is adequately allocated to the local cost of the Project. The project holds joint weekly meeting and the ninth JCC meeting.	24 C/P personnel are allocated to the project. Minor change was conducted: one C/P changed from assy group to design group. 1.4M baht was allocated at the beginning of this term. The budget was too low to buy the upgraded softwares and others to continue the activities of the project. Later additional 1.4 M baht was allocated in every week. The ninth JCC meeting was held.	BSID made the personnel reshuffled before. Then, two of 6 C/Ps in design group became the supporting staff. This time one C/P in assy group requested to move to design group. It was approved. Misunderstood the Thai budget system. Software is classified in durable article in Thailand. The director of BSID was very busy. However, the project usually solves the important or the urgent items in informal meetings with acting director and other directors.
1 Necessary machinery and equipment will be provided, installed, operated and maintained properly.	1-1 The type and quantity of machinery and equipment provided are appropriate. 1-2 Provided machinery and equipment are inspected and operated appropriately. 1-3 Spare parts are appropriately through local supplier.	There is no plan to provide machinery and equipment from Japanese side in this term in the original plan. The machinery and equipment are kept in good conditions at BSID and also operated appropriately. Regarding the quick response of local sources for raw materials and spare parts, C/P makes some ways to contact with local supplier.	CADCEUS Version 6 software and Super GI for V55 have been provisioned to Thai side The machinery and equipment were generally kept in good conditions at BSID and also operated appropriately. Thai side has already had routes to contact with local supplies.	At the end of the term, the project obtained the additional budget to buy upgraded license of 3DCAD and 3DCAM software and so on from JICA.
2 Technical capability of the counterpart personnel (hereinafter referred to as "C/P") will be upgraded in the fields of mold design, mold processing, mold assembling and trial shot.	2-1 Each C/P improves his knowledge and skill of respective technology transfer items.	Technical transfer from JICA expert to the Thai technical C/P implements through several measures namely lectures and hands-on training as planned in the TCP.		Some subjects were just started in this terms, therefore skill for some items is not high yet.

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Achievement of Outputs (from January to June in 2004)

<p>3 Seminars and training courses in the said fields will be in the said fields will be</p>	<p>2-2 The number of achieved target products increases.</p> <p>2-3 Original manuals, textbooks and training materials are developed.</p>	<p>The last target mold, mold for camera body will be finished.</p> <p>Training manuals develop at each training course in principle.</p>	<p>The last target mold, mold for camera body was finished. C/P achieved all the five target molds. The mold was also designed by using 3D mold design technology.</p> <p>The project developed training materials for the training course of 3D Mold Design/CADCEUD and Experimental 3D Design of Telephone shown in Annex 15 and 16.</p>	<p>During this term technical training courses were held ten times, including four design, two processing and four assembly and trial/slot courses. They held six times in BSID and four times in various regional areas. Thai government respects regional areas for developing industry and enhancing economic levels. The total number of participants was 165 in this term.</p>
<p>4 Technical information and advisory services in the said fields will be implemented systematically.</p>	<p>3-1 The number of implemented seminars, training courses and its participants increases.</p> <p>4-1 The number of implemented advisory services increases.</p> <p>4-2 Related technical data including client information are accumulated.</p> <p>4-3 The quantity and quality of technical information and advisory services satisfy the clients' needs.</p>	<p>Implements training course of 3D Mold Design, Experimental 3D Design of Telephone, processing and assembly.</p> <p>Advisory service was regarded as on the job training, therefore the project decided in opening the gate at any time for private companies.</p> <p>Each time factory visits are conducted, C/P or Japanese experts submit report. The project collects and compiles them.</p>	<p>In this term advisory service was prosecuted for total 17 factories mainly in regional area like Korat, Surin, Khon Kaen, Rayoon etc.</p> <p>After each advisory service was conducted, C/P or Japanese experts submitted reports to the project. Advisory reports were written in Thai, English or Japanese.</p> <p>C/P and Experts visit factories according to the clients' request. Mainly Japanese experts reply the problem. C/P is on the job training. It is still early to evaluate the satisfaction level of the clients benefited</p>	<p>During this term technical training courses were held ten times, including four design, two processing and four assembly and trial/slot courses. They held six times in BSID and four times in various regional areas. Thai government respects regional areas for developing industry and enhancing economic levels. The total number of participants was 165 in this term.</p>
<p>5 Trial prototyping services will be implemented systematically.</p>	<p>5-1 The number of implemented trial prototyping services increase.</p> <p>5-2 The quality of trial prototyping services satisfy the clients' needs.</p>	<p>The mold of multi-usage is finished. Another three molds for CD case-set, will design with 3DCAD.</p> <p>By using multi-usage mold, C/P learn the ejectorpin system, cooling system, the position of cavity/core etc.</p>	<p>The mold of multi-usage was finished. Another three molds for CD case-set, have been already designed with 3DCAD and the mold for CD case is fabricating in processing group.</p> <p>C/P could complete multi-usage mold through design, processing and assembly and trial shot very well. This cavity/core was used for polishing technical training course.</p>	<p>During this term technical training courses were held ten times, including four design, two processing and four assembly and trial/slot courses. They held six times in BSID and four times in various regional areas. Thai government respects regional areas for developing industry and enhancing economic levels. The total number of participants was 165 in this term.</p>

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Progress of Activities for each Outputs (Output No. in the PDM and its description : 0~5)

Progress of Activities		Problems in this term	Targets and Activities in next term
Plan	Action		
0-1 Allocate necessary personnel.	24 C/P personnel are allocated to the project. Minor change conducted, that is one c/p changed from assay group to design group.		To keep the number of C/P as planned.
0-2 Formulate plans of activities.	Formulated the revised TCP at 7th JCC after mid-term evaluation. However, master plan of activities was reconstructed for remained one year based on the basic idea that was reviewed at the mid-term evaluation.	The revised plan focuses on the technical training course and on 3DCAD/CAM in place of 2D. The schedule is very tight. The managers should always check the progress.	The important point is to execute the master plan properly. The project are going to develop technical training courses another four courses and to fabricate three internal prototyping molds until the end of the project.
0-3 Make budget plan and execute properly.	The budget of this year, 1.4 M baht is low compared the plan signed by Mr. Manu in 1999	Problem was how to cover the shortage of the budget to buy required articles. The project requested to increase the budget, and consequently another 1.4 M baht was added in mid-term budget.	In order to keep these activities of the project continuously after the project finishes, Thai side should buy version-upped 3D software of CAD/CAM (CADCEUS, Craft Mill) and milling tools for precise and high speed milling.
0-4 Establish and operate management system.	The director of BSID and some director became so busy that the regular meeting between Thai side and Japanese side changed to hold once a month. However, the project usually solved the important or the urgent items in informal meetings with acting director and other directors. The project should check the progress at any time.		The activity schedule will become so tight that C/Ps become very busy. Therefore, the directors and project manager should manage C/Ps tight schedules well. Otherwise above mentioned activities might not finish by this October.
1-1 Make facility refurbishment plan and implement.	Made the plan and implemented.		Implementing as planned.
1-2 Provide and install necessary machinery and equipment.	There was no plan to provide machinery originally. However, two equipments, CADCEUS Ver.6, Super GI ( high speed feeder) and Streo Zoom Microscope have been provisioned to Thai side.	It took more time than expected for CADCEUS Ver.6 and Super GI ( high speed feeder) to be installed at BSID due to a various procedure.	Operating them properly.
1-3 Operate and maintain the machinery and equipment properly.	Most of the machinery and the equipment were operated and maintained properly.	NC machine were not operated utilizing the advanced functions fully due to the lack of drill, tools and raw materials.	Super GI ( high speed feeder) will be set in V55 and then M/C will be operated with high speed milling in making molds for CD Case.

Santi

Progress of Activities for each Outputs (Output No. in the PDM and its description : 0--5)

Progress of Activities		Problems in this term	Targets and Activities in next term
Plan	Action		
2-1 Make Technical Cooperation Program.	Made TCP at mid-term evaluation term. Formulated the revised TCP at 5th JCC after mid-term evaluation. The project has been carried out through the new plan and the progress in this term ( from January to June in 2004) is in general on schedule.		Executing as planned.
2-2 Implement technology transfer to the C/P.	In the design group, 3D mold design technology was transferred to C/P through long-term and short-term experts at BSID. Three molds for CD case-set were designed with using 3 DCAD software as the internal prototype molds. In the processing group, mold for multi-usage was fabricated. The problems that came out after the trial shot for a camera body were re-fabricated. The basic 3D CAM and high speed milling technology were transferred. In the assembly and trial/shot group, molds for camera body and multi-usage that had gone through the processing section were finished, and trial shot was done afterwards.		Implementing as planned.
2-3 Monitor and evaluate the result of technology transfer to the C/P.	Monitored and evaluated the result of technology transfer to the C/P. (See attached results of monitoring, the Annex 21)		Implementing as planned.
3-1 Make plan of technical training and seminars.	Made plan of technical training courses of design, processing and assembly/trial shot and seminars. See the Annex 2	The project is in general carried out on schedule excluding to some postponed courses.	Make plan of technical training courses after the end of the project.
3-2 Implement technical training and seminars	During this term technical training courses were held ten times, including four design, two processing and four assembly and trial/shot courses. They held six times in BSID and four times in various regional areas Puri, Surin, Korad, Khon KaenBaanlike . Thai government respects regional areas for developing industry and enhancing economic levels.		Implementing as planned. The final seminar will be held October 13th, 2004.
3-3 Monitor and evaluate technical training and seminars.	In order to monitor and evaluate technical training and seminars, questionnaires were conducted at the end of each technical training course. Latest one is being analysed. See the Annex 17.		Implementing as planned.

*Samuel*

Progress of Activities for each Outputs (Output No. in the PDM and its description : 0~5)

Progress of Activities		Problems in this term	Targets and Activities in next term
Plan	Action		
4-1 Make plan of trial technical Information and advisory services.	The project decides to conduct the advisory service in any time through a year according to request of companies. So did not make advisory services.		Implementing advisory services at any time through a year according to request of companies.
4-2 Collect and compile technical information and material.	Visited not only private companies but universities, R&D Collect and compile technical information and material.		Implementing as planned.
4-3 Implement trial technical information and advisory services.	In this term advisory service was prosecuted for total 27 factories mainly in regional area like Korad, Surin, Rachaburi, Lampang etc	Visited not only private companies but also universities, R&D centers, skill development centers and so on and collected and compiled technical information and material.	Implementing advisory services according to request of companies.
4-4 Monitor and evaluate trial technical Information and advisory services.	Since C/P does not have enough practical experience in spite of having gained fundamental knowledge of specific subjects, and advisory service are mainly taken by Japanese experts and regarded as on-the job training. C/P collected questionnaire from factories C/P implemented advisory service.		
5-1 Make plan of trial prototyping services.	It is still difficult for C/P to produce commercial molds through a consistent process from Mold Design to Trial Shot. However the project should let C/P gain practical experiences. So the project made plan of producing internal prototyping molds instead of external prototyping service. Made the master plan. See the Annex 2.		Implement as planned.
5-2 Implement trial prototyping service.	The mold of multi-usage was injected on trial, inconvenient part was cleared and the part was modified. Another three molds for CD case-set have been designed with 3DCAD and the mold for CD case is fabricated in processing group.		Implement as planned. See the Annex 2
5-3 Monitor and evaluate trial prototyping service.	See the Annex 21.	Since C/P does not have enough practical skills to produce commercial molds through consistent process, and rototyping service is regarded as on-the job training, it is early to evaluate the the satisfactory level of the clients.	Implement as planned.

*Samel*

**Annex34 List of Attendance of the Discussions****Japanese side****Evaluation team**

- |                           |   |
|---------------------------|---|
| 1. Mr. Masayoshi Juro     | Team Leader,<br>Senior Assistant to the Director General,<br>Economic Development Department, JICA                                  |
| 2. Dr. Toshitaka Matsuoka | Technical Evaluation<br>Member of Technical Support Committee in<br>Japan,<br>President,<br>Matsuoka Engineering Consultants Office |
| 3. Mr. Etsuji Yoshimura   | Evaluation Management<br>Staff, Small and Medium Enterprise Team,<br>Economic Development Department, JICA                          |
| 4. Mr. Izumi Sakaya       | Evaluation Analysis<br>Consultant, Global Group 21 Japan Inc.   |

**SIC-Tool and Mold Technology Development Project**

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|------------------------|--------------------------------|
| 1. Dr. Jun Ikeuchi     | Chief Advisor                  |
| 2. Mr. Yasuo Uchida    | Coordinator                    |
| 3. Mr. Junzo Ohno      | CAD/CAM & 3D Mold Design       |
| 4. Mr. Takahito Yoshio | Mold Processing                |
| 5. Mr. Noboru Ishizaki | Mold Assembling and Trial Shot |

**Thai side**

(\*The member of Thai Evaluation Team)

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|---------------------------|--|
| 1. Mr. Supat Limpaporn    | Director General<br>Department of Industrial Promotion (DIP)<br>Ministry of Industry |
| 2. Mr. Prapat Vanapitaksa | Deputy Director General<br>DIP   |
| 3. Mr. Saneh Niyomthai*   | Director<br>Bureau of Supporting Industries Development (BSID)                       |



Saneh

4. Mr. Sirichai Pothitapana\* Director of  
Metal Working and Machinery Industries Division,  
BSID
5. Dr. Pasu Loharjun\* Director  
Industrial Parts Manufacturing Development Division,  
BSID
6. Mr. Prakob Janma\* Head of Product, Mold & Die Technical Design  
Development, BSID
7. Mr. Kittiphat Panitakorn\* Senior Expert, BSID
8. Mr. Viroj Sirithanasart\* President  
Thai Tool and Die Industry Association (TDIA)
9. Mr. Sombat Wudhanasrap\* Assistant Secretary, TDIA
10. Mr. Parinya Chuenmeechow\* President  
Thai Plastic Industries Association (TPIA)
11. Mr. Kowate Limtrakul\* Managing Director  
T.Krunghthai Industries Public Co.,Ltd.



Saneh