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TABLE 2A-1

\$ (MILLION) SPENDING ON EQUIPMENT
IN MITEC BY JAPANESE GOVT.

DIVISION	1978 TO 1984
ELECTROPLATING	131
WELDING	28
PRESSWORK	93
DIE-MAKING	143
TEST & INSPECTION	121
INFORMATION & GEN.	24
SPARE PARTS	24

TOTAL:	564

Source: JICA & SIRIM, Joint Evaluation Report, 1984

TABLE 2A-2

NO. OF COUNTERPARTS TRAINED IN JAPAN

DIVISION	1978 TO 1984
ELECTROPLATING	5
WELDING	4
PRESSWORK	5
DIE-MAKING	6
TEST & INSPECTION	4
INFORMATION	4
ADMINISTRATION	2

TOTAL:	35

Source: JICA & SIRIM, Joint Evaluation Report, 1984

TABLE 2A-3

NO. OF JAPANESE EXPERTS DESPATCHED

DIVISION	LONG-TERM	SHORT-TERM
ELECTROPLATING	1	7
WELDING	2	1
PRESSWORK	2	2
DIE-MAKING	2	5
TEST & INSPECTION		7
INFORMATION	1	
CHIEF ADVISER	2	
IMPLEMENTING TEAM		4
PROJECT		1
MANAGEMENT		
TOTAL:	10	27

Source: SIRIM & JICA, Joint Evaluation Report, 1984

TABLE 2A-4

MITEC AND MIDECS BUDGET, 1979 - 1992 (UNIT: M\$1,000)

FUNDING	DEVT	OPERATION	R & D	TOTAL
YEAR	5070	3706		8776
1984		1196		1196
1985		950		950
1986	900	3280		4180
1987		2296		2296
1988	645	2120		2765
1989	725	545		1270
1990	1150	235	333	1718
1991	550	258	970	1778
1992	2000	355	713	3068

Source: SIRIM, MIDECS, 1992

Table 2A-5' Staffing by divisions in the Project period

() :planned

YEAR	1979	1980	1981	1982	1983	1984
Head	(1) 1	(1) 1	(1) 1	1	1	1
Diemaking	(6) 5	(6) 6	(9) 9	9	11	11
Presswork	(4) 3	(4) 5	(7) 5	6	6	5
Welding	(6) 3	(6) 6	(7) 7	6	6	5
Electroplating	(4) 4	(4) 5	(5) 6	9	8	7
Test & Inspection	(3) 2	(3) 4	(5) 6	5	4	4
Information	(4) 3	(4) 1	(6) 2	4	6	6
Others	(13) 10	(13) 14	(13) 14	15	14	13
TOTAL	(41) 31	(41) 42	(53) 50	55	56	52
R.O.	(11) 11	(11) 10	(17) 16	13	14	12
A.R.O.	(-) 2	(-) 2	(4) 3	3	3	3
Technician	(12) 4	(12) 11	(13) 11	15	16	15
Draughtsman	(2) 2	(2) 2	(3) 3	3	3	3
Laboratory Assistant	(2) 1	(2) 2	(2) 2	3	3	3
others	(-) -	(-) -	(-) -	2	2	2
TOTAL	(27) 20	(27) 27	(39) 35	39	41	38

Table 2A.5: HITEC and HIDEDEC's Personnel Development, 1984-1989

Year	1984	1985	1986	1987	1988	1989
Position	HITEC	HITEC	HITEC/ HIDEDEC	HIDEDEC	HIDEDEC	HIDEDEC
TECHNICAL:						
Research Officer	13	14	14	43	44	49
Assistant Research Officer	3	3	5	19	15	15
Technicians	15	15	18	42	41	41
Draughtsman	3	3	3	14	14	14
Apprentices	0	0	0	8	7	7
Laboratory Assistant	3	3	3	4	5	5
Others	2	2	2	0	0	0
Sub-total	39	40	45	130	126	131
NON TECHNICAL:						
Storekeepers				3	3	3
Stenographers				2	2	2
Clerks				6	5	5
Typists				0	0	0
Office Boy				2	3	3
Telephone Operator				1	1	1
General Worker				0	3	3
Sub-total	13	12	12	22	25	25
Total	52	52	57	152	151	156

Note: HIDEDEC's staff were pooled from HITEC, HIRDC and Design and Fabrication Unit

TABLE 2A-6

NO. OF STAFF IN MIDEDEC & AMTC (AS AT 31-10-1992)

	MIDEDEC	AMTC
Technical:		
RESEARCH OFFICER	34	4(27)
ASS. RES. OFF.	4	1(5)
TECHNICIAN/LA/D	46	5(22)
SUB-TOTAL	84	10(54)
ADMINISTRATION	16	(5)
TOTAL	100	10(59)

Figures in the () denote total No. of staff in AMTC
 Figures in front of () denote No. of staff in die-making division

Source: SIRIM, MIDEDEC & AMTC, 1992

TABLE 2A-7

NO. OF ADVISORY/CONSULTANCY SERVICES PROVIDED

DIVISION	1979	1980	1988	1992
ELECTROPLATING	8	8	142	N.A. 50
WELDING	11	8		
PRESSWORK	23	32		
DIE-MAKING	23	22	12	8
GENERAL	7	9		
TOTAL:	72	79		

Source: SIRIM, MIDEDEC, 1992

TABLE 2A-8

NO. OF FIRMS RECEIVING TEST & INSPECTION SERVICES

DIVISION	1982	1983
TENSILE BEND TEST	491	846
CHARPY IMPACT	77	46
EMPA	2	26
X-RAY	156	134
DIMENSIONAL MEASUR	78	88
OTHERS	470	126
TOTAL:	1274	1266

Source: JICA & SIRIM, Joint Evaluation Report, 1984

TABLE 2A-9

FEES RECEIVED FROM ADVISORY/TEST & CHECKING/CONSULTANCY SERVICE

DIVISION	1988 \$	1992 \$
ELECTROPLATING	35000	130000 25000 * 110000 **
WELDING	50000*	
PRESSWORK		
DIE-MAKING	30000	
TEST & CHECKING		
INFORMAION		

* denotes internal bill

** includes prototype fabrication & plastic injection moulds

Source: SIRIM, MIDEAC & AMTC, 1992

TABLE 2A-10

NO. OF CASES OF FABRICATION SERVICES (AS AT 31-10-1992)

DIVISION	1979	1983	1988	1992
ELECTROPLATING	8	31		
WELDING	6	50	160	245
PRESSWORK	3	17		
DIE-MAKING	2	18	15	18
GENERAL	17	51		
TOTAL:	36	167	181	
			(MIDEC)	

Source: JICA & SIRIM, Joint Evaluation Report, 1984
 SIRIM, MIDEC & AMTC, 1992

TABLE 2A-11

NO. OF TRAINING COURSES OFFERED (AS AT 31-10-1992)

DIVISION	1982	1983	1988	1992
ELECTROPLATING	1(71)	5(88)	4 } (180)	5 } (80)
WELDING	1(20)	1(48)		
PRESSWORK	0(6)	0(11)		
DIE-MAKING	0(17)	3(35)	1	1
GENERAL	3	3		
TOTAL:	5(114)	12(182)	24 (233)	
			(MIDEC)	

Source: JICA & SIRIM, Joint Evaluation Report, 1984
 SIRIM, MIDEC & AMTC, 1992

TABLE 2A-12

Number and Type of Services by Unit, 1986-1989

Unit	Type of Services	Parameter	1986	1987	1988	1989
Engineering Design	1. Advisory/Consultancy Services	Company	-	26	27	22
	2. Training	Course Participant	-	20	26	6
	3. Design & Development	Project	-	12	15	32
	i. Machine	Project	-	12	15	6
	ii. Mould/Die & Plastic Injection	Project	-	21	20	18
Industrial Design	1. Consumer Product Design					4
	i. Wood					1
	ii. Ceramic					1
	iii. Metal					3
	iv. Plastic & Fibreglass					4
	2. Furniture Design					41
	3. Graphic, Label & Packaging Design for Local Industry					60
	4. Graphic Design for SIRIH Publication					75
	5. Poster Design for Units in SIRIH					6
	6. SIRIH Exhibition/Showroom Design					27
Machine Shop Services	7. Decoration & Backdrop for functions organized by SIRIH					9
	8. Packaging Design for SIRIH					19
	9. Design Services for Ministry and Government Department					
	1. Manufacturing					
	i. Mould	Case	-	16	36	19
	ii. Machine Production	Case	-	14	5	3
	iii. Jigs & Fixtures	Case	-	188	28	18
	iv. Machine Components	Case	-	40	31	135
	2. Machine Services	Case	-	270	340	168
	3. Lease of Machine Time	Hour	-	1000		423
Metal Forming & Finishing	i. Private Company	Hour	-	-	558	
	ii. Incubator Company	Hour	-	-	3329	
	4. Modification & Repair					
	i. Mould	Case	-	0	0	11
	ii. Machine	Case	-	0	0	1
	1. Advisory/Consultancy Services	Company	93	112	151	142
	2. Prototype Fabrication/Trial Production/Lease of Equipment	Case	76	113	174	181
	3. Training/Seminar/Lecture	Course	19	19	19	29
	4. Technical Project/Development	Project	6	13	10	6
	5. Internal Services	Case	92	51	133	145
Metallurgical Services	1. Advisory/Consultancy Services	Company	13	15	16	13
	2. Training	Participant	133	276	150	205
	3. Research	Project	7	5	3	2
	4. Technical Services	Sample	380	445	500	431
	5. Development	Case	-	81	100	79
Foundry		No.	13	33	9	2
	1. Development of Foundry Unit	To be partially operated in mid 1990				
	2. Training					
	3. Research & Development					
	4. Incubator Project					

TABLE 2A-13

SUMMARY OF COURSES, WORKSHOP, SEMINAR AND LECTURE, 1981 - 1989

	COURSES	WORKSHOP	SEMINAR	LECTURE	OTHERS *	TOTAL
1981	1					1
1982	4		1			5
1983	8		2		2	12
1984	2				2	4
1985	5		1		4	10
1986	2		2	1		5
1987	8			1	15	24
1988	9	1		2	22	34
1989	7			3	34	44
TOTAL	46	1	6	7	79	139

* refers to industrial trainings or industry requested trainings conducted by MIDEK to the industry

Source: SIRIM, MIDEK, 1992

TABLE 2A-14

% DISTRIBUTION OF WORKERS BY INDUSTRY SIZE

	1974	1974	1974
Small-scale Indust	22.4	22.4	22.4
Below 5 (a)	0.27	0.27	0.27
(5-49)	22.1	22.1	22.1
Medium-scale Industries	30.9	28.4	31.4
(50 - 59)	14.9	13.7	12.9
(100 - 199)	16.0	14.7	18.5
Large-scale Industry	46.7	54.2	54.3
(200 - 499)	20.8	20.9	19.8
(500 - 999)	13.2	13.0	13.0
1000 and above	12.7	20.3	21.5
Total	100.0	100.0	100.0

Note: employment size-group of below 5 are termed tiny-scale industries

Source: Department of Statistics,
Annual Industrial Survey, various years

Table 2A-15 No. of services, training courses/participants and publication/exhibitions

YEAR	1979	1980	1981	1982	1983	1984	Total
Advisary Visits	74	117	36	48	37	10	322
Consultancy	36	76	78	127	167	66	550
Test & Inspection	-	-	45	1,274	1,266	395	2,980
Prototype fabric.	-	2	3	31	60	30	125
Training Courses	-	-	1	5	12	6	24
(participants)	-	-	13	114	182	81	390
Information							
(publications)	2	2	4	11	16	14	49
(exhibitions)	-	1	1	2	3	2	9

Table 2A-16 Provision of machineries and equipment from Malaysian Gov't

	1979	1980	1981	(M\$1,000) Total
Information equipment	12	-	-	12
Draught room equipment	9	-	-	9
Die-making	40	30	16	86
Presswork	30	30	16	76
Welding	20	20	8	48
Electroplating	185	145	170	500
Waste gas system	111	-	-	111
Waste water system	287	-	-	287
Chemicals	250	30	375	655
(for electroplating)				
Office room equipment	62	-	-	62
Total	1,006	255	584	1,845

TABLE 2B-1

EXPENDITURE ON EQUIPMENT BY JAPANESE GOVT.

LABORATORIES	PROJECT PERIOD
MASS	86918
LENGTH	27044
ELECTRICITY	46521
TEMPERATURE	59894
VOLUME	73505
INSPECTION	9103

TOTAL: (¥1,000)	302985

Source: SIRIM & JICA, Joint Evaluation Report, 1985

TABLE 2B-2

NO. OF COUNTERPARTS TRAINED IN JAPAN

LABORATORIES	PROJECT PERIOD
MASS	1
LENGTH	1
ELECTRICITY	3
TEMPERATURE	3
VOLUME	3
INSPECTION	1

TOTAL:	12

Source: SIRIM & JICA, Joint Evaluation Report, 1985

TABLE 2B-3

NO. OF LONG/SHORT TERM EXPERTS DESPATCHED

LABORATORIES	PROJECT PERIOD
MASS	10
LENGTH	2
ELECTRICITY	5
TEMPERATURE	2
VOLUME	2
CHIEF ADVISER	2

TOTAL:	23

Source: SIRIM & JICA, Joint Evaluation Report, 1985

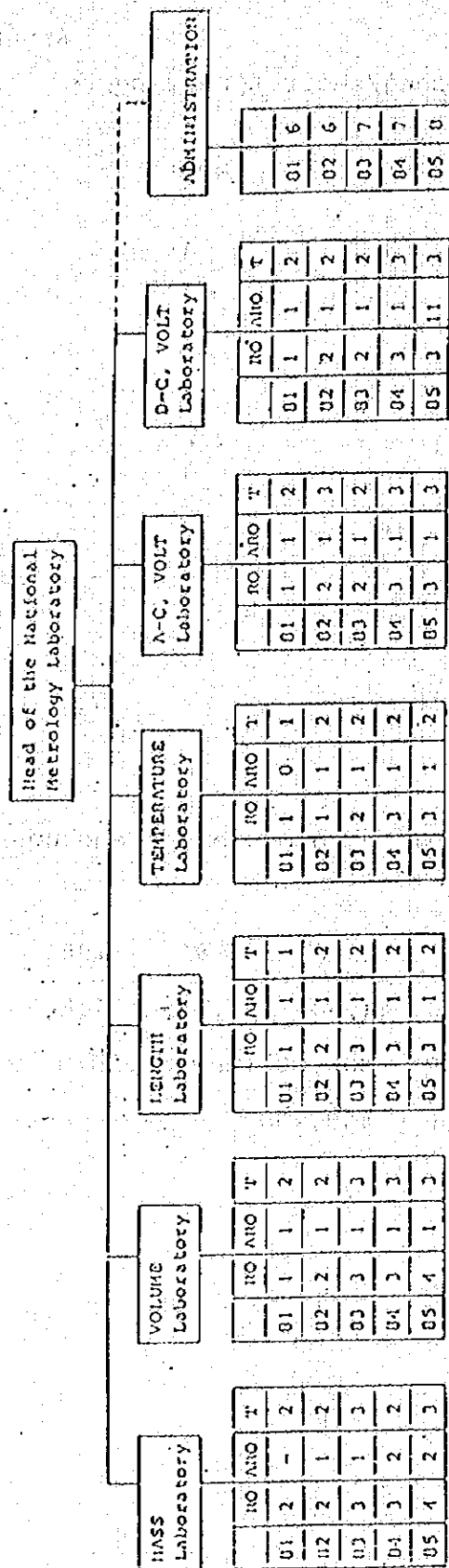
Table 2B-3' No. of Long/short-term experts

FIELDS	Long	Short
Chief Advisor	2	-
Electricity }	1	4
Mass }	1	2
Volume }	1	3
Length	-	2
Temperature	-	2
Repair & install	-	6
Other	-	1
Total	5	20

Table 2B-5' Budget (\$1,000) for procurement and operation by Malaysian Gov't

FUNDING	1981	1982	1983	1984	1985	Total
Operation	39,900	50,000	44,500	51,739	54,000	240,139
Development	30,000	25,000	--300,000(new building)--			355,000
Total	69,900	75,000	--450,239--			595,139

TABLE 2B-4 STAFFING PLAN OF THE METROLOGY UNIT, 1981 - 1985



NOTE: NO: Research Officer

ARO: Assistant Research Officer

T: Technician

	NO	ARO	T	TOTAL
1901	0	4	10	22
1902	12	6	13	31
1903	16	6	15	37
1904	19	7	16	42
1905	21	7	17	45

(Source: JICA & SIRIM: Joint Evaluation Report, 1986)

TABLE 2B-5

BUDGET FOR PROCUREMENT, OPERATION & OTHERS

FUNDING	1988	1989	1990	1991	1992
OPERATION *	144	120	114	114	240
DEVELOPMENT	683	960	1100	3000	2000
R & D	300	218	440	475	681
TOTAL:	1127	1298	1654	3589	2921

* For mileage, hospitals expenses, small maintenance of calibration labs, etc (exclude salary and utility expenses)

Source; SIRIM, Metrology Unit, 1992

TABLE 2B-6

STAFF OF UNIT METROLOGY (AS AT 1 - 11 - 1990)

Year	Senior R. Officer	Research Officer	Asst. R. Officer	Lab Technician	Supporting Staff
1980	1	6	4	8	6
1981	1	7	4	10	6
1982	1 *	11 *	6	13	6
1983	1 *	11 *	6	13	6
1984	1 *	11 *	6	13	6
1985	1	11	6	13	6
1986	1	11	6	13	6
1987	2	10	6	12	5
1988	2	10	6	12	5
1989	4	8	6	12	5
1990	4 ***	7 **	8	12	5

* Few posts not filled up

** Two on study leave

*** Two on study leave

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-7

LIST OF MAJOR EQUIPMENT AVAILABLE AT
SIRIM MEASUREMENT CENTRE

NO.	NAME OF EQUIPMENT	BRAND	MODEL
	<u>A. ELECTRICAL LABORATORY</u>		
1.	AC/DC Calibration Standard	RFL	829G
* 2.	AC Power Calibration System	YEW	2503/58
3.	AC/DC Current Source	CAL. INST	3213 K
4.	Decade Resistance Box	YEW	
5.	Current Shunt	GUILDLINE	9211A
6.	Digital Power Factor Meter	YEW	2524
7.	Kelvin-Varley Voltage Divider	FLUKE	720A
8.	DC Reference Standard	FLUKE	731B
9.	Digital Multimeter	HP	3458A
10.	Precision LCR Meter	HP	4284A
11.	Potentiometer	L&N	7556
12.	Standard Resistors	YEW, L&N	-
13.	Standard Capacitors	GEN. RAD	1409
14.	Multifunction Standard Calibrator	DATRON	4708
15.	RMS Differential Voltmeter	FLUKE	931B
16.	Multifunction Calibrator	FLUKE	5700
17.	High Voltage Digital Meter	T/DENSOKU	TDV-20AC
18.	Cut-off Current Calibrator	T/DENSOKU	TLC-501E
*19.	Standard Cell Enclosure	GUILDLINE	9152
20.	Resistance Measuring System	ESI	2420
21.	Capacitance Bridge	GEN. RAD.	1615-A
22.	Set of Standard Inductors	GEN. RAD.	1409

NO.	NAME OF EQUIPMENT	BRAND	MODEL
<u>B. TIME & FREQUENCY/LABORATORY</u>			
*1.	Rubidium Frequency Standard	NEC	1007
2.	Quartz Oscillator	HP	105A
3.	Distribution Amplifier	HP	5087A
4.	Frequency Difference Meter	TRACOR	527E
5.	Universal Counter	HP	5328B
6.	Synthesizer/Function Generator	HP	3325A
7.	Pulse Function Generator	HP	8116A
8.	Digitizing Oscilloscope	HP	54501A
9.	Programme Oscilloscope Calibrator	TIME ELECT.	9803
10.	Programme Pulse Function Generator	WAVETEK	271
11.	Precision Integrating Sound Level Meter	BRUEL & KJAER	2230
12.	Sound Level Calibrator	BRUEL & KJAER	
13.	Set of Microphones	BRUEL & KJAER	
14.	Cesium Frequency Standard	HP	5061B(Hig
<u>C. TEMPERATURE LABORATORY</u>			
*1.	Standard Platinum Resistance Thermometer	L&N	8167-25B
2.	Standard Pt/Rh Thermocouple	L&N	S-Type
*3.	Standard Mercury-in-Glass	SHINNIHON-KEISOKU	
*4.	Primary Standards Fixed Point		
	Triple Point of Water	FOXBORO	130
	Zinc Fixed Point	CHINO	-
5.	Radiation Pyrometer	TOPCORN	OEP-PM-9
*6.	Oil Bath	CHINO	KT-B204

NO.	NAME OF EQUIPMENT	BRAND	MODEL
7.	Water bath	HETO	KB 22
*8.	Vertical Furnace Unit	CHINO	KT-F109
*9.	High Temperature Horizontal Furnace	CHINO	KT-F106A
*10.	Salth Bath Unit	YOSHIDA	3050-C
11.	Resistance Thermometer Bridge	TINSLEY	5840
12.	Digital Thermometer	TAKEDA-RIKEN	TR2114
13.	Temperature Logger	CHINO	AR-2737
14.	Surface Calibrator	HART-SCIENTIFIC	AR-2737
*15.	Temperature and Humidity Chamber	PLATINOUS F-SERIES	PR-2FT
*16.	Set of Thermocouples	CHINO	-
<u>D. MASS & CAPACITY LABORATORY</u>			
1.	Electronic Mass Comparator	METTLER	EB 60M
2.	Electronic Micro Mass Comparator	METTLER	AT 21
3.	Electronic Multirange Weighing Scale	METTLER	KA 32S
4.	Sets of Standard Weight	-	-
5.	Set of Standard Brass Tank	WRAGG	-
6.	Platform Weighing Scale	METTLER	KN-1500
*7.	Precision Balances	CHYO	-
8.	Set of Standard Glasswares	-	-

NO.	NAME OF EQUIPMENT	BRAND	MODEL
<u>E. FORCE LABORATORY</u>			
1.	Universal Calibrating Machine	MOREHOUSE	ET2500
2.	Sets of Proving Ring	MOREHOUSE	6700
3.	Sets of Load Column		
4.	Testing Machine	CARL MAHR	865E
5.	Roundness Measuring Instrument	RONDCOM	1D-06
6.	Set of Dead Weight Pressure Tester	NAGANO-KEISO	-
7.	Hydraulic Pressure Gauge Tester	BUDENBERG	FIG. 100
8.	Mercury Column Vacuum Tester	BUDENBERG	-
9.	Mercury Column Pressure Tester	BUDENBERG	-
<u>F. LENGTH LABORATORY</u>			
1.	Height Gauge	TESA	MCIRO-11
2.	Gauge Block Calibration Processing	TESA	372
*3.	Sets of Standard Gauge Block	TSUGAMI	B-51
*4.	Gauge Block Comparator	TSUGAMI	TYPE-T
*5.	Length Comparator - 10 Meter	KANSAI-SEIKI	KN.001
*6.	Coordinate Measuring Machine	MITUTOYO	F805
*7.	Dial Calibration Tester	MITUTOYO	170
8.	Universal Measuring Machine	MAHR	TYPE-828
*9.	Universal measuring Microscope	TSUGAMI	200D
*10.	Length Comparator - 1 Meter	KANSAI-SEIKI	-

Appendix 1.2

NO.	NAME OF EQUIPMENT	BRAND	MODEL
	<u>G. FLOW & VOLUMETRIC LABORATORY</u>		
* 1.	Sets of Standard Prover Tank	-	-
2.	Petroleum Master Flowmeter	SMITH	LF4-51
3.	Water master Flowmeter	SMITH	9457
4.	Prototype Automated Gas Meter Calibration Bench	-	-
* 5.	Flow Standard Device with Membrane Flowmeter	KINMON	-

* Equipment supplied by Japanese Government

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-8

EXPENDITURE ON CALIBRATION EQUIPMENT BY MALAYSIAN GOVT.

	1988	1989	1990	1991	1992
TOTAL \$'000	781	853	895	2750	2000

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-9

LEVELS OF ACCURACY ACHIEVED: PROJECT PERIOD & 1992

Parameters	Range	Project Period	1992
Length	0.01um to 10m	± 2ppm*	same
Mass	1mg to 1 ton	± 0.05mg	± 0.02mg
Force	0 to 220 ton	Nil	± 0.025%
Pressure	0 to 8000 psi	0.1%	± 0.01%
Temperature	-50 C to 1400 C	± 0.01 C	same
E.Voltage	0 to 1.5KV	± 5ppm	± 1ppm
E.Resistance	0 to 10 16ohm	± 5ppm	± 1ppm
E.Current	0 to 100A	± 10ppm	± 10ppm
E.Inductance	0 to 1000H	± 0.02%	same
E.Capacitance	0 to 1000F	± 0.002%	same
Frequency/Time	0 to 1GHZ	± 10 -10	±10 -12
R&F Microwave	Nil	Nil	-
Photometry	Nil	Nil	-
Magnetic	Nil	Nil	-
Acoustic	70 - 14db	Nil	± 0.1db
Ref.material	Nil	Nil	-

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-10
Present Status of Calibration Facilities and Services

Parameter	Equipment and Technique	Range	Accuracy (Uncertainty)
LENGTH			
End-Stds	Comparison against standard gauge blocks	1 mm - 100 mm	$\pm 0.05 \mu\text{m} - \pm 0.20 \mu\text{m}$
Line-Stds	Comparison against 1 m standard scales	1 m	$\pm 0.005 \text{ mm}$
	i) 3-axis dimensional measurements using a 3-coordinate measuring machine	X-800 mm Y-500 mm Z-450 mm (min. div. 1 μm)	$\pm 7 \mu\text{m}$ (max.)
	ii) 2-axis dimensional measurements using a universal machine	X-200 mm Y-100 mm (min. div. 0.5 μm)	$\pm 4 \mu\text{m}$ (max.)
	iii) 1-axis dimensional measurements using a universal measuring machine	450 mm	$\pm 5 \mu\text{m}$ (max.)
	iv) Meter Compar- ator	10 m	$\pm 0.01 \text{ mm}$
	v) Angle measurements using sine bars, polygon mirrors, indexing tables, autocollimators etc.		$\pm 0.5'' - \pm 2''$
	vi) Roundness measurements using roundness measuring machine	Max. magnification 10 k times	$\pm 0.2 \mu\text{m}$
MASS	i) Comparison against kilogramme standard using precision balance	1 kg	$\pm 0.6 \text{ mg}$
	ii) Comparison against standards of mass using precision balances	1mg - 20g 20g - 200 g 200g - 3kg 3kg - 50kg 50 kg - 1t Up to 1500 kg	$\pm 0.02 \text{ mg}$ $\pm 0.3 \text{ mg}$ $\pm 0.6 \text{ mg}$ $\pm 200 \text{ mg}$ $\pm 5 \text{ g} + 50 \text{ g}$ $\pm 20 \text{ g}$
VOLUME	iii) Platform Mass Comparator i) Gravimetric methods	Dependent on capacity of weighing balance and physical dimensions of sample	5×10^{-4}
	ii) Comparison against standard volumetric glass	5 ml - 10 l	$6 \times 10^{-3} - 5 \times 10^{-4}$
	iii) Comparison against standard tanks	50 l, 500 l, 2 k l, and 5k l	$\pm 0.1\%$

Present Status of Calibration Facilities and Services (Contd.)

Parameter	Equipment and Technique	Range	Accuracy (Uncertainty)
FORCE	i) Comparison against standard proving rings	Rings capacities: 5,000 kgf, 27,000 kgf, 60,000 kgf, 120,000 kgf and 270,000 kgf	$\pm 0.025\%$ of capacity
	ii) Comparison against load proving devices	10,000 kgf, 30,000 kgf, 60,000 kgf, and 300,000 kgf	$\pm 0.2\%$ of capacity
PRESSURE	i) Standard mano/bareometer	1 atm	$\pm 10 \mu\text{m Hg}$
	ii) Controlled clearance dead-weight piston meters	125 kg/cm ² & 750 kg/cm ²	$\pm 0.01\%$
	iii) Deadweight tester	8000 psi and 1000 kg/cm ²	$\pm 0.05\%$
DENSITY	i) Hydrostatic methods for solids of reasonable dimensions		$5 \text{ parts in } 10^4$
	ii) Standard hydrometers	0.000 - 2.000 g/ml	DS-710
TEMPERATURE	i) Fixed point cells	Tripple point Sn point Zn point	$\pm 0.1 \text{ mK}$
	ii) Comparison against std. mercury-in-glass thermometers	-50°C - 600°C	$\pm 0.02 - 0.05^\circ\text{C}$
	iii) Comparison against std. platinum resistance thermometers	180°C - 630°C	$\pm 1 \text{ mK} - \pm 0.01^\circ\text{C}$
	iv) Comparison against std. thermocouples	630°C - 1064°C	$\pm 0.3^\circ\text{C}$
	v) Comparison against radiation pyrometer	400°C - 1400°C	$\pm 1\%$
ELECTRICAL D.C. Voltage	i) D.C. Self Calibrating System (Measure and Generate)	0 to 1.1 kV	25 ppm
	ii) Potentiometric System (Measure)	0 - 1500V	50 ppm
	iii) D.C. Differential Voltmeter (Measure)	0 - 1100V	$\pm 0.0025\%$ of input
	iv) D.C. Reference Standard (Generate)	10V, 1V, ΔE (000 to 999 μV) 1.018 + ΔE and 1.019 + ΔE	10 ppm - 30 ppm

Present Status of Calibration Facilities and Services (Contd.)

Parameter	Equipment and Technique	Range	Accuracy (Uncertainty)
D.C. Current	i) D.C. Calibrating System (Measure)	0 - 10 A	$\pm 0.08\%$
	ii) Shunt and potentiometer (Measure)	0 - 300 A	$\pm 0.01\% - \pm 0.03\%$
D.C. Resistance	i) D.C. Ratio System	0.1 Ω - 1 M Ω	50 ppm
	ii) Wheatstone Bridge	0.1 Ω - 11,111 M Ω	$\pm 0.03\% - 2\%$
	iii) Precision Resistance Measuring System:		
	Direct measurement	0.01 M Ω - 1.2 M Ω	$\pm 0.001\%$
A.C. Voltage	Comparison measurement	0.1 M Ω - 100 M Ω	
	i) A.C. Calibrator (Measure and Generate)	0.1V - 100V Frequency range: 50 Hz, 60Hz, 400 Hz & 1kHz	$\pm 0.08\%$
	ii) Thermal Transfer Technique (Measure)	0.5V - 1000V Frequency range: 5Hz - 1 MHz	$\pm 0.01\% - 0.2\%$ Depending on range and frequency
	iii) Thermal Voltage Converter	-	± 10 ppm
	iv) Precision A.C. Calibrator (Generate)	1 mV - 1000 V Frequency range: 10 Hz - 1 MHz	$\pm 0.01\% - 0.3\%$
	v) A.C. Differential Voltmeter (Measure)	0.001V - 500 V	$\pm (0.05\% \text{ of input} + 0.025\% \text{ of range})$
		500 V - 1100 V (Frequency 20 Hz - 20 kHz)	$\pm 0.1\% \text{ input}$
	vi) A.C. Reference Standard	10 V r.m.s. 50 Hz	$\pm 0.015\%/30 \text{ days}$
	vii) True R.M.S. Differential Voltmeter	0.01 V - 1100V (10 Hz - 1 MHz)	0.01 V - 500 V (30 Hz - 50 kHz) $\pm (0.05\% \text{ of input} + 0.005\% \text{ range})$
	viii) Thermal transfer Standard System Measure: Current (5 Hz - 100kHz)	0 - 25 mA (without shunts)	Above 500 V - 1100 $\pm 0.02\% - 0.2\%$
		0 - 20 A (with shunts)	depending on range and frequency
	ix) A.C. Calibrator (Measure & Generate)	100 μ A - 10A	$\pm 0.08\%$ or range
	x) Current Transformer	0 - 50 A	$\pm 0.05\%$ or range

Present Status of Calibration Facilities and Services (Contd.)

Parameter	Equipment and Technique	Range	Accuracy (Uncertainty)
A.C. Power	Single-phase AC Power Calibration System	18 KW	$\pm 0.1\%$
Capacitance	Precision Capacitance Bridge	10^{-5} pF - 11.1 pF	0.01% at 1kHz
Inductance	i) Standard Inductor	100 μ H, 1 mH, 100 mH and 1H	$\pm 0.1\%$
	ii) Digital LCR Bridge	0.01 μ H - 99,999 H	$\pm 0.02\%$
Frequency	i) Phase and Frequency Comparator	Up to 10 MHz	$\pm 10^{-11}$
	ii) Synthesiser	Up to 60 MHz	$\pm 10^{-9}$
	iii) Precision digital counters	Up to 1.3 GHz	$\pm 10^{-7}$

At present the number of company using calibration facilities at SIRIM is about 600 of which about 85% is multinational and big scale industry and about 15% is small and medium scale industry.

Total income for 1991 is about M \$640,000

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-11

NO. OF CALIBRATION/MEASUREMENT/VERIFICATION SERVICES PROVIDED

LABORATORIES	1988	1989	1990	1991
MASS	3956	4374	4416	7258
LENGTH	165	336	350	2260
VOLUME	899	731	N.A.	N.A.
FLOW	667	675	1425	296
FORCE & PRESSURE	373	482	518	704
TEMPERATURE	362	536	583	1378
ELECTRICITY	622	803	924	1100
TIME/FREQUENCY	0	0	0	151
TOTAL:	7044	7937	8216	13147
TOTAL (\$):	406883	410147	496165	640000

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-12

SUMMARY OF CALIBRATION SERVICES BY THE METROLOG UNIT
1980 - 1990

Year	Equipment Calibrate	Total Income	Operating Expenses	$\frac{\text{No. 3} \times 100\%}{\text{No. 4}}$
1980	999	22450	249000	8.8
1981	1501	48000	309000	15.5
1982	3146	120000	377000	31.8
1983	1979	175000	560000	31.3
1984	3627	171562	517000	33.3
1985	2697	342228	738417	46.3
1986	5127	404170	683670	59.1
1987	6592	357810	706063	50.7
1988	7044	406883	751000	54
1989	7937	410147	852748	48.1
1990	8216	496265	895337	55.4

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-13

NO. OF STANDARDS ACHIEVED AS AT 31-10-1992

LABORATORIES	PROJECT PERIOD	ADDITIONAL (1992)
MASS	4 x 1 SET	-
LENGTH	4 x 1 SET	-
INDUSTRIAL	1 standard	-
ENGINEERING		
FREQUENCY & ACOUSTIC	1 standard	1 standard
ELECTRICITY	10 standards	2 standards
TEMPERATURE	4 standards	1 standard
VOLUME	7 standards	-
TOTAL:		4 standards

* 1 set refers to primary, secondary, tertiary and working standards

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-14

TRAINING & CONSULTANCY SERVICES BY SIRIM IN METROLOGY

TRAINING/CONSULTANCY	1988	1989	1990
FLOW (T)	1	1	1
ELECTRICITY (C)	0	0	1
TOTAL	1	1	2

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-15

NO. OF INTERNATIONAL INTER-COMPARISON STANDARDS
AS AT 31-10-1992

LABORATORIES	1987 - 1992	COUNTRIES
MASS	3	JAPAN, AUSTRALIA, NEW ZEALAND (1KG)
LENGTH	1	JAPAN (1 METER)
ELECTRICITY	3	JAPAN (1 OHM), CANADA (1 OHM), CANADA (1V)
TEMPERATURE	2	JAPAN, UK (PLATINUM RESISTANT THERMOMETER)
TOTAL:	9	

Source: SIRIM, Metrology Unit, 1992

TABLE 2B-16

NO. OF ACCREDITED LABORATORIES, 1991 - 1992

	1991	1992
LENGTH	1	
PRESSURE	1	1
ELECTRICITY		1
TEMPERATURE		1
INDUSTRIAL ENGINEERING	1	
TOTAL:	1 *	3

* only 1 laboratory was accredited (in 3 parameters)

Source: SIRIM, Metrology Unit, 1992

TABLE 2A-17
LIST OF ACCREDITED LABORATORIES IN MALAYSIA, 1992

No.	Type	Name of Laboratories	Field(s) of testing	State
1.	B	Celcure Chemicals (M) Sdn Bhd	Analysis of copper, chromium and arsenic in treated wood and preservative formulation	Kuala Lumpur
2.	A	Cement Industries (Sabah) Sdn Bhd	Chemical and mechanical (physical) testing of ordinary portland cement and clinker	Sabah
3.	A	Fedmas Assay Office Sdn Bhd	Chemical (assay of gold)	Penang
4.	B	Koppers-Hickson Chemicals (M) Sdn Bhd	same as 1. above	Penang
5.	B	Nusantara Technologies Sdn Bhd	Pressure & mechanical calibrations	Kuala Lumpur
6.	B	Physical Testing Lab., Rubber Technology Centre, RRI	Mechanical (physical) testing of rubber and rubber products	Selangor
7.	A	Ancom Berhad	same as 1. above	Selangor
8.	A	Laporte Chemicals (M) Sdn Bhd	same as 1. above	Selangor

Note: Type A for internal quality control/conditionally available for public testing/registered members only

Type B public testing services

Source: SIRIM, Directory of Certified Products and Companies, and Accredited Laboratories in Malaysia 1992

TABLE 2C-1

LIST OF JAPANESE EXPERTS DESPATCHED AS AT 31-12-1991

	LONG-TERM	SHORT-TERM
OXIDE	1	3
NON-OXIDE	1	3
GLASS CERAMICS	2	3
COORDINATOR	1	13
	---	---
TOTAL:	5	22

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-2

NO. OF COUNTERPARTS TRAINED IN JAPAN AS AT 31-12-1991

	No.
OXIDE	3
NON-OXIDE	3
GLASS CERAMICS	3
OP. OF EQUIPMENT	4

TOTAL:	13

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-3
COUNTERPART'S TRAINING IN JAPAN, AS AT 31-10-1992

Participant	Date	Topic
1. Dr. Ahmad Zaharuddin Idrus	1988.11.07-1988.11.12	Discussion on the project implementation
2. Dr. Ong Khong Seng	- do -	- do -
3. Dr. Radzali Othman	1988.12.05-1988.12.28	Synthesis of rare-earth doped glass ceramics
4. Mr. Ramli Salleh	1989.03.27-1989.08.11	Synthesis and characterisation of metal element doped lanthanum modified lead zirconate titanate (PLZT)
5. Dr. Abdul Hamid Yahya	1989.03.27-1989.06.24	Hot-pressing of silicon carbide
6. Mr. Saidin Karim	1989.03.27-1989.06.24	Operation techniques of scanning electron microscope.
7. Mr. Chang Boon Ping	1989.08.29-1989.11.26	Synthesis of aluminosilicate glass.
8. Ms. Aishah Isnin	1990.03.27-1991.01.27	Synthesis and characterization of metal element doped lanthanum modified lead zirconate titanate.
9. Mr. Ismail Ahmad	1990.09.04-1990.12.28	Synthesis of barium titanate.
10. Dr. Mustaza Hj. Ahmadun	1990.10.29-1990.11.17	Corrosion Protection.
11. Ms. Nor Azmah Abd Kadir	1991.04.02-1991.04.28	Characterization of not-pressed silicon carbide.
12. Mr. Nazarrudin Baharon	1991.06.10-1991-09-22	Hot-pressing of zirconium boride dispersed silicon carbide.
13. Mr. Teng Wan Dung	1991.07.02-1991.09.08	Operation techniques of powder X-ray diffractometer.
14. Mr. Mohamad. Zahid Abdul Malek	1992.01.07-1992.03.15	Rare earth aluminosilicate glass
15. Mr. Saidin Karim	1992.02.11-1992.03.15	Operation techniques on electron microscopy.
16. Mrs. Zubaidah bt. Mohd. Nasir	1992.07.19-1992.08.09	Cathodic Protection.

SOURCE: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-4

INPUT BY JAPANESE GOVT. (M\$1,000) AS AT 17-11-1991

	AMOUNT
EQUIPMENT, TOOLS & OTHERS	4248
COUNTERPART TRAINING	520
EXPERTS DESPATCHED	2321
MULTILATERAL ACTIVITIES	301
CONSULTATIVE TEAMS	176

TOTAL: (MR\$'000)	7566

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-5

LIST OF EQUIPMENT, TOOLS AND OTHER FACILITIES
 PROVIDED BY JICA UNDER THE MALAYSIA-JAPAN PROJECT ON

CHARACTERIZATION OF FINE CERAMICS

=====

<u>Name of equipment</u>	<u>Price in MS</u>
1. Hot pressing machine with accessories	731,260.00
2. Scanning Electron Microscope-Energy Dispersive X-Ray Analyzer With accessories	602,020.00
3. Controlled Atmosphere Furnace with accessories	520,920.00
4. Powder X-Ray Diffractometer with accessories	309,072.20
5. Universal Testing Machine with accessories	224,996.00
6. Precision Surface Grinding Machine with accessories	222,490.00
7. Dielectric measurement apparatus with accessories	155,594.00
8. Sieves and shaker	6,910.00
9. Dilatometer with accessories	62,020.00
10. Recording Spectrometer with accessories	135,014.00
11. Tube furnaces with accessories	101,600.00
12. Cold Isostatic Press with accessories	87,406.00
13. Crucibles	27,700.00
14. Differential Thermal analyzer-Thermal Gravimetry with accessories	67,440.00
15. Balances with accessories	25,530.00
16. Ball Mill Roller with accessories	28,697.60
17. Desiccators with accessories	6,156.60
18. Planetary Mill with accessories	87,648.00
19. Muffle Furnaces with accessories	19,224.00

Appendix 1.3

20. Mortars and Pestles	1,803.80
21. Glass Melting Furnace with accessories	94,932.00
22. Glass Treatment Furnace with accessories	44,030.00
23. Multispectro Colour Metre with accessories	85,860.00
24. Microhardness Tester with accessories	84,080.00
25. Cutting Machines with accessories	25,840.00
26. Microscopes with accessories	28,272.00
27. Ultrasonic baths	2,791.40
28. Drying Oven	1,800.00
29. Abrasive Materials	3,304.00
30. Materials and Chemicals	24,000.00
31. Supporting tools	28,202.08
32. Vehicle (PAJERO)	52,646.11
33. Computer with accessories	26,243.00
34. Photocopy machine with accessories	18,520.00
35. Facsimile Machine	4,300.00
36. Word Processor with accessories	11,848.40
37. Electric typewriter	1,690.00
38. Other office facilities	5,015.52
39. Reference Books	32,606.55
40. Packaging, Shipping and insurances	248,852.90
Total	4,248,336.16
	=====

TABLE 2C-6

INPUT BY MALAYSIAN GOVT. (M\$1,000) AS AT 17-11-1991

	AMOUNT
TRAVELING & TRANSPORTATION	6
CONSUMABLES & SUPPLIES	88
EQUIPMENT & ACCESSORIES	89
REPAIRS & RENOVATION	56
PROFESSIONAL SERVICES	3

TOTAL: (MR\$'000)	242

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-7

NO. OF TECHNICAL STAFF IN THE FINE CERAMICS PROJECT
(AS AT 31-10-92)

LECTURER	2
RESEARCH OFFICER	13
TECHNICIAN	1

TOTAL:	16

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-8

NO. OF COLLABORATIVE RESEARCH AS AT 17-11-1991

		DATE	NATIONALITY
OXIDE	1	6/8/90 -	THAILAND
		1/11/90	INDONESIA
NON-OXIDE	1	13/5/91 -	THAILAND
		10/8/91	
GLASS CERAMICS	1	13/5/91 -	PHILLIPINES
		10/8/91	
TOTAL:	3		7 participants

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-9

TRAINING OF JUNIOR RESEARCHERS AS AT 17-11-1991

	NO.	NATIONALITY	DATE
INSTRUMENTATION	5	BRUNEI	19/11/90
		INDONESIA	15/12/90
		PHILLIPINES	
		SINGAPORE	
		THAILAND	
CHARACTERISATION OF CERAMICS	3	INDONESIA	13/5/91 -
		PHILLIPINES	11/6/91
		SINGAPORE	
TOTAL:	8		

Source: SIRIM, Ceramic Technology Centre, 1992

TABLE 2C-10

Malaysia Participation In Multilateral Activities of Other ASEAN Countries

Name	Term	Multilateral Activity
1. Dr. Ong Khong Seng	1989.06.13-1989.06.17	Singapore Seminar I
2. Dr. Abdul Razak Daud	- do -	- do -
3. Dr. Teh Ser Kok	- do -	- do -
4. Mr. Mohd Zahri Amat Sarbini	1990.02.01-1990.02.28	Singapore Training I
5. Mr. Ooi Cheng Lee	1990.03.04-1990.03.18	Brunei Training I
6. Mr. Mohd. Yazid Ahmad	- do -	- do -
7. Ms. Hasnah Abdul Wahab	1990.05.16-1990.08.17	Brunei Collaborative I
8. Dr. Mohd Jain Noordin Mohd Kassim	1990.08.05-1990.08.09	Brunei Seminar I
9. Ms. Hasnah Abdul Wahab	- do -	- do -
10. Mr. Mustafar Sudin	- do -	- do -
11. Dr. Mustaza Hj. Ahmadun	1990.09.16-1990.09.22	Singapore Seminar II
12. Mr. Tan Cheong Meng	- do -	- do -
13. Mr. Wong Mok Par	- do -	- do -
14. Mr. Mohd Zahri Amat Sarbini	1990.10.15-1990.11.13	Thailand Training I
15. Dr. Kamarudin Ab. Malek	1990.10.16-1990.10.20	Thailand Seminar I
16. Ms. Hasnah Abdul Wahab	- do -	- do -
17. Mr. Mohd. Radzi Mohd. Toff	- do -	- do -
18. Mr. Foo Kon Fah	1990.11.03-1990.11.30	Indonesia Training I
19. Mr. Salleh Omar	1990.12.01-1991.02.28	Indonesia Collaborative I
20. Mr. Nasrudin Jarkasi	1991.01.06-1991.02.02	Philippine Training I
21. Dr. Tee Tiam Ting	1991.03.04-1991.03.10	Indonesia Seminar I
22. Mr. Ahmad Fuad Yusuf	- do -	- do -
23. Mr. Yaakob Ismail	- do -	- do -
24. Dr. Azmi Rahmat	1991.03.04-1991.03.09	Philippine Seminar I
25. Mr. Mohd. Sharif Mustafa	- do -	- do -
26. Mr. Mohd. Amin Hashim	- do -	- do -
27. Mr. Mohd. Abd. Hamid	1991.07.08-1991.08.07	Philippine Training II
28. Mr. Azman Said	1991.09.16-1991.12.14	Philippine Collaborative II
29. Mr. Mansor Hj. Mohamad Sani	1991.09.28-1991.10.27	Indonesia Training II
30. Ms. Habibah Zainal Abidin	1991.11.10-1991.12.05	Thailand Training II
31. Mr. Ooi Ing Hong	1992.05.30-1992.06.28	Indonesia Training III
32. Mr. Azman Said	1992.06.02-1992.06.04	Philippine Seminar II
33. Mr. Abdul Hakim Hashim	- do -	- do -
34. Dr. Mustaza Hj. Ahmadun	- do -	- do -
35. Mr. Zahamruzz Ahmad	1992.06.22-1992.07.05	Brunei Training II
36. Mr. Hashim bin Ngah	- do -	- do -
37. Mr. Mohd. Nazir Zainal Arief	1992.06.29-1992.07.03	Indonesia Seminar II
38. Dr. Tee Tiam Ting	- do -	- do -
39. Mr. Jamaludin M. Daud	- do -	- do -
40. Dr. Ong Khong Seng	1992.09.21-1992.09.23	Singapore Seminar II
41. Mr. Chang Boon Ping	- do -	- do -
42. Mr. Saidin Karim	- do -	- do -
43. Ms. Hasnah bt. Abdul Wahab	- do -	- do -
44. Ms. Norzaila bt Sulaiman	- do -	- do -

Multilateral Activities JFY 1991

Training - 1991.05.13 - 1991.06.11

- | | |
|---------------------------------|------------|
| 1. Mr. Muljadi | Indonesia |
| 2. Ms. Ma Teresa Vidanes Navaro | Philippine |
| 3. Ms. Lee Chong Guek | Singapore |
| 4. Mr. Nimit Sriprang | Thailand |

Collaborative Research Work - 1991.05.13 - 1991.08.10

- | | |
|-------------------------------|------------|
| 1. Ms. Juanita Banal Salvador | Philippine |
| 2. Dr. Laddwan Pduangsap | Thailand |

Seminar - 1991.10.01 - 1991.10.02

- | | |
|---|------------|
| 1. Dr. Masaru Goto | Japan |
| 2. Dr. Shin-ichi Shirasaki | - do - |
| 3. Dr. Akihiko Nukui | - do - |
| 4. Dr. Shinobu Yamaoka | - do - |
| 5. Dr. Takayasu Ikegami | - do - |
| 6. Dr. Hidehiko Tanaka | - do - |
| 7. Dr. Satoru Inoue | - do - |
| 8. Mr. Haji Md. Jumin bin Hj. Marsal | Brunei |
| 9. Ms. Dayang Suzana binte Hj. Awang Adenan | - do - |
| 10. Mr. Hamiddon bin Hj. Md. Said | - do - |
| 11. Mr. Hans Karmel Sudjono | Indonesia |
| 12. Dr. Askamal Abbas | - do - |
| 13. Dr. Tjia May On | - do - |
| 14. Mr. Severino T. Bernardo | Philippine |
| 15. Ms. Natividad R. Villostas | - do - |
| 16. Ms. Josefina R. Celorico | - do - |
| 17. Dr. Tam Chat Tim | Singapore |
| 18. Dr. Khor Khuan Aik | - do - |
| 19. Dr. Chuah Gaik Khuan | - do - |
| 20. Dr. Nongluck Pankurddee | Thailand |
| 21. Dr. Nopadol Chaikum | - do - |
| 22. Dr. Somchal Thongtem | - do - |

Appendix 1.3

Multilateral Activities JFY 1990

Training - 1990.11.19 - 1990.12.15

1. Ms Pangeran Anak Norhashimah Pangeran Hj. Ibrahim	Brunei
2. Ms. Sri Cicih Kurniasih Tarmudi	Indonesia
3. Ms. Natividad Ramoso Villostas	Philippine
4. Mr. Tung Siew Kong	Singapore
5. Ms. Pornup Laoprasopwattana	Thailand

Collaborative Research Work - 1990.08.06 - 1990.11.01

1. Ms Chutima Tantigate	Thailand
2. Ms. Nanick Sulistarihani	Indonesia

Multilateral Activities JFY 1992

Collaborative Research - 1992.05.20 - 1992.08.16

- | | |
|---------------------------|------------|
| 1. Mr. Perdamean Sebayang | Indonesia |
| 2. Mrs. Jocelyn Paz Reyes | Philippine |

(Source: SIRIM, Ceramic Technology Centre, 1992)

TABLE 3A-1

EFFICIENCY

ENOUGH PROJECT INPUTS (YES)

Japanese Side	%
Equipment	71.4
Training	57.1
Experts	57.1
Malaysian Side	
Budget/Funding	84.2
Staffing	95.0
Facilities	80.0
Overall Efficiency of the Project	90.0
Project Succeeded	90.0
(Source: Counterparts)	

TABLE 3A-2

EFFECTIVENESS
ACHIEVEMENT DURING PROJECT PERIOD (MEAN SCORES)

	Electro Plating	Presswork	Welding	Die- Making
Overall	4.17	3.43	4.33	3.78
Advisory Visits	4.00	3.14	4.00	3.25
Test & Inspection	3.71	2.50	3.20	2.75
Tech. Consultancy	4.17	3.29	3.80	3.89
Prototype Fabrication	3.67	3.33	3.00	3.50
Training/Seminars	4.00	3.43	3.60	3.90

(Source: Counterparts)

TABLE 3A-3

EFFECTIVENESS
ACHIEVEMENT OF PROJECT IN TECHNOLOGY TRANSFER

	Mean Score
Overall	4.18
Electroplating	4.13
Presswork	3.63
Welding	4.17
Die-Making	4.11

(Source: Counterparts)

TABLE 3A-4

EFFECTIVENESS

ATTAINMENT OF TECHNOLOGICAL IMPROVEMENT (MEAN SCORES)

	Overall	Electro Plating	Presswork	Welding	Die- Making
Effectiveness of MITEC in 1984	3.90	4.14	2.43	3.60	3.56
Effectiveness of MITEC today	3.63	3.86	3.00	3.60	3.00

(Source: Counterparts)

TABLE 3A-5

EFFECTIVENESS

USEFULNESS OF SIRIM'S SERVICES

	To Respondents	To Local SMI's
Overall	3.67	3.00
Electroplating	3.00	4.00
Presswork	4.50	3.00
Welding	4.00	4.00
Die-Making	3.50	3.50
Others	4.50	4.00

(Source: Beneficiaries)

TABLE 3A-6

EFFECTIVENESS

NO. OF BENEFICIARIES USING MITEC'S SERVICES

	Ever Used	Currently Used	Stopped
Electroplating	3	2	1
Presswork	1	1	
Welding	2	1	1
Die-Making	1	1	

(Source: Beneficiaries)

TABLE 3A-7

EFFECTIVENESS

POPULATION OF BENEFICIARY'S STAFF TRAINED BY SIRIM, 1988-1991

	1989	1990	1991
N	2	3	2
Trained by other local/foreign firms			2
% Trained by SIRIM	100.0	100.0	50.0

(Source: Beneficiaries)

TABLE 3A-8

IMPACT
CONTRIBUTION OF MITEC PROJECT

	Yes (%)	Importance (Mean Scores)
Growth of SMI (in 84)	100.0	3.48
Technological Improvem	100.0	3.45
Unexpected Outcomes	47.4	
Negative Impact	14.3	

(Source: Counterparts)

TABLE 3A-9

IMPACT

% \$ SPENDING ON METAL ENGINEERING IN SIRIM, 1989-1991

	1989	1990	1991
\$ Spend on SIRIM		20.0	40.0
\$ Spend on other Institutions		5.0	15.0
% Spent in SIRIM		80.0	72.7

(Source: Beneficiaries)

TABLE 3A-10

RELEVANCE

% OF RESPONDENTS WHO ANSWERED YES

	Counterpart	Beneficiary	Professional
Goal & Project Purpose still valid	100.0		100.0
Services by SIRIM still relevant	95.2	80.0	100.0
Changes Needed	55.0	50.0	100.0
Adaptations Made	76.9	33.3	100.0
Rate of Adaptation (Mean Scores)	3.10	4.00	2.00
Technological improvement of SMI's in past 5 years (Mean Scores)		4.2	

(Source: Counterparts, Beneficiaries & Professionals)

TABLE 3A-11

RELEVANCE

BENEFICIARIES UTILISATION OF TECHNOLOGICAL SERVICES OF OTHER INSTITUTES

	Yes-(%)	Within Malaysia	Outside Malaysia
Electroplating	16.7	16.7	
Presswork	16.7	16.7	
Welding	16.7		16.7
Die-Making	16.7	16.7	
Test & Checking	16.7	16.7	
Consultation	50.0	16.7	33.3

(Source: Beneficiaries)

TABLE 3A-12

SUSTAINABILITY

PERFORMANCE OF MIDEC/AMTC IN MEETING THE TECHNOLOGICAL NEEDS OF LOCAL SMI

	Counterpart	Beneficiary Respondents Company	Local SMI's	Professional
Overall	3.90	3.00	3.00	2.00
Electroplating	3.50	3.67	3.67	5.00
Presswork	3.17	3.00	3.50	2.00
Welding	3.75	3.00	3.00	2.00
Test & Checking	3.33	3.00	3.00	
Press Die-Making	3.63	3.00	3.00	2.00
Consultation	3.83	3.25	3.00	1.00

(Source: Counterparts, Beneficiaries & Professionals)

TABLE 3A-13

SUSTAINABILITY

ADEQUACY OF RESOURCES FOR MIDEC/AMTC FOR ITS ACTIVITIES
(MEAN SCORES)

	Equipment	Human Resources	Facilities
Overall	3.45	3.36	3.27
Electroplating	3.17	2.86	3.17
Presswork	2.00	2.57	2.50
Welding	3.20	2.80	3.50
Test & Checking	3.29	3.40	
Press Die-Making	3.33	3.22	
Consultation			

Funding

Operational	3.40
Development	3.21
Research & Development	3.86

(Source: Counterparts)

Appendix 2.1

MITEC PROJECT QUESTIONNAIRE RESULT TABLE (COUNTERPART)

(A: No of responses, B: Rating)

		ELECTROPLATING		PRESSWORK		DIE-MAKING		WELDING	
		A	B	A	B	A	B	A	B
0_C	Tech.enhance 1984	5	100.0%	4	75.0%	5	100.0%	2	100.0%
	Input from Japan								
1_1A	Equipment	5	80.0%	4	25.0%	5	100.0%	2	100.0%
1_1A1	Not enough	0		2		0		0	
1_1A2	Obsolete	1		1		0		0	
1_1A3	Others	0		0		0		0	
1_1B	Training in Japan	5	100.0%	4	25.0%	5	40.0%	2	50.0%
1_1B1	Not enough	0		2		2		1	
1_1B2	Not appropriate	0		0		0		0	
1_1B3	Others	0		0		2		0	
1_1C	Technology transfer	5	80.0%	4	75.0%	5	60.0%	2	50.0%
1_1C1	N-enough J.experts	0		0		0		0	
1_1C2	Period too short	1		1		1		1	
1_1C3	N-adequate to need	0		0		1		0	
1_1C4	Others	0		0		0		0	
	Malaysian input								
1_1D	Funding	5	100.0%	4	75.0%	3	100.0%	2	100.0%
1_1E	Facilities	5	100.0%	3	100.0%	5	80.0%	2	100.0%
1_1F	Staffing	5	100.0%	4	75.0%	5	60.0%	2	100.0%
	Achieve.in serv.in 1984								
	Electroplating								
1_2AA	Overall	5	4.4	0		0		0	
1_2AB	Advisory visit/SVs	5	4.2	0		0		0	
1_2AC	Test&Inspect. SVs	5	4.0	0		0		0	
1_2AD	Tec.consul/info SVs	5	4.4	0		0		0	
1_2AE	Proto/Tri.product	5	4.0	0		0		0	
1_2AF	Training Seminars	5	4.2	0		0		0	
	Presswork								
1_2BA	Overall	1	4.0	4	3.3	0		0	
1_2BB	Advisory visit/SVs	1	5.0	4	2.5	0		0	
1_2BC	Test&Inspect. SVs	1	3.0	3	2.3	0		0	
1_2BD	Tec.consul/info SVs	1	5.0	4	2.8	0		0	
1_2BE	Proto/Tri.product	1	5.0	4	3.3	0		0	
1_2BF	Training Seminars	1	5.0	4	3.0	0		0	
	Welding								
1_2CA	Overall	1	5.0	0		0		1	4.0
1_2CB	Advisory visit/SVs	1	5.0	0		0		2	3.5
1_2CC	Test&Inspect. SVs	1	4.0	0		0		2	2.5
1_2CD	Tec.consul/info SVs	1	5.0	0		0		2	3.0
1_2CE	Proto/Tri.product	1	4.0	0		0		2	3.0
1_2CF	Training Seminars	1	5.0	0		0		2	2.5
	Die-making								
1_2DA	Overall	1	4.0	1	3.0	5	4.4	0	
1_2DB	Advisory visit/SVs	1	4.0	0		5	3.0	0	
1_2DC	Test&Inspect. SVs	1	3.0	0		5	2.6	0	
1_2DD	Tec.consul/info SVs	1	5.0	0		5	4.0	0	
1_2DE	Proto/Tri.product	1	4.0	1	4.0	4	4.0	0	
1_2DF	Training Seminars	1	5.0	1	4.0	5	4.0	0	

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Achievement 1978-984									
1_4A	Overall	3	4.3	2	4.0	4	4.5	0	
1_4B	Electroplating	5	4.4	0		1	4.0	0	
1_4C	Presswork	1	5.0	4	3.0	1	5.0	0	
1_4D	Welding	1	5.0	0		1	5.0	2	3.5
1_4E	Die-making	1	5.0	1	3.0	5	4.4	0	
1_5	Output justify Input	5	100.0%	4	75.0%	5	100.0%	2	100.0%
Attain. of tech improvement. in 1984									
2_1A	Overall	3	4.0	0		4	4.3	1	3.0
2_1B	Electroplating	5	4.2	0		0		0	
2_1C	Presswork	1	3.0	4	3.3	0		0	
2_1D	Welding	1	4.0	0		0		2	3.0
2_1E	Die-making	1	3.0	1	3.0	4	4.0	0	
Extent of technology development today									
2_2A	Overall	2	4.0	0		3	4.0	1	3.0
2_2B	Electroplating	5	4.0	0		0		0	
2_2C	Presswork	1	3.0	4	3.0	0		0	
2_2D	Welding	1	4.0	0		0		2	3.0
2_2E	Die-making	1	3.0	1	2.0	5	3.6	0	
2_3	Extent MIDECA/AMTC activities	5	3.8	4	3.5	5	4.4	2	3.0
3_1	Contribution to SMI since 1984	5	100.0%	4	100.0%	5	100.0%	2	100.0%
3_1A	Importance	5	4.0	4	3.0	5	3.8	2	3.0
3_2	Cont.to tech.improve.	5	100.0%	4	100.0%	5	100.0%	2	100.0%
3_2A	Importance	5	4.0	4	2.8	5	3.8	2	3.0
3_3	Unexpected outcome	5	60.0%	3	33.3%	4	25.0%	2	50.0%
3_4	Negative impact	5	20.0%	4	0.0%	5	0.0%	2	100.0%
4_1	P&Goal validation	5	100.0%	4	100.0%	5	100.0%	2	100.0%
4_2	Output relevance	5	100.0%	4	75.0%	5	100.0%	2	100.0%
4_3	Major change	5	40.0%	4	75.0%	5	40.0%	2	50.0%
4_4	Adaptation	2	50.0%	4	50.0%	3	100.0%	2	100.0%
4_4B	Adaptation rate	1	4.0	2	3.5	2	3.5	2	2.5
Meet tech. needs									
5_1A	Overall	2	4.5	1	4.0	5	3.6	0	
5_1B	Electroplating	5	3.6	0		0		0	
5_1C	Presswork	1	3.0	4	3.3	0		0	
5_1D	Welding	1	5.0	0		0		2	3.0
5_1E	Test & checking	1	4.0	0		2	2.5	0	
5_1F	Die-making	1	5.0	0		5	3.8	0	
5_1G	Tech consul/info	1	4.0	0		2	3.5	0	
Resource - equipment									
5_2AA	Overall	2	3.5	1	2.0	5	3.8	0	
5_2AB	Electroplating	5	3.4	0		0		0	

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5_2AC	Presswork	1	4.0	4	1.5	0	0	
5_2AD	Welding	1	4.0	1	2.0	0	2	3.5
5_2AE	Test & checking	1	4.0	0		3	3.7	0
5_2AF	Die-making	1	4.0	1	2.0	2	3.5	0
Human resource								
5_2BA	Overall	3	3.7	1	2.0	4	4.0	0
5_2BB	Electroplating	5	3.0	1	3.0	0	0	
5_2BC	Presswork	1	4.0	4	2.5	0	0	
5_2BD	Welding	1	4.0	1	2.0	0	2	2.5
5_2BE	Test & checking	1	4.0	1	3.0	1	4.0	0
5_2BF	Die-making	1	4.0	1	2.0	5	3.8	0
5_2BG	Tech consul/info	1	4.0	1	1.0	2	4.0	0
Resource - Funding								
5_2CA	Operational	5	3.6	3	3.0	3	4.0	1 3.0
5_2CB	Development	5	3.6	2	2.0	3	3.7	1 2.0
5_2CC	R&D	5	4.0	2	3.0	2	4.0	2 3.5
Resource - Facilities								
5_2DA	Overall	3	3.7	2	1.5	4	3.8	0
5_2DB	Electroplating	5	3.4	0		0	0	0
5_2DC	Presswork	1	4.0	4	2.0	0	0	0
5_2DD	Welding	1	4.0	0		0	2	3.5
5_2DE	Test & checking	1	4.0	0		3	3.0	0
5_2DF	Die-making	1	4.0	0		3	3.3	0
5_3	Service procedure	5	100.0%	3	100.0%	5	80.0%	2 100.0%
MIDRC/AMTC in-house training								
5_4A	Overall	2	50.0%	1	100.0%	2	50.0%	0
5_4B	Electroplating	4	100.0%	0		0	0	0
5_4C	Presswork	0		3	100.0%	0	0	0
5_4D	Welding	0		0		0	2	100.0%
5_4E	Die-making	0		0		4	75.0%	0
5_5	Equipment maint.sys	4	100.0%	3	66.7%	5	60.0%	2 100.0%
Equipment condition								
5_6A	Overall	3	3.7	1	4.0	4	4.0	0
5_6B	Electroplating	5	3.4	0		0	1	3.0
5_6C	Presswork	1	3.0	4	2.0	0	0	
5_6D	Welding	1	3.0	0		1	4.0	2 3.0
5_6E	Die-making	1	3.0	0		4	3.3	0

Appendix 2.1

MITEC PROJECT QUESTIONNAIRE RESULT TABLE (BENEFICIARIES)

(A:No of Responses, B:Rating)

		ELECTROPLATING		PRESSWORK		WELDING		DIE-MAKING	
		A	B	A	B	A	B	A	B
Project succeeded in enhance tech. capability									
0_1A	Their company	3	100.0%	1	100.0%	2	100.0%	1	100.0%
0_1C	Local SMI	2	100.0%	1	100.0%	1	100.0%	1	100.0%
SIRIM's usefulness for their company									
1_2AA	Overall	2	4.0	1	4.0	2	4.0	1	4.0
1_2AB	Electroplating	3	3.0	1	3.0	2	3.0	1	3.0
1_2AC	Presswork	2	4.5	1	4.0	2	4.5	1	4.0
1_2AD	Welding	2	4.0	1	3.0	2	4.0	1	3.0
1_2AE	Die-making	1	4.0	1	4.0	1	4.0	1	4.0
1_2AF	Others	1	5.0	0		1	5.0	0	
for local SMI									
1_2BA	Overall	1	3.0	1	3.0	1	3.0	1	3.0
1_2BB	Electroplating	1	4.0	1	4.0	1	4.0	1	4.0
1_2BC	Presswork	1	3.0	1	3.0	1	3.0	1	3.0
1_2BD	Welding	1	4.0	1	4.0	1	4.0	1	4.0
1_2BE	Die-making	1	4.0	1	4.0	1	4.0	1	4.0
1_2BF	Others	0		0		0		0	
Contribution to growth of:									
2_1A	their company	3	100.0%	1	100.0%	2	100.0%	1	100.0%
2_1A1	Importance	3	3.0	1	4.0	2	3.0	1	4.0
2_1B	local SMI	2	100.0%	1	100.0%	1	100.0%	1	100.0%
2_1B1	Importance	2	3.5	1	4.0	1	4.0	1	4.0
2_2	Increase P-quality	2	0.0%	1	0.0%	2	0.0%	1	0.0%
Become more competitive									
2_3A	to domestics	2	50.0%	1	0.0%	1	0.0%	1	0.0%
2_3B	to foreign countries	1	0.0%	1	0.0%	1	0.0%	1	0.0%
Any other impact on									
2_4A	their company	3	66.7%	1	100.0%	2	50.0%	1	100.0%
2_4B	local SMI	1	100.0%	1	100.0%	1	100.0%	1	100.0%
Negative impact									
2_5A	their company	3	0.0%	1	0.0%	2	0.0%	1	0.0%
2_5B	local SMI	2	0.0%	1	0.0%	1	0.0%	1	0.0%
3_1	Tech. improve. 5 year	3	4.0	1	4.0	2	4.0	1	4.0
SIRIM service still relevant to									
3_2A	their company	3	66.7%	1	100.0%	2	100.0%	1	100.0%
3_2B	local SMI	1	100.0%	1	100.0%	1	100.0%	1	100.0%
Major change									
3_3A	their company	1	100.0%	1	100.0%	1	100.0%	1	100.0%
3_3B	local SMI	1	100.0%	1	100.0%	1	100.0%	1	100.0%
SIRIM adaptation									
3_4A	to their company	1	0.0%	1	0.0%	1	0.0%	1	0.0%

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3_4A2	Adaptation rate	0		1	0.0%	0		1	0.0%
3_4B	to local SMI	1	0.0%	1	0.0%	1	0.0%	1	0.0%
3_4B2	Adaptation rate	0		0		0		0	
Utilize other than SIRIM									
3_5A	Electroplating	2	50.0%	1	100.0%	1	100.0%	1	100.0%
3_5A1	in Malaysia	2	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5A2	Overseas	1	100.0%	0		0		0	
3_5B	Presswork	1	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5B1	in Malaysia	1	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5B2	Overseas	0		0		0		0	
3_5C	Welding	2	50.0%	1	0.0%	2	50.0%	1	0.0%
3_5C1	in Malaysia	0		0		0		0	
3_5C2	Overseas	1	100.0%	0		1	100.0%	0	
3_5D	Die-making	1	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5D1	in Malaysia	1	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5D2	Overseas	0		0		0		0	
3_5E	Test & checking	2	50.0%	1	100.0%	1	100.0%	1	100.0%
3_5E1	in Malaysia	2	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5E2	Overseas	1	100.0%	0		0		0	
3_5F	Consul/information	3	66.7%	1	100.0%	2	100.0%	1	100.0%
3_5F1	in Malaysia	2	100.0%	1	100.0%	1	100.0%	1	100.0%
3_5F2	Overseas	2	100.0%	0		1	100.0%	0	
3_5G	Others	0		0		0		0	
3_5G1	in Malaysia	0		0		0		0	
3_5G2	Overseas	0		0		0		0	
MIDEC/AMTC performance in meeting tech. needs									
to their company									
4_1A1	Overall	2	3.0	1	3.0	2	3.0	1	3.0
4_1A2	Electroplating	2	3.0	1	3.0	1	3.0	1	3.0
4_1A3	Presswork	1	3.0	1	3.0	1	3.0	1	3.0
4_1A4	Welding	1	3.0	1	3.0	1	3.0	1	3.0
4_1A5	Test & checking	1	3.0	1	3.0	1	3.0	1	3.0
4_1A6	Die-making	1	3.0	1	3.0	1	3.0	1	3.0
4_1A7	Consul/information	3	3.3	1	3.0	2	3.0	1	3.0
4_1A8	Others	0		0		0		0	
to local SMI									
4_1B1	Overall	1	3.0	1	3.0	1	3.0	1	3.0
4_1B2	Electroplating	2	3.0	1	3.0	1	3.0	1	3.0
4_1B3	Presswork	1	3.0	1	3.0	1	3.0	1	3.0
4_1B4	Welding	1	3.0	1	3.0	1	3.0	1	3.0
4_1B5	Test & checking	1	3.0	1	3.0	1	3.0	1	3.0
4_1B6	Die-making	1	3.0	1	3.0	1	3.0	1	3.0
4_1B7	Consul/information	1	3.0	1	3.0	1	3.0	1	3.0
4_1B8	Others	0		0		0		0	
4_2	Other tech.SVs request	1	0.0%	1	0.0%	1	0.0%	1	0.0%

Appendix 2.1

MITEC PROJECT QUESTIONNAIRE RESULT TABLE (JAPANESE EXPERT)
(A:No of answers, B:Rating)

		PRESS		WELDING		DIE	
		A	B	A	B	A	B
1-0	Contribution to enhance SMI's tech capability in 1984	2	100.0%	1	100.0%	2	50.0%
Japanese input							
1-1AA	Equipment	2	100.0%	1	100.0%	2	100.0%
1-1AA1	Not enough	0		0		0	
1-1AA2	Obsolete	0		0		0	
1-1AA3	Others	0		0		0	
1-1AB	Training in Japan	2	50.0%	1	100.0%	2	50.0%
1-1AB1	Not enough period	0		0		0	
1-1AB2	Not appropriate	0		0		0	
1-1AB3	Others	0		0		1	
1-1AC	Tech transfer	2	50.0%	1	100.0%	2	50.0%
1-1AC1	Lack of J.expert	0		0		0	
1-1AC2	Too short period	0		0		0	
1-1AC3	Not appropriate	0		0		0	
1-1AC4	Others	0		0		1	
Malaysia input							
1-1BA	Funding	1	100.0%	0		1	100.0%
1-1BB	Facilities	1	100.0%	1	100.0%	2	100.0%
1-1BC	Stuffing	1	100.0%	1	100.0%	1	100.0%
1-1BD	Others	0		0		0	
Achievement in services to SMI in 1984							
Electroplating							
1-2AA	Overall	0		0		0	
1-2AB	Advisory visit/SVs	0		0		0	
1-2AC	Test&inspec. SVs	0		0		0	
1-2AD	Tech.consul/info.SVs	0		0		0	
1-2AE	ProtTP fabrication & trial productions	0		0		0	
1-2AF	Training/Seminars	0		0		0	
Presswork							
1-2BA	Overall	2	3.5	0		1	4.0
1-2BB	Advisory visit/SVs	2	3.5	0		1	4.0
1-2BC	Test&inspection SVs	2	2.5	0		1	3.0
1-2BD	Tech.consul/info.SVs	2	3.5	0		1	4.0
1-2BE	ProtTP fabrication & trial productions	2	3.5	0		1	3.0
1-2BF	Training/Seminars	2	3.0	0		1	4.0
Welding							
1-2CA	Overall	0		1	4.0	0	
1-2CB	Advisory visit/SVs	0		1	3.0	0	
1-2CC	Test&inspection SVs	0		1	2.0	0	
1-2CD	Tech.consul/info.SVs	0		1	4.0	0	
1-2CE	ProtoTPfabrication & trial productions	0		1	3.0	0	
1-2CF	Training/Seminars	0		1	5.0	0	
Die-making							
1-2DA	Overall	1	4.0	0		2	3.0
1-2DB	Advisory visit/SVs	1	4.0	0		1	4.0

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1-2DC	Test&inspection SVs	1	3.0	0		1	3.0
1-2DD	Tech.consul/info.SVs	1	4.0	0		2	3.5
1-2DE	ProtoTP fabrication	1	3.0	0		2	3.0
	& trial productions						
1-2DF	Training/Seminars	1	4.0	0		1	4.0
	Tech. transfer to counterpart						
1-3A	Overall	0		0		0	
1-3B	Electroplating	0		0		0	
1-3C	Presswork	2	3.5	0		1	4.0
1-3D	Welding	0		1	4.0	0	
1-3E	Die-making	1	4.0	0		2	3.5
1-4A	Output justify input	2	100.0%	1	100.0%	2	50.0%
	Contribution in SMI tech. improvement in 1984						
2-1A	Overall	0		0		0	
2-1B	Electroplating	0		0		0	
2-1C	Presswork	2	3.5	0		1	4.0
2-1D	Welding	0		1	4.0	0	
2-1E	Die-making	1	4.0	0		2	3.5
	Attainment of SMI tech improvement in 1984						
2-21A	Overall	0		0		0	
2-21B	Electroplating	0		0		0	
2-21C	Presswork	2	2.5	0		1	3.0
2-21D	Welding	0		0		0	
2-21E	Die-making	1	3.0	0		2	3.0
	Attainment of SMI tech improvement currently						
2-22A	Overall	0		0		0	
2-22B	Electroplating	0		0		0	
2-22C	Presswork	0		0		0	
2-22D	Welding	0		0		0	
2-22E	Die-making	0		0		1	3.0
2-31	Support.SMI needs in 1984	2	3.0	1	4.0	2	3.0
2-32	Support.SMI current needs	1	2.0	0		1	3.0
3-1	Cont.to SMI growth	2	100.0%	1	100.0%	2	100.0%
3-1X	Importance	2	4.0	1	4.0	2	3.5
3-2	Cont.to SMI tech.improve	2	100.0%	1	100.0%	2	100.0%
3-2X	Importance	2	4.0	1	4.0	2	3.0
3-3	Unexpected outcome	2	100.0%	0		2	100.0%
3-4	Negative impact	2	0.0%	1	0.0%	2	0.0%
4-1	Goal&purpose still valid	0		0		1	0.0%
4-21	Meet SMI Tech. needs						
	in 1984	2	100.0%	1	100.0%	2	100.0%
4-22	Meet SMI current						
	Tech. needs	2	100.0%	1	100.0%	2	100.0%
4-3	Major changes	2	0.0%	1	0.0%	1	0.0%

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4-4	Adaptation of SIRIM	0	0	0
4-4X	Adaptation rate	0	0	0
Meet SMI's Tech. needs since 1984				
5-1A	Overall	0	0	0
5-1B	Electroplating	0	0	0
5-1C	Presswork	1	4.0	1 4.0
5-1D	Welding	0	0	0
5-1E	Test&checking	0	0	0
5-1F	Die-making	1	4.0	2 3.5
5-1G	Consul/information	0	0	0
Resources				
Equipment				
5-2AA	Overall	0	0	0
5-2AB	Electroplating	0	0	0
5-2AC	Presswork	0	0	0
5-2AD	Welding	0	0	0
5-2AE	Test&checking	0	0	0
5-2AF	Die-making	0	0	1 2.0
Stuffing				
5-2BA	Overall	0	0	0
5-2BB	Electroplating	0	0	0
5-2BC	Presswork	0	0	0
5-2BD	Welding	0	0	0
5-2BE	Test&checking	0	0	0
5-2BF	Die-making	0	0	1 2.0
5-2BG	Consul/information	0	0	0
Funding				
5-2CA	Operational	0	0	0
5-2CB	Development	0	0	0
5-2CC	R&D	0	0	0
Facilities				
5-2DA	Overall	0	0	0
5-2DB	Electroplating	0	0	0
5-2DC	Presswork	1	3.0	0 0
5-2DD	Welding	0	0	0
5-2DE	Test&checking	0	0	0
5-2DF	Die-making	0	0	0
5-3	Procedure manuals	0	0	0
Training stuffs				
5-4A	Overall	0	0	0
5-4B	Electroplating	0	0	0
5-4C	Presswork	1	0.0%	0 0
5-4D	Welding	0	0	0
5-4E	Die-making	0	0	1 100.0%
5-5	Equipment maint.system	0	0	0
Condition of equipments				
5-6A	Overall	0	0	0
5-6B	Electroplating	0	0	0
5-6C	Presswork	0	0	0

Appendix 2.1

5-6D	Welding	0	0	0
5-6E	Die-making	0	0	0

MITEC PROJECT COUNTERPART COMMENTS

ELECTROPLATING

EFFECTIVENESS

2-4 ANY OTHER COMMENTS

-- In 1984, it was still quite difficult for us (SIRIM & JICA) to introduce these recession or low demand in the market, the SMI's investment in electroplating was somehow quite low.

-- MIDEAC had moved into other area of expertise, e.g. Electroplating had become one of the various activities. As one time it was our prime concentration.

-- Other technologies had also move towards high-tech involvement.

-- We cannot have continuous research activities because *lack of human resources in SIRIM, *lack of technical knowledge, and too few staff involved in electroplating activities.

-- As electroplating, presswork & die-making are still new, expertise from Japan is still needed.

IMPACT

3-3 UNEXPECTED OUTCOMES

-- Wide-spread of the QC concept in both the government & private sectors.

-- Work ethic of Japanese.

-- # of companies had grown and their capabilities developed but we didn't foresee these problem on environmental. Companies not willing to spend for w/water treatment.

-- Work ethic and thinking pattern of ex-MITEC officers (experience in Japan)

3-5 ANY OTHER COMMENTS

-- The Project has enhanced the technical capabilities of our SMIs.

RELEVANCE

4-3 MAJOR CHANGES

-- A number of SMIs had turn into fully automatic system & they begin to cater more high-tech industries such as electronics & defense industries.

-- There should be alteration e.g. electroplate, presswork & die-making -Lapse of 14 years,

4-4 ADAPTATION OF MIDEAC/AMTC TO CHANGING ELECTROPLATING

-- Acquiring new facilities & equipments.

-- Needs more equipments to support our activities.

-- Sending more personnel for studies & training.

-- We need more well experienced & skilled professionals to deals with complicated problems faced by them.

-- SIRIM had set new directive and priority areas such as advance manufacturing. These facilities benefited the mold and dies section immensely. As for the others, not much changes had

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been seen.

-- Yes in the area of Mold and Die-making plus in the area of electroplating/press-work and welding. Why? - priorities set by SIRIM.

-- By improving its services facilities and manpower developed.

4-5 ANY OTHER COMMENTS

-- The Project activities are still going on, although it is at a slower rate.

-- The technical knowledge and equipment acquired during the Project period are out-dated now. (e.g. obsolete equipment - no spare parts & difficult to find)

SUSTAINABILITY

5-2 RESOURCES

-- We need a few more well-trained experienced personnel.

5-3 SERVICE PROCEDURE ESTABLISHMENT

-- Service procedure establishment level is 50%.

5-4 MIDECA/AMTC IN-HOUSE TRAINING

-- No new staffs to warrant in-house trainings.

5-7 ANY OTHER COMMENTS

-- More advanced equipment are needed to cope with the industrial needs. Hence, more advanced technical skills needed too. Thus, we need more advanced technical trainings for our present staff.

-- Singapore, Taiwan and Hongkong, where their technicalities are not as high as other advanced countries, but still higher than ours'.

-- The Project is sustainable because there are still lots of industrial needs allowed.

-- Today, MIDECA not only provide services to local SMIs, but also serve multi-national SMIs, particularly those from Singapore, Taiwan and Hongkong.

-- Most local suppliers won't know where to source for spare parts.

-- Spare parts difficult to get; have to source from Japan.

-- Most of the Project's activities are still going on. However, we always face technical problems in these activities. This might be due to lack of technical Know-how (knowledge) of the staff.

-- More automatic equipments we needed.

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PRESSWORK

EFFICIENCY

1-1 ENOUGH INPUT FROM JAPAN

-- Everything was OK till 1984. (ENOUGH INPUT FROM JAPAN/MALAYSIA)

2-4 ANY OTHER COMMENTS

-- No technology transfer to SMIs, but SMIs only use machines in SIRIM.

-- Additional equipment is needed as our present equipment are not efficient to cater for the current industrial needs.

-- Additional training are needed in order to cope with the advancement of technology.

-- As electroplating, presswork & die-making are still new, expertise from Japan is still needed.

IMPACT

3-3 UNEXPECTED OUTCOMES

-- After the Japanese experts left there was no effort to maintain and improve on the Project.

RELEVANCE

4-2 OUTPUT RELEVANCE

-- Staff has been trained in basic technology. No advancement.

-- Training has it's most of problems, e.g. Language, irrelevance.

4-3 MAJOR CHANGES

-- After MITEC project, SMI visits by Japanese were stopped; waited for SMIs come for help.

-- No increase in personnel:presswork.

-- The Project design should be changed to enable follow-up measures to be under taken.

-- Increase in # of components made locally by SMIs.

-- Increase in % of local content,(e.g. in automobile components)

-- The level of technology in MITEC(MIDEC/AMTC) needs to be upgraded to keep pace with changes in industry. Quite often the SMIs are better off than us.

-- There should be alteration e.g. electroplate,presswork & die-making -Lapse of 14 years.

4-4 ADAPTATION OF MIDEC/AMTC TO CHANGING ELECTROPLATING

-- MIDEC has not kept in touch with needs of industry.

-- Restructure the MIDEC organization to catch for the need of SMIs.

-- There has been very little change in MIDEC/AMTC to meet the changing needs of SMIs.

-- MITEC has changed its organization structure in order to suit to the changes of the industry.(die-making...AMTC)

Appendix 2.2

4-5 ANY OTHER COMMENTS

-- We must be trained how to sustain the development of transferred technology to leap up with the growth of technology in industries.

SUSTAINABILITY

5-2 RESOURCES

-- Not sufficient people - 2 research officers (1 only consultancy & R&D)
-- The equipments available has been out-dated.
-- There is no attempt to improve the skill of the staff.

5-5 EQUIPMENT MAINTENANCE SYSTEM ESTABLISHMENT

-- No, This is due to lack of funding and the static skill level of the staff.

5-6 EQUIPMENT MAINTENANCE

-- Difficulty in obtaining spare parts.
-- Lack of funding.
-- No training provided in machine maintenance.
-- We do not have enough experience, we lack other special tools which are needed for the maintenance of equipment.

5-7 ANY OTHER COMMENTS

-- 7 within 54 persons quitted
-- CNC presswork machine not available in SIRIM but used by local SMI.
-- Follow-up project ... necessary focus on upgrading training of personnel.
-- MIDECS is now involved in R&TD division.
-- May need major investments: equipments & technology in next few years in order to stay with industry, e.g. NTP.
-- Originally 3 persons in presswork in MITEC training, but 2 left, caused lack of staff.
-- There has been no retraining or skill up-grading for the old staff.
-- Training provided for the new staff were basic in nature.
-- It is important to continue the project in view of the advancement of technology which change time to time and to fulfill the needs of SMIs in Malaysia.
-- Trained staff were transferred to other departments without considering the implications.

WELDING

EFFICIENCY

1-1 ENOUGH INPUT FROM JAPAN

- Satisfy the basic need of new & SM industries.

EFFECTIVENESS

2-4 ANY OTHER COMMENTS

- In the initial stage of the Project, SIRIM was the only center which provide such services. So, it benefited them most. In that sense, technology transfer and technical-know-how was very effective.

- MITEC has satisfied the industrial needs at that time. But now, they've more advanced equipment than us. So, SIRIM needs to develop the center in order to cope with the needs.

- We are still useful to those who are new in this industry.

- We need more advanced equipments and technological requirement.

IMPACT

3-4 NEGATIVE IMPACT

Low cost service had pampered their expectation and distorted the value of technology among the SMI.

3-5 ANY OTHER COMMENTS

The benefits of the Project are not directly in many sense (except those who have direct dealings with us), the rest are more of spin-off effects (e.g. brake-shoe industries).

The impact of the project is on the growth of SMIs in Malaysia. We laid the ground work in this industry, and they developed from there.

RELEVANCE

4-4 ADAPTATION OF MIDECA/AMTC TO CHANGING ELECTROPLATING

Keep track with technological growth.

R&D opportunities/effort to develop Malaysian designs.

4-5 ANY OTHER COMMENTS

- 50%-on services; 50%-R&D on local product design machine.

- R&D purpose to reduce import cost.

- The original purpose of the Project still seems relevant to today's needs.

- We should up-grade our activities in terms of technologicality and experience.

SUSTAINABILITY

5-7 ANY OTHER COMMENTS

-- Product designcurrently some products are never been made locally. This is an over reliance to foreign industries. We wish to increase the local-content of our productions.

-- R&D should be separated from services for better outputs in Research. It is necessary for the Project to be carried on. If not, it will cost much higher for SMIs to carry on, particularly in the failure of certain components of the machine.

-- We need also to go into higher level of technology in order to cope with current needs advanced technology. The Project should be carried on because we need more advanced technical knowledge to cope with the current technology which are much more advanced.

-- It developed the ground work of technical expertise after several years of experience dealing with SMI requirements.

Welding equipment requires minimal maintenance. Some obsolete equipment had been replaced with better model.

-- We wish to also provide our technical experience to other 3rd world country who do not need very high technical knowledge....by providing consultation, assistance & technology transfer.

DIE-MAKING

EFFECTIVENESS

2-2 TODAY'S EXTENT TECHNOLOGICAL DEVELOPMENT OF LOCAL SMI'S

- Low impact because after MITEC project, MIDEK stagnated didn't grow.
- SIRIM management to diversify activities/didn't have time to consolidate activities//experiences.

2-4 ANY OTHER COMMENTS

- Multi national companies provide people with skills to private sector/resign to move to private sector. Reason:developing vendors/suppliers
- Project is successful but outsiders is ignorant of service for the local SMIs.
- As electroplating, presswork & die-making are still new, expertise from Japan is still needed.

IMPACT

3-1 SIRIM'S CONTRIBUTION

- SIRIM "competing" to help SMIs, SIRIM is not the only organization contributing to SMIs growth.

3-3 UNEXPECTED OUTCOMES

- Formation of MIDEK (some officers disagreed with disintegrate technology dept./units, because of this reorganization; because no time to consolidate their activities (different management style)
- Specialized service were distributed to most general service.
- Division of MITEC, through absorption into other SIRIM's center.
- Senior staff left to join private companies.

RELEVANCE

4-1 GOAL & PURPOSE VALIDATION

Industry demand of last 4 years tremendous growth of firms and their capability.

Wide range of SMI technology needs in advance/start-ups.

4-3 MAJOR CHANGES

Target groups should be well defined.

Increase of demand for progressive Die.

Have progressed from simple Die to progressive Die.

There should be alteration e.g. electroplate, presswork & die-making -Lapse of 14 years.

4-4 ADAPTATION OF MIDECA/AMTC TO CHANGING ELECTROPLATING

To a small extent. (Wide range of SMI technology needs advanced/startups.)

From simple die to progressive die, to die & mold making.

Previously only doing die-making, now has ventured into mold welding, machine assembly, CNC.

Previously only doing die-making, now has ventured into mold welding, machine assembly, CNC.

Die-making has been able to produce small components for the Proton Saga project.

4-5 ANY OTHER COMMENTS

- Still lack of machine. (AMTC has 3 CNC machine only)
- Hope there will be follow-up in terms of Japanese experts in Die-making.

SUSTAINABILITY

5-2 RESOURCES

- Need a new workshop for AMTC, currently share the same workshop.
- No expert in die-making to solve arising problems.
- There is the special fund at AMTC which is used to pay for O/T, materials.
- Experts needed to guide and upgrade the level of knowledge of staff (especially new ones)
- Need more space

5-4 MIDECA/AMTC IN-HOUSE TRAINING

- The skills among the staff are the same. Prefer to be sent out for training. e.g. CIASTS
- No priority given to in-house training by management.

5-5 EQUIPMENT MAINTENANCE SYSTEM ESTABLISHMENT

- To some extents.
- Maintenance is on breakdown basis, due to limited funds.
- Lack of expertise in maintaining/repairing.
- Too costly to repair equipments.

5-7 ANY OTHER COMMENTS

- Project was very good; a lot more could have been achieved; no continuity, no growth; controller changed.
- After training, transferred to unrelated areas that the expertise learnt is not utilized.

MIDEC/AMTC BENEFICIARIES COMMENTS (ELECTROPLATING)

EFFECTIVENESS

1-5 ANY OTHER COMMENTS

-- Hope SIRIM will upgrade their electroplating, welding and presswork equipment and technology. Still using the equipment donated by JICA during the project period.

-- The rest is up to the entrepreneurs. In past we would like very much to be trained in countries like Japan where most of the equipment and technological know-how were most up to date.

-- Training in a sense that lessons will only be provided once there's a technical problem. Our staff was engaged in a incubator programme sponsored by SIRIM. SIRIM will only provide technology and factory facilities.

IMPACT

2-4a IMPACT FROM SIRIM

-- SIRIM is instrumental in helping me to launch my own company by giving me access to their equipment and services

3-1 TECHNICAL IMPROVEMENT IN PAST 5 YEARS

-- The National car project and multinationals in Malaysia has brought about the technological improvement and growth of local SMIs.

-- Greater opportunity for local SMIs with the support from government in engaging in a big project such as our national car project.

3-2 SERVICES STILL RELEVANT

-- Especially in the area of tool and die-making.

-- Services is not really up to date. Equipment we've been engaged is out dated.

-- Current technical needs require more sophisticated & automated machines.

3-3 MAJOR CHANGES IN DEVELOPING SMIS

-- Need to upgrade the technology in the areas of electroplating, presswork and welding.

3-4 SIRIM'S ADAPTATION TO CHANGE

-- SIRIM have neglected the following areas; electroplating, presswork and welding.

3-6 Any other Comments

-- We only utilized technological services in SIRIM. There's no other technological services in electroplating beside SIRIM.

RELEVANCE

4-2 SERVICES EXPECTED TO SIRIM

-- Technology in Plasma spraying & CAD/CAM network station.

-- SIRIM is still lacking the up to date equipment. In fact we have been utilizing the equipment donated by JICA in 1978. No

Appendix 2.2

new machines have been installed ever since.

-- Up to date services required. Other companies without the involvement with SIRIM has done well with up to date technologies in electroplating services.

4-3 ANY OTHER COMMENTS

-- No emphasis given to sustain the Project; the technology of equipment and skill need to be upgraded from time to time.

MITEC BENEFICIARIES COMMENTS (PRESSWORK, WELDING, DIE-MAKING)

EFFECTIVENESS

1-5 ANY OTHER COMMENTS

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RELEVANCE

4-3 ANY OTHER COMMENTS

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MITEC PROJECT JAPANESE EXPERTS COMMENTS (PRESSWORK)

EFFICIENCY

1-1Ab TRAINING IN JAPAN

-- Training period too short

1-1Ac TECHNOLOGY TRANSFER FROM JAPAN

-- Consultancy period too short

-- My assignment period was only 3 years, too short to transfer technology adequately. Manufacturing has such many components that all of basic technique/skills were unable to be transferred.

1-5 OTHER COMMENTS ON EFFICIENCY

-- I disappointed to shortening instruction period due to delay in completion of building and delivery of equipment

EFFECTIVENESS

2-4 OTHER COMMENTS ON EFFECTIVENESS

-- I don't know current condition of MITEC actually, but I think MITEC is brisk in its activities and succeeded because I see Malaysia has developed rapidly and become a key point in overseas points of Japanese industries on newspaper/TV etc.

IMPACT

3-3 UNEXPECTED OUTCOME

-- Enhancement of efficiency in processing conic parts was promoted by press-work instead of manual processing.

-- Strengthening the ties of friendship between Malaysia and Japan (i.e. Japanese experts and counterparts and also their family).

RELEVANCE

4-1 GOAL & PURPOSE VALIDATION

-- I cannot answer because Project had completed long time ago.

4-5 OTHER COMMENTS ON RELEVANCE

-- On advisory visits to SMI's factory I heard them to want to obtain high-tech & expensive equipment, and felt uneasy about much for work volume.

SUSTAINABILITY

5-7 OTHER COMMENTS ON SUSTAINABILITY

-- I am not sure, but I gladly suppose Malaysia is developing so rapidly that MITEC is sustain its activities.

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MITEC PROJECT JAPANESE EXPERTS COMMENTS (WELDING)

SUSTAINABILITY

5-7 OTHER COMMENTS ON SUSTAINABILITY

-- I don't know how MITEC has changed or not after my assignment because of no information.

MITEC PROJECT JAPANESE EXPERTS COMMENTS (DIE-MAKING)

EFFECTIVENESS

2-4 OTHER COMMENTS ON EFFECTIVENESS

-- I don't know current condition of MITEC actually, but I think MITEC is brisk in its activities and succeeded because I see Malaysia has developed rapidly and become a key point in overseas points of Japanese industries on newspaper/TV etc.

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SUSTAINABILITY

5-7 OTHER COMMENTS ON SUSTAINABILITY

-- I am not sure, but I gladly suppose Malaysia is developing so rapidly that MITEC is sustain its activities.

THE JOINT EVALUATION STUDY ON
THE JAPANESE TECHNICAL COOPERATION PROJECTS
IN MALAYSIA

QUESTIONNAIRE

METAL INDUSTRY TECHNOLOGY CENTER PROJECT

ECONOMIC PLANNING UNIT, PRIME MINISTERS' DEPARTMENT

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER 1992

BACKGROUND OF RESPONDENT

Appendix 2. 3

Name :

Designation :

Division :

Organisation/Firm :

(For SIRIM employee)

Year joined SIRIM :

If Metrology Division, indicate specialty :

☐ Mass

☐ Length

☐ Volume

☐ Electricity

☐ Temperature

If Fine Ceramics Division, indicate specialty :

☐ Oxide

☐ Non-Oxide

☐ Glass and Rare Earth Oxide

If MIDECA, indicate specialty :

☐ Electroplating

☐ Presswork

☐ Die Making

☐ Welding

Which JICA activities did you participate in ?

.....

.....

METAL INDUSTRY TECHNOLOGY CENTRE QUESTIONNAIRE (A) TO COUNTERPARTS

0. Do you think the MITEC Project has succeeded in enhancing the technological capability of local SMIs in Malaysia in 1984?

YES ☐ NO ☐

If "No", please explain: _____

EFFICIENCY

This section is concerned with the efficiency of the Project, i.e. how economically the inputs are translated into outputs. Kindly tick (✓) the most appropriate answer or write down your comments.

1-1. Please evaluate whether there were enough project "Inputs" from Japan/Malaysia between 1978-1984 to enhance the technological capability of SMIs in Malaysia in 1984?

A. Japanese side

a. Equipment

YES ☐ NO ☐

If "No", please choose appropriate reasons.

- ☐ Not enough equipment
☐ Obsolete technology
☐ Others (please specify: _____)

b. Training in Japan

YES ☐ NO ☐

If "No", please choose appropriate reasons.

- ☐ Not enough training
☐ Training not appropriate for the needs of MITEC programmes
☐ Others (please specify: _____)

c. Technology transfer from Japan

YES ☐ NO ☐

If "No", please choose appropriate reasons.

- ☐ Not enough Japanese experts
☐ Consultancy period too short
☐ Mismatch of experts to technological needs
☐ Others (please specify: _____)

B. Malaysian side

a. Budget/Funding

YES ☐ NO ☐

If "No", please explain: _____

b. Facilities
(e.g. space, utilities)

YES ☐ NO ☐

If "No", please explain: _____

c. Staffing (e.g. technicians, professionals) YES ☐ NO ☐

If "No", please explain: _____

d. Others (please specify: _____)

1-2. How do you rate the Project's achievement (1978-1984) in the services of MITEC to the beneficiaries in 1984 ?

A. Electroplating

	No comment	Low				High
	☐	1	2	3	4	5
a. Overall	☐	1	2	3	4	5
b. Advisory visits/services	☐	1	2	3	4	5
c. Test & Inspection services	☐	1	2	3	4	5
d. Technical consultancy/ Information services	☐	1	2	3	4	5
e. Prototype fabrications & Trial productions	☐	1	2	3	4	5
f. Training courses & Seminars	☐	1	2	3	4	5

B. Presswork

	No comment	Low				High
	☐	1	2	3	4	5
a. Overall	☐	1	2	3	4	5
b. Advisory visits/services	☐	1	2	3	4	5
c. Test & Inspection services	☐	1	2	3	4	5
d. Technical consultancy/ Information services	☐	1	2	3	4	5
e. Prototype fabrications & Trial productions	☐	1	2	3	4	5
f. Training courses & Seminars	☐	1	2	3	4	5

C. Welding

	No comment	Low				High
	☐	1	2	3	4	5
a. Overall	☐	1	2	3	4	5
b. Advisory visits/services	☐	1	2	3	4	5
c. Test & Inspection services	☐	1	2	3	4	5
d. Technical consultancy/ Information services	☐	1	2	3	4	5
e. Prototype fabrications & Trial productions	☐	1	2	3	4	5
f. Training courses & Seminars	☐	1	2	3	4	5

D. Die-making

	No comment	Low	1	2	3	4	High
a. Overall	☐		1	2	3	4	5
b. Advisory visits/services	☐		1	2	3	4	5
c. Test & Inspection services	☐		1	2	3	4	5
d. Technical consultancy/ Information services	☐		1	2	3	4	5
e. Prototype fabrications & Trial productions	☐		1	2	3	4	5
f. Training courses & Seminars	☐		1	2	3	4	5

1-4. How do you rate the Project's achievement (1978-1984) in technology transfer to counterparts in 1984?

	No comment	Low	1	2	3	4	High
a. Overall	☐		1	2	3	4	5
b. Electroplating	☐		1	2	3	4	5
c. Presswork	☐		1	2	3	4	5
d. Welding	☐		1	2	3	4	5
e. Die-making	☐		1	2	3	4	5

1-5. Do you think the Project "Outputs" justify the "Inputs" by both the Japanese and Malaysian governments between 1978-1984?

YES ☐ NO ☐

If "No", please explain: _____

1-6. Any other comment: _____

EFFECTIVENESS

This section is concerned with the effectiveness of the Project, i.e. the extent whereby the objectives of the Project are successful. Kindly tick (✓) the most appropriate answer or write down your comments.

2-1. What level of attainment of technological improvement of SMIs in Malaysia in 1984 was contributed by the MITEC Project?

	No comment	Low	1	2	3	4	High
a. Overall	☐		1	2	3	4	5
b. Electroplating	☐		1	2	3	4	5
c. Presswork	☐		1	2	3	4	5
d. Welding	☐		1	2	3	4	5
e. Die-making	☐		1	2	3	4	5

2-2 To what extent is the technological development of local SMIs in Malaysia today derived from "Outputs" of the MITEC Project?

	No comment	Low	1	2	3	4	High
a. Overall	☐		1	2	3	4	5
b. Electroplating	☐		1	2	3	4	5
c. Presswork	☐		1	2	3	4	5
d. Welding	☐		1	2	3	4	5
e. Die-making	☐		1	2	3	4	5

2-3. To what extent do current MIDECA/AMTC activities support the technological requirements of local SMIs in Malaysia?

No comment ☐ Low 1 2 3 4 5 High

2-4. Any other comment: _____

IMPACT

This section is concerned with the impact of the Project, i.e. the effects of the Project; direct or indirect, positive or negative. Kindly tick (✓) the most appropriate answer or write down your comments.

3-1. Do you think the MITEC Project has contributed to the growth of local SMIs in Malaysia since 1984?

YES ☐ NO ☐

If "Yes", how important?

Low 1 2 3 4 5 High

3-2. Do you think the MITEC Project has contributed to technological improvement of local SMIs in Malaysia since 1984?

YES ☐ NO ☐

If "Yes", how important?

Low 1 2 3 4 5 High

3-3. Were there any unexpected outcome of MITEC Project?

YES ☐ NO ☐

If "Yes", please comment: _____

3-4. Have there been any "Negative Impacts" from the MITEC Project on the growth of local SMIs in Malaysia?

YES ☐ NO ☐

If "Yes", please comment: _____

3-5. Any other comment: _____

RELEVANCE

This section is concerned with the relevance of the Project, i.e. whether the objectives of the Project are pertinent and worthwhile. Kindly tick (✓) the most appropriate answer or write down your comments.

4-1. Are the purpose and development goal of the Project (i.e. the technological improvement and growth of local SMIs in Malaysia) still valid?

YES ☐ NO ☐

If "No", please comment: _____

4-2. Are the outputs (services to beneficiaries, etc) of the MITEC Project still relevant to the current technical needs of local SMIs in Malaysia?

YES ☐ NO ☐

If "No", please comment: _____

4-3. Have there been major changes in the development of local SMIs in Malaysia to warrant a change in the MITEC (MIDEC/AMTC) Project design?

YES ☐ NO ☐

If "No", skip Q.4-4.

If "Yes", please comment: _____

4-4. Have the changes adapted in MIDEC/AMTC met the changing needs of local SMIs in Malaysia?

YES ☐ NO ☐

If "No", please comment: _____

If "Yes", please rate the adaptation.

Low 1 2 3 4 5 High

And please elaborate how MIDEC/AMTC has followed these changes.

4-5. Any other comment: _____

SUSTAINABILITY

This section is concerned with the sustainability of the Project, i.e. the extent the Project is continued after the assistance is completed. Kindly tick (✓) the most appropriate answer or write down your comments.

5-1. Please assess the performance of MIDECA/AMTC in meeting the technological needs of local SMIs in Malaysia?

	No comment	Low	1	2	3	4	High
a. Overall	☐	1	2	3	4	5	
b. Electroplating	☐	1	2	3	4	5	
c. Presswork	☐	1	2	3	4	5	
d. Welding	☐	1	2	3	4	5	
e. Test & Checking	☐	1	2	3	4	5	
f. Press Die-making	☐	1	2	3	4	5	
g. Consultation/Information	☐	1	2	3	4	5	
h. Others (please specify: _____)							

5-2. Does MIDECA/AMTC have enough resources for its activities?

A. Equipment

	No comment	Low	1	2	3	4	High
a. Overall	☐	1	2	3	4	5	
b. Electroplating	☐	1	2	3	4	5	
c. Presswork	☐	1	2	3	4	5	
d. Welding	☐	1	2	3	4	5	
e. Test & Checking	☐	1	2	3	4	5	
f. Press Die-making	☐	1	2	3	4	5	
h. Others (please specify: _____)							

B. Human resources (e.g. professional and technical personnels)

	No comment	Low	1	2	3	4	High
a. Overall	☐	1	2	3	4	5	
b. Electroplating	☐	1	2	3	4	5	
c. Presswork	☐	1	2	3	4	5	
d. Welding	☐	1	2	3	4	5	
e. Test & Checking	☐	1	2	3	4	5	
f. Press Die-making	☐	1	2	3	4	5	
g. Consultation/Information	☐	1	2	3	4	5	
h. Others (please specify: _____)							

C. Funding

	No comment	Low				High
a. Operational	☐	1	2	3	4	5
b. Development	☐	1	2	3	4	5
c. R & D	☐	1	2	3	4	5

D. Facilities (e.g. space, utilities,)

	No comment	Low				High
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Test & Checking	☐	1	2	3	4	5
f. Press Die-making	☐	1	2	3	4	5
g. Others (please specify: _____)						

5-3. Has the service procedure (e.g. instruction manuals, job description, operational procedure, etc) been established in MIDECA/AMTC?

YES ☐ NO ☐

5-4. Does MIDECA/AMTC provide in-house training in the various sections?

(If "No", please comment:)

	YES	NO	
a. Overall	☐	☐	_____
b. Electroplating	☐	☐	_____
c. Presswork	☐	☐	_____
d. Welding	☐	☐	_____
e. Press Die-making	☐	☐	_____
f. Others (Please specify: _____)			

5-5. Is the equipment maintenance/procurement/control system established before still ongoing at MIDECA/AMTC?

YES ☐ NO ☐

If "No", please comment: _____

5-6. Please assess the maintenance condition of MIDE/AMTC equipments.
And if you tick "1" or "2", please choose appropriate reasons*.

	No comment	low	1	2	3	4	High	5	reasons*
a. Overall	☐		1	2	3	4	5		_____
b. Electroplating	☐		1	2	3	4	5		_____
c. Presswork	☐		1	2	3	4	5		_____
d. Welding	☐		1	2	3	4	5		_____
e. Press Die-making	☐		1	2	3	4	5		_____
f. Others (Please specify: _____)									

* Reasons:

- A : lack of spare parts/no supplier
- B : lack of expertise in maintaining/repairing
- C : too costly to repair equipments
- D : obsolete model
- E : others (please specify: _____)

5-7. Any other comment: _____

(Thank you for your cooperation!)

THE JOINT EVALUATION STUDY ON
THE JAPANESE TECHNICAL COOPERATION PROJECTS
IN MALAYSIA

QUESTIONNAIRE

METAL INDUSTRY TECHNOLOGY CENTER PROJECT

ECONOMIC PLANNING UNIT, PRIME MINISTERS' DEPARTMENT

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER 1992

JOINT EVALUATION STUDY
INFORMATION BROCHURE

Introduction and Purpose of Survey

This questionnaire is part of a joint evaluation study of the three projects which were funded by Japanese International Cooperation Agency or JICA. The Economic Planning Unit in the Prime Ministers' Department and JICA have engaged independent consultants to conduct a joint evaluation survey. The three projects which are being evaluated are:-

- 1 Metal Industry Technology Centre Project, 1978-84
- 2 National Metrology Laboratory Project, 1981-86
- 3 ASEAN Project on Characterisation of Fine Ceramics, 1987-92

The main purpose of this joint evaluation study is to identify achievements and problems of these projects such that future projects can benefit from the lessons learnt here.

Questionnaire Format

This questionnaire is divided into five (5) main parts:-

- Efficiency: examines how economically inputs are converted into outputs
- Effectiveness: studies the extent whereby the objectives of the project are successful
- Impact: probes into the effects of the project, direct or indirect, positive or negative
- Relevance: investigates whether the objectives of the project are pertinent and worthwhile
- Sustainability: evaluates the extent the project is continued after the assistance is completed

We seek your fullest cooperation in providing frank and honest opinions, and we assure you that opinions expressed herein will not be attributed to individual persons, and that full confidentiality can be expected. All published results of this survey will only be in aggregated statistics.

Guidelines for Completing this Questionnaire

- 1 Most of the answers require you to make an assessment or evaluation, i.e. just to tick the appropriate response. However where appropriate, please feel free to write to comment, especially where you think the project can benefit from your experience or knowledge of the industry, project management, etc. Written comments will be highly valued. We assure you that the information that you provide will not be identified to you without your written permission.
- 2 Please comment on all the sections of the questionnaire in which you are knowledgeable or indicate your answers in the appropriate places.
- 3 An ex-post evaluation is required in most of the cases. Please bear in mind that the reference frame of the assessment is very important. Some of the questions relate to making an assessment just after the project was completed. Others relate to making an assessment of its relevance today.
- 4 Kindly return the completed questionnaire by October 23rd 1992 via enclosed (self-addressed) envelope.

Please contact any of the persons listed below if you have any queries about the nature of the study or survey:-

Mr Takao Kaibara
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Suite 18.1, 18th floor
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Jalan Raja Laut
50350 Kuala Lumpur

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Fax: 03- 293 1790

Mr K. Thillanadarajan
External Assistance Section
Economic Planning Unit
Prime Minister's Department
Jalan Dato Onn
50502 Kuala Lumpur

Tel: 03- 230 0133 or 293 3333
Fax: 03- 291 4268

In case of uncertainty on any aspect of the questionnaire, please contact:

Mr T Rajavijayan
PE Research
86B Jalan SS24/2
Taman Megah
47301 Petaling Jaya
Selangor

Tel: 03- 777 2189
Fax: 03- 777 2087

This particular questionnaire is concerned with Metal Industry Technology Centre Project.

Background of MIDECA/AMTC/Product Design Centre

In 1978, the Japanese government agreed to provide a technical cooperation programme in setting up a Metal Industry Technology Centre (MITEC) Project in Malaysia. The principal purpose of this Project was the development of management and technology in the metal industry in Malaysia. This Project was completed in 1984.

The main areas of technical assistance was in ;

- a. Electroplating
- b. Presswork
- c. Die-making
- d. Welding

However, other supporting aspects were also included :-

- a. Advisory services (to local industries)
- b. Testing and checking
- c. Information services

Since the completion of this Project, all the equipment, manpower and technological capability was absorbed into SIRIM's Metal Industry Development Centre (MIDECA), Advanced Manufacturing Technology Centre (AMTC) and the Product Design Centre. All of the three units and centres are under SIRIM's Industrial Research Division.

You may or may not have heard of the MITEC Project. Whichever the case, please evaluate the services of MIDECA/AMTC/Product Design Centre in relation to your (i.e. your organisation/company) needs.

JOINT EVALUATION STUDY

Date :.....

Background Information

Respondent's name :

Current Designation :

Firm or Organisation :

Address :

No of Workers/Employees : _____

Industrial Sector : _____

(Main business activity): _____

Year Firm/Institution
established : _____-----
Interviewer:Project : MIDEK
Metrology
Fine Ceramics

METAL INDUSTRY TECHNOLOGY CENTRE PROJECT QUESTIONNAIRE TO BENEFICIARIES

0. Do you think SIRIM's MITEC/AMTC has succeeded in enhancing the technological capability of your company and local SMIs in Malaysia?

a. Your company YES ☐ NO ☐

If "No", please explain: _____

b. Local SMIs in Malaysia YES ☐ NO ☐

If "No", please explain: _____

EFFECTIVENESS

This section is concerned with the effectiveness of the Project, i.e. the extent whereby the objectives of the Project are successful. Kindly tick (✓) the most appropriate answer or write down your comments.

1-1. Have your company ever utilized the services of SIRIM (i.e. MITEC/MIDEC/AMTC)?

YES ☐ NO ☐

If "Yes", please indicate when your company first started using these services, and whether your company is still using them.

	Ever Used	Year	Currently Used	Please specify:
a. Electroplating	☐	_____	☐	_____
b. Presswork	☐	_____	☐	_____
c. Welding	☐	_____	☐	_____
d. Press die-making (/Die-making)	☐	_____	☐	_____
e. Others: (_____)	☐	_____	☐	_____

If "No", please skip to No.1-4.

1-2 How useful are/were the various services of SIRIM (i.e. MITEC/MIDEC/AMTC) to the technological improvement of :

A. Your company

	No Comment	Low				High
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Press die-making (/Die-making)	☐	1	2	3	4	5
f. Others: (_____)	☐	1	2	3	4	5

B. Local SMIs

	No Comment	Low	1	2	3	4	High
a. Overall	☐	1	2	3	4	5	
b. Electroplating	☐	1	2	3	4	5	
c. Presswork	☐	1	2	3	4	5	
d. Welding	☐	1	2	3	4	5	
e. Press die-making (/Die-making)	☐	1	2	3	4	5	
f. Others: ()	☐	1	2	3	4	5	

1-3. Which of the services of SIRIM (i.e. MIDECA/AMTC) have your company stopped using? If stopped, please state the reasons:

	Stopped	Reasons:
a. Electroplating	☐	
b. Presswork	☐	
c. Welding	☐	
d. Press die-making (/Die-making)	☐	
e. Others: ()	☐	

1-4. How many have your company's engineering staff been trained in the past years by:

	1989	1990	1991
a. SIRIM	()	()	()
b. other local companies	()	()	()
c. foreign firms	()	()	()

1-5. Any other comment: _____

IMPACT

This section is concerned with the impact of the Project, i.e. the effects of the Project; direct or indirect, positive or negative. Kindly tick (✓) the most appropriate answer or write down your comments.

2-1. Do you think SIRIM (i.e. the MITEC Project/MIDEC/AMTC) has contributed to the growth of your company and local SMIs in Malaysia?

a. Your company

YES ☐ NO ☐

If "Yes", how important?

Low 1 2 3 4 High 5

If "No", Please comment: _____

b. local SMIs in Malaysia

YES ☐ NO ☐

If "Yes", how important?

Low 1 2 3 4 High 5

If "No", Please comment: _____

2-2. Was there an increase in your product's quality after using the services of SIRIM (i.e. the MITEC Project/MIDEC/AMTC) ?

YES ☐ NO ☐

2-3. After using the services of SIRIM (i.e. the MITEC Project/MIDEC/AMTC), have your products become more competitive with other:

a. Domestic companies' products

YES ☐ NO ☐

b. Foreign countries' products

YES ☐ NO ☐

2-4. Were there any other impacts from SIRIM (i.e. the MITEC Project/MIDEC/AMTC) on:

a. Your company

YES ☐ NO ☐

If "Yes", please comment: _____

b. Local SMIs in Malaysia

YES ☐ NO ☐

If "Yes", please comment: _____

2-5. Have there been any "Negative Impacts" from SIRIM (i.e. the MITEC Project/ MIDECA/AMTC) on the growth of:

a. Your company YES ☐ NO ☐

If "Yes", please comment: _____

b. Local SMIs in Malaysia YES ☐ NO ☐

If "Yes", please comment: _____

2-6. How much does your company spend annually on metal engineering services (i.e. presswork, die-making, product design, specialised electroplating and welding) offered by: (if you cannot provide the actual \$/figure, please provide percent distribution)

	1989	1990	1991
a. SIRIM	()	()	()
b. Other local companies	()	()	()
c. Foreign firms	()	()	()

2-7. Any other comment: _____

RELEVANCE

This section is concerned with the relevance of the Project, i.e. whether the objectives of the Project are pertinent and worthwhile. Kindly tick (✓) the most appropriate answer or write down your comments.

3-1. How would you rate the technological improvement and growth of local SMIs in Malaysia over the past 5 years?

Low 1 2 3 4 5 High

Please comment: _____

3-2. Are the services of SIRIM (i.e. MIDECA/AMTC) still relevant to the current technical needs of:

a. Your company YES ☐ NO ☐

Please comment: _____

b. Local SMIs in Malaysia YES ☐ NO ☐

Please comment: _____

3-3. Have there been major changes in the development of your company and local SMIs in Malaysia to warrant a change in the services of SIRIM (i.e. MIDECA/AMTC)?

a. Your company YES ☐ NO ☐

If "Yes", please comment: _____

b. Local SMIs in Malaysia YES ☐ NO ☐

If "Yes", please comment: _____

3-4. Have the changes adapted in SIRIM (i.e. MIDECA/AMTC) met the changing needs of:

a. Your company YES ☐ NO ☐

If "No", please comment: _____

If "Yes", please rate the adaptation. Low 1 2 3 4 High 5

Please elaborate how MIDECA/AMTC has followed these changes. _____

b. Local SMIs in Malaysia YES ☐ NO ☐

If "No", please comment: _____

If "Yes", please rate the adaptation. Low 1 2 3 4 High 5

And elaborate how MIDECA/AMTC has followed these changes. _____

3-5. Do you utilize the technological services of other institutes/companies in/outside of Malaysia?

	Yes	No	Within M'sia	Outside M'sia
a. Electroplating	☐	☐	☐	☐
b. Presswork	☐	☐	☐	☐
c. Welding	☐	☐	☐	☐
d. Press die-making (/Die-making)	☐	☐	☐	☐
e. Test & checking	☐	☐	☐	☐
f. Consultation/Information	☐	☐	☐	☐
g. Others(_____)	☐	☐	☐	☐

3-6. Any other comment: _____

SUSTAINABILITY

This section is concerned with the sustainability of the Project, i.e. the extent the Project is continued after the assistance is completed. Kindly tick (✓) the most appropriate answer or write down your comments.

4-1. Please assess the performance of MIDECA/AMTC in meeting the current technological needs of :

A. Your company

	No comment	Low				High
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Test & Checking	☐	1	2	3	4	5
f. Press Die-making	☐	1	2	3	4	5
g. Consultation/Information	☐	1	2	3	4	5
h. Others (please specify: _____)						

B. local SMIs in Malaysia

	No comment	Low				High
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Test & Checking	☐	1	2	3	4	5
f. Press Die-making	☐	1	2	3	4	5
g. Consultation/Information	☐	1	2	3	4	5
h. Others (please specify: _____)						

4-2. Is there any other technological services in the metal engineering section which you would like to see SIRIM offers?

YES ☐ NO ☐

If "Yes", please comment: _____

4-3. Any other comment: _____

(Thank you for your cooperation!)

THE JOINT EVALUATION STUDY ON
THE JAPANESE TECHNICAL COOPERATION PROJECTS
IN MALAYSIA

QUESTIONNAIRE

METAL INDUSTRY TECHNOLOGY CENTER PROJECT

ECONOMIC PLANNING UNIT, PRIME MINISTERS' DEPARTMENT

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER 1992

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INFORMATION BROCHURE**

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Tel: 03- 293 5416
Fax: 03- 293 1790

Mr K. Thillanadarajan
External Assistance Section
Economic Planning Unit
Prime Minister's Department
Jalan Dato Onn
50502 Kuala Lumpur

Tel: 03- 230 0133 or 293 3333
Fax: 03- 291 4268

In case of uncertainty on any aspect of the questionnaire, please contact:

Mr T Rajavijayan
PE Research
86B Jalan SS24/2
Taman Megah
47301 Petaling Jaya
Selangor

Tel: 03- 777 2189
Fax: 03- 777 2087

This particular questionnaire is concerned with Metal Industry Technology Centre Project.

Background of MIDECA/AMTC/Product Design Centre

In 1978, the Japanese government agreed to provide a technical cooperation programme in setting up a Metal Industry Technology Centre (MITEC) Project in Malaysia. The principal purpose of this Project was the development of management and technology in the metal industry in Malaysia. This Project was completed in 1984.

The main areas of technical assistance was in :

- a. Electroplating
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However, other supporting aspects were also included :-

- a. Advisory services (to local industries)
- b. Testing and checking
- c. Information services

Since the completion of this Project, all the equipment, manpower and technological capability was absorbed into SIRIM's Metal Industry Development Centre (MIDECA), Advanced Manufacturing Technology Centre (AMTC) and the Product Design Centre. All of the three units and centres are under SIRIM's Industrial Research Division.

You may or may not have heard of the MITEC Project. Whichever the case, please evaluate the services of MIDECA/AMTC/Product Design Centre in relation to your (i.e. your organisation/company) needs.

JOINT EVALUATION STUDY

Date :.....

Background Information

Respondent's name :

Current Designation :

Firm or Organisation :

Address :

No of Workers/Employees : _____

Industrial Sector : _____

(Main business activity): _____

Year Firm/Institution
established : _____-----
Interviewer:Project : MIDECA
Metrology
Fine Ceramics

METAL INDUSTRY TECHNOLOGY CENTRE PROJECT QUESTIONNAIRE TO PROFESSIONALS

0. Do you think SIRIM's MIDECA/AMTC has succeeded in enhancing the technological capability of local SMIs in Malaysia?

YES ☐ NO ☐

If "No", please explain: _____

EFFECTIVENESS

This section is concerned with the effectiveness of the Project, i.e. the extent whereby the objectives of the Project are successful. Kindly tick (✓) the most appropriate answer or write down your comments.

1-1. What level of attainment of technological improvement of local SMIs in Malaysia since 1984 has been contributed by the MITEC Project?

	No comment	Low				High
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Die-making	☐	1	2	3	4	5

1-2. To what extent is the technological development of local SMIs in Malaysia today derived from activities of the MITEC Project?

	No comment	Low				High
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Die-making	☐	1	2	3	4	5

1-3. Any other comment: _____

IMPACT

This section is concerned with the impact of the Project, i.e. the effects of the Project; direct or indirect, positive or negative. Kindly tick (✓) the most appropriate answer or write down your comments.

- 2-1. Do you think SIRIM (i.e. the MITEC Project/MIDEC/AMTC) has contributed to the growth of local SMIs in Malaysia?

YES ☐ NO ☐

If "Yes", how important?

Low 1 2 3 4 5 High

Please comment: _____

- 2-2. Were there any other impacts from SIRIM (i.e. the MITEC Project/MIDEC/AMTC) on the development of local SMIs in Malaysia?

YES ☐ NO ☐

If "Yes", please comment: _____

- 2-3. Have there been any "Negative Impacts" from SIRIM (i.e. the MITEC Project/MIDEC/AMTC) on the growth of local SMIs in Malaysia?

YES ☐ NO ☐

If "Yes", please comment: _____

- 2-4. Any other comment: _____

RELEVANCE

This section is concerned with the relevance of the Project, i.e. whether the objectives of the Project are pertinent and worthwhile. Kindly tick (✓) the most appropriate answer or write down your comments.

- 3-1. Do you think the purpose and development goal of the MITEC Project (i.e. the technological improvement and growth of local SMIs in Malaysia) are still valid?

YES ☐ NO ☐

If "No", please comment: _____

- 3-2. Are the services of SIRIM (i.e. MIDECA/AMTC) still relevant to the current technical needs of local SMIs in Malaysia?

YES ☐ NO ☐

If "No", please comment: _____

- 3-3. Have there been major changes in the development of local SMIs in Malaysia to warrant a change in the services of SIRIM (i.e. MIDECA/AMTC)?

YES ☐ NO ☐

If "No", skip Q.3-4.

If "Yes", please comment: _____

- 3-4. Have the changes adapted in SIRIM (i.e. MIDECA/AMTC) met the changing needs of local SMIs in Malaysia?

YES ☐ NO ☐

If "No", please comment: _____

If "Yes", please rate the adaptation. Low 1 2 3 4 5 High

And please elaborate how MIDECA/AMTC has followed these changes.

- 3-5. Any other comment: _____

SUSTAINABILITY

This section is concerned with the sustainability of the Project, i.e. the extent the Project is continued after the assistance is completed. Kindly tick (✓) the most appropriate answer or write down your comments.

4-1. Please assess the performance of MIDECA/AMTC in meeting the current technological needs of local SMIs in Malaysia?

	No comment	Low				High
	☐	1	2	3	4	5
a. Overall	☐	1	2	3	4	5
b. Electroplating	☐	1	2	3	4	5
c. Presswork	☐	1	2	3	4	5
d. Welding	☐	1	2	3	4	5
e. Test & Checking	☐	1	2	3	4	5
f. Press Die-making	☐	1	2	3	4	5
g. Consultation/Information	☐	1	2	3	4	5
h. Others (please specify: _____)						

4-2. Does MIDECA/AMTC have enough resources for its activities?

	No comment	Low				High
	☐	1	2	3	4	5
a. Overall	☐	1	2	3	4	5
b. Equipment	☐	1	2	3	4	5
c. Human Resources	☐	1	2	3	4	5
d. Funding	☐	1	2	3	4	5
e. Facilities	☐	1	2	3	4	5
f. Others (please specify: _____)						

4-3. Any other comment: _____

(Thank you for your cooperation!)