PROTOTYPE FABRICATION/TECHNICAL PROJECT CARRIED OUT AT MITEC DURING 1980 - 1984

Company/organisation	Date/Duration	Project/request	Division concerned
1980			
1. MARA K.L.	Jan - Nov	Feasibility study on the manufacture of rubber tapping knife.	Diemaking and presswork
2. MIDF Industrial Consultants Sdn. Bhd., K.L.	Sep - Dec	Feasibility study on the manufacture of brass shoe eyelet.	Presswork
1981			
1. In-house.	July - Aug	Production of letter opener.	Diemaking, presswork, welding and electroplating
2. In-house.	Oct - Dec	Fabrication of die for brass cup.	Diemaking and presswork
3. Techno-economy, SIRIM.	Dec	Welding of filler base for plastic line.	Welding
1982			
1. SIRIM.	Jan - Feb	Production of key chain.	Diemaking, presswork and electroplating.
2. Kejuruteraan Emas, K.L.	Jan - Feb	Fabrication of die for lamp post socket.	Diemaking and presswork.
3. Bakarim Kreatif, Kelang.	Jan - July	Fabrication of die for kris-shaped letter opener.	Diemaking and presswork
4. Techno-economy, SIRIM.	March	Welding of some components for sauce filling machine.	Welding
5. RBF, SIRIM.	March	Fabrication of aluminium tanks.	Welding
6. Saunders Medallist, K.L.	March	Gold plating on medals.	Electroplating
7. Saunders Medallist, K.L.	April - July	Production of Royal Malaysian Navy Badge.	Diemaking, presswork and electroplating
8. Kejuruteraan Emas, K.L.	May	Fabrication of fuse box samples.	Presswork

	Company/organisation	Date/Duration	Project/request	Division concerned
9.	Malaysian Gauge & Tools Shah Alam.	May	Aluminium welding by TIG on extruded pieces.	Welding.
10.	Technicon Sdn. Bhd., Shah Alam.	May	TIG welding of aluminium nozzle cupping.	Welding.
11.	Malaysian Gauge & Tools, Shah Alam.	May	TIG welding of cast aluminium drilling components.	Welding.
12.	Taba Silver, K.L.	June	Fabrication of coining die for medals and trial gold and silver plating.	Diemaking, presswork and electroplating.
13.	In-house.	July	Fabrication of V-bending die.	Diemaking.
14.	Techno-economy, SIRIM.	July	Welding of stainless steel tanks and vacuum tanks for bottle filling machine.	Welding.
15.	RBF, SIRIM.	July - Aug	TIG welding of aluminium component vessels.	Welding.
16.	In-house.	Aug	Fabrication of semi progressive die for piercing.	Diemaking and presswork.
17.	Kejuruteraan Emas, K.L.	Sept	Fabrication of die for grass cutter blades.	Diemaking and presswork.
18.	Saunders Medallist, K.L.	Sept	Fabrication of progressive die for badge holder.	Diemaking and presswork.
19.	Auto Parts Mfg., Port Klang.	Sept	Fabrication of dies for casing of car radiators.	Diemaking and presswork.
20.	Taba Silver, K.L.	Sept.	Fabrication of blanking die for medal pin.	Diemaking and presswork.
21.	In-house	Oct - Nov	Fabrication of compound die for air filter cover.	Diemaking and presswork.
22.	In-house.	Oct.	Fabrication of 1 ton pneumatic press.	Presswork and welding.
23.	Malaysian Gauge and Tools, Shah Alam.	Oct.	TIG welding of 6063 extruded aluminium.	Welding.
24.	Kuala Lumpur Town Council, K.L.	Oct.	Gold plating of logo for Dewan Bandaraya.	Electroplating.
25.	Kementerian Sains, Teknologi & Alam Sekitar, K.L.	Nov	Production of sports medal for Hari Keluarga KEMSAINS.	Diemaking, presswork, and electroplating.

Company/organisation	Date/Duration	Project/request	Division concerned
26. Malaysian Gauge & Tools, Shah Alam.	Nov	Welding of extruded aluminium pieces.	Welding.
27. Brassware Entreprenuer, Trengganu.	Nov	Trial polishing of cake moulds.	Electroplating.
28. Symposium Perusahaan Logam.	Nov	Chrome plating of medallion.	Electroplating.
29. MARA, K.L.	Nov	Gold plating of clock base.	Electroplating.
30. Kien Component.	Dec	Zinc plating on spring clips for motor car wheel cap.	Electroplating.
31. Mariwasa Kraftangan, K.L.	Nov	Gold plating of clock base.	Electroplating.
1983			
1. Bakarim Emas Kreatif, K.L.	Jan	To trial produced kris shaped souvenir at MITEC.	Presswork
2. ZAL Telecommunication, K.L.	Jan.	Electroplating of mild steel fanning strips besides coat dipping in tin.	Electroplating.
		Repair of forming dies.	Diemaking.
3. Asian NDK Crystal Sdn.Bhd. Sg. Way, Selangor.	Jan.	Repair of a machine component for vacuum pump housing.	Welding.
4. Syarikat Straits E & E Petaling Jaya.	Jan.	Sample fabrication of LLN bracket and shackle.	Presswork and electroplating.
5. Mariwasa Kraftangan, K.L.	Jan - Sept	Fabrication of medal pin holder die.	Diemaking and presswork.
6. Kejuruteraan Emas, K.L.	Feb	Repair of a set of gear teeth.	Welding.
7. Malaysian Gauge and Tools Shah Alam.	Feb	To weld 100 pieces of aluminium jigs.	Welding.
8. Syarikat Perabutahan, Kelang.	Feb	Machining job on metal pieces.	Diemaking.
9. Polymould Tool and Engineering Sungai Way, Selangor.	Feb	To strip hard chromium plating from brass.	Electroplating.
10. Workshop Majutera, Trengganu.	March	Welding of copper plates using copper electordes.	Welding.

	Company/Organisation	Date/Duration	Project/Request	Division concerned
11.	PUSPATI, Bangi.	Mar - Oct	Production of aluminium cans for use in rotary specimen rack.	Diemaking, presswork and electroplating.
12.	Bakarim Emas, Kelang.	April - July	To design and fabricate die for letter opener in the shape of samurai sword.	Diemaking and presswork.
13.	Syarikat Shabas, K.L.	April	Welding of 38 sets of copper plates.	Welding.
14.	Malaysian Gauge and Tools, Shah Alam.	April	Welding of aluminium jigs for electrical conduits.	Welding.
15.	Mariwasa Kraftangan, K.L.	April	Repair work on a coining die.	Diemaking.
16.	Matsushita Electric Sdn. Bhd. Shah Alam.	April	Repair of damage die/mould by TIG welding.	Welding.
17.	K. K. Engineering Enterprise, Kelang.	April	To do a drilling job on 12 pieces of mild steel plates with 12 holes on each plate.	Diemaking.
18.	AG & P (M'sia) Sdn. Bhd., K.L.	April	Use of MITEC's facilities to conduct welders Qualification Test in accordance with ASME Code 1x for high pressure piping in the 6G position.	Welding.
19.	Syarikat Shabas, K.L.	May	Fabrication of copper anodes from 8' x 4' x 5' copper sheets.	Presswork.
20.	Asian Precision, Sg. Way, Selangor.	May	Request to fabricate some special jigs and this was done using the jig machine.	Diemaking.
21.	Kejuruteraan Emas, K.L.	May	Use of the 150T hydraulic press to produce 6 pieces of sample of a car rear speaker dashboard.	Presswork.
22.	Mariwasa Kraftangan, K.L.	May	Coining of TLDM medals, using the 150T hydraulic press.	Presswork.
23.	Syarikat Kejuruteraan Pembinaan Puchong, Selangor.	May	Heat treatment on 8 samples of punches.	Diemaking.
24.	Bank Pembangunan (M), K.L.	May	Fabrication of jig for a particular machine.	Diemaking.

Company/Organisation	Date/Duration	Project/Request	Division concerned
25. Mariwasa Kraftangan, K.L.	May	Replacement of a coining die chipped off during trial production.	Diemaking
26. Syk. Bakarim Kreatif, Kelang.	June	To strip off gold without disturbing the under layer of nickel of jewellery.	Electroplating.
27. Mariwasa Kraftangan, K.L.	June	To set up coining dies in the 150T hydraulic press for production of some medals.	Presswork.
28. Tu Trading, K.L.	June	Manufacture of shelf racks using the press brake and also a few of the press.	Presswork.
29. ZAL Telecommunications, K.L.	June	Try-out of dies fabricated by MITEC.	Presswork.
30. Tu Trading, K.L.	July	Making of shelf racks.	Presswork.
31. Syarikat Kejuruteraan Emas, K.L.	July	Making of 7 sets of samples of Telecoms equipment parts.	Presswork.
32. Bakarim Kreatif, Kelang.	Aug.	Nickel plating on tie pin.	Electroplating
33. Brimal Stampress Sdn. Bhd., Kelang.	Aug.	Weighting their locking system components of the safety belts.	Electroplating.
34. Techno-economy, SIRIM.	Sept.	Fabrication on some parts of bottle filling machine.	Welding.
35. Metrology, SIRIM.	Sept.	Assistance on joining of aluminium chrome wires for their thermocouples.	Welding.
36. Kementerian Sains, Teknologi dan Alam Sekitar, K.L.	Sept.	Silver plating on copper trays.	Electroplating.
37. Johannes Alloy Sdn. Bhd., K.L.	Sept.	Performance test on 4 types of electrodes to study their welding characteristics and x-ray quality.	Welding.
38. Johannes Alloy Sdn. Bhd. K.L.	Oct.	Testing and evaluation of 10 types of electrode with different flux composition.	Welding.
39. MIRDC, SIRIM.	Oct.	Heat treatment on mold collar SKD61-(iron) before machining.	Diemaking.
40. Kraftangan Malaysia, K.L.	Oct.	Slicing jobs on the cow horns using the contour band saw machine.	Diemaking.

Company/Organisation	Date/Duration	Project/Request	Division concerned
41. Bakarim Kreatif, Kelang.	Oct.	Nickel and silver plating on 233 pieces of tie pins.	Electroplating.
42. MIRDC, SIRIM.	Oct.	Heat treatment on mold collar SKD61 - after machining.	Diemaking.
43. Scientific Research Unit, SIRIM.	Oct.	To heat up a stainless steel shaft to a temperature of 300°C before molding work.	Diemaking.
44. Syarikat akg industries, Kelang.	Oct.	The drawings of the die for the production of lids of an oil can.	Diemaking.
45. Scientific Research Unit, SIRIM.	Oct.	Repair of SUS 420 stainless steel shaft.	Welding.
46. PUSPATI, Bangi, Selangor.	Oct - Nov.	Production of 1,500 pieces of aluminium cans for reactor.	Presswork.
47. Inter-east Sdn. Bhd., Trengganu.	Oct.	Design of joint preparation for structural frame of training rig.	Welding.
48. Institut Teknologi MARA, Shah Alam.	Nov.	Making samples for the KTM Badges.	Diemaking
49. Kementerian Sains, Teknologi dan Alam Sekitar, K.L.	Nov - Dec	Fabrication and production of KEMSAINS medals.	Diemaking, presswork and
50. Mariwasa Kraftangan, K.L.	Nov.	Fabrication of punch and electrodes for medals.	Diemaking.
51. Asian Precision (M) Sg. Way, Selangor.	Nov- Dec	Fabrication of 'push plates' for use to push jewels into watches.	Diemaking.
52. Unit RBF, SIRIM	Nov.	Fabrication of stamping blocks for soap mold project.	Diemaking.
53. MIRDC, SIRIM.	Nov.	Guidance and supervision on machining works.	Diemaking.
54. MIRDC, SIRIM.	Dec.	Annealing of SKD 61 high speed steel HSS.	Diemaking.
55. Mariwasa Kraftangan, K.L.	Dec.	Fabrication of punches for badge die (4 punches).	Diemaking.

Company/Organisation	Date/Duration	Project/Request	Division concerned.
56. Malaysian Solar Sdn. Bhd., Kelantan.	Dec.	Improvement of fabrication of SUS solar water tank.	Welding.
57. Bank Negara, Shah Alam.	Dec.	Use of press machine for hobbing process for 1¢ shilling mould.	Presswork.
58. Syarikat Bikino Sdn. Bhd., K.L.	Dec.	Making of samples for 'connector block assembly' for telephone contacts.	Diemaking, presswork, welding and electroplating.
59. Kejduruteraan Emas Sdn. Bhd., K.L.	Dec.	Fabrication of trays for files.	Diemaking and presswork.
60. SIRIM & JICA	Dec. '83 - May '84.	Production of paper weight.	All divisions.
1984			
1. Kilang Wang, Shah Alam.	Jan.	To carry out coining on some 50 cents coining dies.	Presswork.
2. Asian Precision (M), Sg. Way, Selangor.	Jan.	Requested the fabrication of press guide blocks.	Diemaking.
3. Kejuruteraan Emas, K.L.	Jan.	Requested assistance in making 'mascot stage tray' samples.	Diemaking and pressworking.
4. Malaysia Solar Sdn. Bhd., Kota Bharu.	Jan.	Requested information on easier fabrication of water tanks to be heated in sunlight.	Welding.
5. Kejuruteraan Emas, K.L.	Jan- April	Requested fabrication of die for draining and square trays.	Diemaking and presswork.
6. Mariwasa Kraftangan, K.L.	Jan.	Requested fabrication of star shaped punches for production of dies and punches.	Diemaking.
7. Jasnor Enterprise (through H.Q.)	Jan. - Feb.	Requested assistance to fabricate samples for Telecoms products.	Presswork.
8. Syk. Bikino Sdn. Bhd., K.L.	Jan. - Mac.	1) requested the making of samples for the connector assembly block. 2) to machine a special seam welding electrode and chrome copper to suit the welding of connector block assembly.	Diemaking, presswork, welding and electorplating.

Company/Organisation	Date/Duration	Project/Request	Division concerned.
9. RBF, SIRIM.	Feb.	Hardening of moulds for soap making machine project.	Diemaking.
10. Kejuruteraan Emas, K.L.	Feb.	Decorative Ni-Cr plating on mini hanger.	Electroplating.
11. Techno-economy, SIRIM.	March	Fabrication of three units of sauce tanks from stainless steel sheets.	Welding.
12. ZAL Telecommunications, K.L.	March	To try out 2 sets of forming dies which have been repaired by diemaking section.	Diemaking.
13. Tu Trading, K.L.	March	To use the gap shearing machine, 45T press machine, 30T press machine and press brake for the production of shelf racks.	Presswork.
14. Syarikat Kejuruteraan Emas, K.L.		Fabrication of six sets of telephone samples.	Presswork.
15. Sri Holdings Sdn. Bhd., Shah Alam.		To repair aluminium shoe moulds.	Diemaking and welding.
16. Syk. Asian Precision (M) Sg. Way, Selangor.		Grinding works on polishing blocks.	Diemaking.
17. Asian Precision (M) Sdn. Bhd., Selangor.	April	Re-grooving of slots for polishing wheels using the precision form grinder.	Diemaking.
18. Kulitkraft Sdn. Bhd., Petaling Jaya.		Repair of cast aluminium mould with fitting defects by MIG welding, grinding and buffing.	Diemaking and welding.
19. Syk. Kejuruteraan Emas, K.L.		Trial Cu-Ni-Cr plating on clothes.	Electroplating.
20. Metal Formers Sdn. Bhd., K.L.		Fabrication of two samples of LLN product (half cup and 'D' bracket).	Presswork.
21. ZAL Telecommunications, Petaling Jaya.	April	Repair and 'try-out' of a forming die which has the problem of short-life punch.	Diemaking and presswork.
22. Metal Formers Sdn. Bhd., Kuala Lumpur.	April	Design and fabrication of combination dies for the production of telephone gauge.	Diemaking and presswork.
23. Tu Trading, K.L.	April	Production of racks using gap shear, 30T & 45T press and press brake.	Presswork.

	Company/Organisation	Date/Duration	Project/request	Division concerned.
24.	Syk. Metal Formers, Petaling Jaya.	May	Die setting for pressworking production at the newly set-up company.	Diemaking and presswork.
25.	Syk. Metal Formers, Petaling Jaya.	May	Trial production on dies for pole/step/ pipe clamp of Telecom form pole. Dies were fabricated at MITEC.	Diemaking and presswork.
26.	ZAL Telecommunication, Petaling Jaya.	May	Try-out of die repaired at MITEC.	Presswork.
27.	Kraftangan Malaysia, Petaling Jaya.	May	Use of contour saw machine for cutting plates to be used for trophy making.	Diemaking.
28.	Syarikat Metal Formers, Petaling Jaya.	May	Trial production of connector block assembly by spot welding. Special electrode tips and also a special assembly jig were designed for the purpose.	Presswork and welding.
29.	Bakelite Manufacture Sdn. Petaling Jaya.	May	Hard chroming of jig moulds.	Electroplating.
30.	Syk. Metal Formers, Petaling Jaya.	May	To harden 4 sets of bending and piercing dies. Treatment consisted of an hour of heating at 1030°C, air cooling and tempering at 180°C.	Diemaking.

TRAINING COURSE AND SEMINAR HELD AT MITEC FROM 1981 - 1984

Number of participants

Course	Diemaking	Presswork	Welding	Electroplating	Test & Inspection	Total
1981						
1. MITEC General Training Course No: 1 October, 5th - 17th.	2	2	3	6		13
1982						
1. MITEC General Training Course No: 2 January, 11th - 23rd Combined with presswork.	5	-	5	5		15
2. Plating Technology Seminar. February, 4th & 5th.				51		51
3. MITEC General Training Course No: 3 April, 19th - 30th.	5	6	5	6		22
4. CO_2 Arc welding Course. August, 23rd - 26th.			7			7
5. MITEC General Training Course No: 4, September 6th - 18th Combined with presswork.	7		3	9		19
Sub-total	17	6	20	71		114
1983						
1. Lectures on Zinc Plating Technology. January 10th & 11th.				23		23
2. MITEC General Training Course No: 5 February 28th - March 12th.	6	3	9	9		27

Course	Diemaking	Presswork	Welding	Electroplating	Test & Inspection	Total
3. Design and operational Aspects of Progressive dies. April 11th - 16th.	4					4
4. Lectures on nickel chrome plating April 20th - 21st.				8		8
5. Course in Heat treatment of tool steel May 9th - 14th.	2					2
6. MITEC General Training Course No: 6 May 30th - June 11th.	7	2	9	6		24
7. Seminar on waste water treatment for electroplating plant. August 3rd - 4th.				18		18
8. Welding Inspection Seminar August 8th - 10th			24			24
9. Heat-treatment Course September 20th - 21st.	9					9
10. Hardchrome plating lectures September 22nd.				5		5
11. Lectures on gold and silver plating October, 12th and 13th.				14		14
12. MITEC General Training Course No: 7 November 14th - 26th.	7	6	6	5		24
Sub-total	35	11	48	88		182
1984						
1. Lectures on principle and application of EPMA. (26th January)					15	15
2. Regional Training Program in metal-working technology. (20th February - 24th March)			12	10		22

Course	Diemaking	Presswork	Welding	Electroplating	Test & Inspection	Total
3. MITEC General Training Course Diemaking and Presswork (27th February - 10th March)	10					10
4. Design and operation aspects of progressive dies. (23rd - 28th April) Combined with presswork.	10					10
5. Design and operation of deep drawing dies. (9 - 10th May) Combined with presswork.	11					11
6. MITEC General Training Course No: 8 (9th - 20th July)	3		4		6	13
Sub-total	34		16	10	21	81
Total	88	19	87	175	21	390

ACTIVITIES RELATED TO INFORMATION SERVICES CAR..ED OUT AT MITEC DUIRNG 1979 - 1984

Year \ Activities	Publication	VTR/Film	Exhibition/Demonstration	Kind of information given to local industries.
1979	Berita MITEC Vol. 1 No: 1 - 2	VTR shooting at factories. Showing VTR tape for in-house lecture.		Local metal working industries. Pollution control.
1980	Berita MITEC Vol. 2 No: 1 - 2	VTR shooting at factories. Showing VTR tape for in-house lecture. Filming of MITEC activities for "Japanese Economic and Technical Cooperation for Malaysia".	Exhibition of samples made in Malaysia.	Local metal working industries. Machinery and material supplier. Standard. MITEC activities.
1981	Berita MITEC Vol. 3 No: 1 - 2. Program for MITEC Opening Ceremony. Brochures for training course No: 1.	VTR Shooting at factories. Showing VTR tape for General Training Course. VTR editing.	Workshop demonstration at Opening Ceremony.	Local metal working industries. Local supplier. Standards. MITEC activities.
1982	Berita MITEC Vol. 4 No: 1 - 4. MITEC Guide. Brochures for: Training Course No: 2 - 4 CO_2 Arc welding Course. Workshop on Zinc Plating Technology. Symposium Perusahaan Logam.	VTR shooting at factories. VTR editing and dubbing. Filming of MITEC activities for "Diffusion of Technology". Filming of MITEC. Activities for Japanese TV series "The World & Japan Tomorrow".	Demonstration of mini gold plating line at Museum Negara on the Science Day. Exhibition of MITEC's activities at EXPO Pembangunan Kelantan.	Training course and seminar. Local metal working industries. Supplier. Standards. Factory, layout and equipment. Testing procedure. MITEC facilities.

Year \ Activities	Publication	VTR/Film	Exhibition/Demonstration	Kind of information given to local industries.
1983	Berita MITEC Vol. 5 No: 1 - 4. Guide to MITEC. Brochures for: Training Course Program. Training Course No: 5 - 7. Design and Operational Aspects of Progressive Die Course. Nickel Chrome Plating Course in heat-treatment of Tool steel. Seminar on waste water treatment for electro-plating plant. Welding Inspection Seminar. Lecture on gold and silver plating. General information for "Regional Training Program".	VTR shooting at MITEC workshop. Showing MITEC film for visitors.	Exhibition of MITEC activities at "Expo International '83". "FMM Expo". "MACHMEX"	Training course and seminar. Local metal working industries. Supplier. Standards. Costing. Q.C. MITEC facilities.
1984	MITEC Booklet. Berita MITEC Vol. 6 No: 1 MITEC News in Berita SIRIM Vol. 9 No: 1. Opening program for Regional Training Program. Brochures for: Annual announcement of course schedules. Lecture on principle and application of EPMA. Training course on diemaking and presswork.	Showing VTR and slide for Regional Training Program. Showing MITEC film for visitors. Coordination for filming of MITEC's training course in conjunction with TV programme on privatisation. Assisted MARA in the production of slides on metal working.	Exhibition of MITEC activities at "MACHMEX '84" Exhibition of products fabricated at MITEC during Closing ceremony.	Training courses and seminar. Supplier. Costing. Machine and equipment and materials. Testing requirements and standard reference. Reference materials from the library.

Year / Activities	Publication	VTR/Film	Exhibition/Demonstration	Kind of information given to local industries.
Design and operation aspects of progressive dies. Tin plating course. Design and operaiton of deep drawing dies. Heat treatment technology. General Training Course No: 8. Program for Closing Ceremony. General information for Regional Training Program. A compilation on the findings of MITEC about the local metal working industries.				

The following reference are kept in the Library.

1.	Technical books	402
2.	Magazines	214 types
3.	Operation manuals	300 types
4.	Standard:	
	- Malaysian standards.	1286
	- JIS	1070
	- British standards.	
5.	Technical reports:	
	- Compiled by MITEC Officers	301
	- Obtained from outside	271
6.	Annual report	19

REPORT COMPILED BY MALAYSIAN COUNTERPART PERSONNEL WITH ASSISTANCE OF JAPANESE EXPERTS

(April, 1984)

1. ADVISORY/CONSULTANCY REPORT

1.1	Diemaking	45 reports	178 pages
1.2	Presswork	58 reports	380 pages
1.3	Welding	20 reports	79 pages
1.4	Electroplating	16 reports	85 pages
1.5	General	17 reports	56 pages
	Total	156 reports	778 pages

2. TRANSFER OF TECHNOLOGY REPORT AND LECTURE NOTES

2.1	Diemaking and presswork		
	- Technology transfer report	39 reports	340 pages
	- Technical report	9 reports	214 pages
	- Lecture notes	14 notes	128 pages
2.2	Welding		
	- Technology Transfer report	20 reports	80 pages
	- Lecture notes	7 notes	65 pages
	- Lecutre notes for the Regional Training Programme	5 notes	520 pages
2.3	Electroplating		
	- Technology transfer report	19 reports	279 pages
	- Lecture notes	10 notes	128 pages
	- Lecture notes for the Regional Training Programme	16 notes	1080 pages
2.4	Test and Inspection		
	- Lecture notes and training reports	8 reports	105 pages
	Total	145 reports and lecture notes	2939 pages

ADVISORY/CONSULTANCY REPORT - DIEMAKING

NO.	DATE	COMPANY	NO. OF PAGES
01	25.04.79	Solar Mechanical Engineering	6
02	26.04.79	Cheng Hua Engineering Sdn. Bhd.	5
03	26.04,79	Loon Soon Engineering Sdn. Bhd.	5
04	27.04.79	Pan Malaysia Engineering Works	7
05	27.04.79	Soon Wan Engineering Works	5
06	12.06.79	Union Engineering Works	8
07	13.06.79	Teknokraft Engineers	3
08	27.06.79	Soon Seng Engineering Works	8
09	28.06.79	Ah Hoi Engineering Works	4
10	28.06.79	Hap Heng Engineering Works	4
11	29.06.79	Kitz (M) Sdn. Bhd.	4
12	29.06.79	Yodoshi Malleable (M) Sdn. Bhd.	5
13	25.09.79	Pan Malaysia Engineering Works	5
14	26.09.79	Tan Engineering Works	6
15	26.09.79	Union Engineering Works	2
16	11.10.79	Fong Yat & Sons Engineering Works Company	3
17	05.11.79	Matsushita Electric Co. (M) Ltd.	2
18	07.11.79	Perusahaan Besi Sdn. Bhd.	4
19	09.11.79	Ying Cheong Engineering Works Sdn. Bhd.	3
20	26.11.79	Polymould Tool Engineering Sdn. Bhd.	6
21	28.11.79	Heapson Engineering Works Co.	2
22	28.11.79	Richard Patterson Simons Engineering Sdn. Bhd.	3
23	01.12.79	Power Steel and Electroplating Sdn. Bhd.	6
24	16.01.80	Solar Mechanical Engineering	1
25	18.01.80	Progress Casting Sdn. Bhd.	2
26	05.02.80	Godrej (M) Sdn. Bhd.	5
27	08.02.80	Oriental Manufacturing Sdn. Bhd.	6
28	09.05.80	Gallant Precision Tools & Engineering	2

NO.	DATE	COMPANY	NO. OF PAGES
29	15.05.80	Gallant Precision Tools and Engineering	2
30	20.05.80	Usaha Mahir Engineering (M) Sdn. Bhd.	3
31	30.05.80	Kejuruteraan Faun Yee Sdn. Bhd.	7
32	23.06.80	Soon Hoe Engineering Works	3
33	25.06.80	Heng Lee Engineering	2
34	26.06.80	Choon Hin Engineering Works Sdn. Bhd.	5
35	27.06.80	Malaysian Bolts and Nuts Engineering	5
36	27.06.80	Syk. Kuantan Engineering Works	3
37	10.07.80	Pembuatan Letrik Kejayaan Sdn. Bhd.	6
38	31.07.80	Precision Tools and Engineering Co.	2
39	08.09.80	Loon Sunn Engineering Works	2
40	09.09.80	Grindtex Precision Tools and Engineering Sdn. Bhd.	3
41	10.09.80	Advanced Precision Engineering	3
42	26.11.80	Heap Leak Mould Works	3
43	28.11.80	Loh Kim Teow Engineering Sdn. Bhd.	4
44	28.11.80	Mak Cheok Pui Foundry	3
45	28.11.80	Sung Lee & Company	3

ADVISORY/CONSULTANCY REPORT - PRESSWORK

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02	16.05.79	Tan Wah Seng Sdn. Bhd.	5
03	16.05.79	Far East Metal Works	10
04	17.05.79	Tan Engineering	5
05	18.05.79	Usahaniaga Teknik Sdn. Bhd	4
06	11.06.79	Kwan Cheong Engineering Sdn. Bhd	4
07	13.06.79	Chow Engineering Works	9
08	14.06.79	Kris Components Sdn. Bhd.	10
09	15.06.79	Chip Yew Machinery Plastic Manufacturer Sdn. Bhd.	7
10	24.09.79	Ngai Cheong Metal Works	3
11	27.09.79	Metal Deck	4
12	27.09.79	Kris Component Sdn. Bhd.	8
13	02.10.79	Patco Malaysia Sdn. Bhd.	8
14	09.10.79	Malaysia Metal Industries	13
15	11.10.79	Siew Cheong Engineering Works	7
16	12.10.79	Friends Metal Ware Foundry Sdn. Bhd.	9
17	12.10.79	Luen Heng Lamp Shades Industries Sdn. Bhd.	6
18	10.10.79	Choo Bee Metal Industries Sdn. Bhd.	7
19	13.10.79	Tan Lan Bicycle Accessories Manufacturer	9
20	06.11.79	NEC Malaysia Sdn. Bhd.	4
21	07.11.79	Abe Hatome (M) Sdn. Bhd.	7
22	08.11.79	Tamura Electric (M) Sdn. Bhd	7
23	30.11.79	Metal Pak (M) Sdn. Bhd	8
24	10.01.80	Patco Malaysia Sdn. Bhd	6
25	11.01.80	Ngai Cheong Metal Works	2
26	16.01.80	Eastern Metal Works	3
27	21.01.80	Impact Industries (M) Sdn. Bhd.	5
28	06.02.80	United Stainless Steel Industry	8

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30	08.02.80	Hock Cheong Metal Manufacturer	14
31	25.04.80	Patco (M) Sdn. Bhd.	13
32	07.05.80	United Stainless Steel Industry (M) Bhd.	10
33	09.05.80	Patco (M) Sdn. Bhd.	4
34	15.05.80	Bakelite Manufacture Sdn. Bhd.	8
35	18.05.80	Usaha Niaga Teknik Sdn. Bhd.	4
36	19.05.80	Malaysia Pistons	7
37	19.05.80	United Bolts and Nuts Sdn. Bhd	3
38	22.05.80	Patco (M) Sdn. Bhd.	3
39	16.06.80	Ngai Cheong Metal Works	12
40	24.06.80	Malayan Metal Works	4
41	25.06.80	Tuah Transport Engineering Sdn. Bhd.	5
42	25.06.80	Usaha Industries (Timor) Sdn. Bhd.	7
43	25.06.80	Kian Hin Tin Factory	3
44	07.07.80	Ngai Cheong Metal Works	3
45	28.07.80	Ngai Cheong Metal Works	3
46	08.09.80	Auto Parts Manufacturers Co. Sdn. Bhd.	5
47	03.10.80	Soon Seng Wire Products Sdn. Bhd.	3
48	30.10.80	Petaling Metal Works Sdn. Bhd.	4
49	03.11.81	Kien Component Industry	4
50	25.11.80	Precico Sdn. Bhd.	3
51	25.11.80	Stainless Products Sdn. Bhd.	7
52	08.12.80	Hong Leong Yamaha Motor Sdn. Bhd.	4
53	10.12.80	Automative Industries Sdn. Bhd.	5
54	12.12.80	Kein Hing Industrial Sdn. Bhd.	4
55	17.12.80	Ngai Cheong Metal Works	7
56	20.09.82	Conway Terminals Manufacturer Sdn. Bhd	8
57	27.10.82	Matsushita Electric Company	10
58	18.11.83	Toshiba (M) Bhd.	5

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02	16.05.79	Teknicon Sdn. Bhd.	5
03	27.06.79	Tai Chong Engineering Sdn. Bhd.	4
04	28.06.79	Choi Heng Engineering Works	2
05	28.06.79	Wong Chin Loy Factory	4
06	29.09.79	CSC Kemico Sdn. Bhd.	6
07	01.10.79	Syk. Kejuruteraan Emas	5
08	09.10.79	Mercury Engineering Sdn. Bhd.	3
09	12.10.79	Metal Engineering Technology Centre	3
10	05.11.79	Federal Iron Works Sdn. Bhd.	7
11	09.11.79	Hargill Malaysia Sdn. Bhd.	2
12	11.01.80	Federal Iron Works	5
13	17.01.80	Malayan Welding Products	6
14	21.01.80	Mechanical Handling Engineering	4
15	15.05.80	Hargill Malaysia Sdn. Bhd.	5
16	11.06.80	Hargill Malaysia Sdn. Bhd.	2
17	23.06.80	Deraman Abdullah dan Rakan-rakan Sdn. Bhd.	3
18	23.06.80	Hiliran Engineering Works	4
19	27.11.80	Sinar Kimpal	5

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05	10.11.79	Electrobrite Metal Finishing Works	3
06	10.11.79	Peter Galvanizing Works	3
07	22.11.79	Ambadi Engineering Bhd.	7
08	24.11.79	Sunlight Electroplating Works	4
09	05.02.80	South Malaysia Industries Bhd.	7
10	07.02.80	Sinar Enterprise	8
11	06.05.80	Hock Cheong Metal Manufacture	3
12	06.05.80	Tong Meng Company (M) Bhd.	3
13	06.05.80	Sinar Enterprise	4
14	07.05.80	Ever United Electroplating Sdn. Bhd.	3
15	25.11.80	Armstrong Cycle Parts Sdn. Bhd.	5
16	26.11.80	Tat & Company	3

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03	08.10.79	Perak SEDC	2
04	08.10.79	Perak Chinese Chamber of Commerce	2
05	10.10.79	Ungku Omar Polytechnic	2
06	11.10.79	MARA, Perak	1
07	12.10.79	MIDA, Perak	1
08	23.06.80	Trengganu SEDC	5
09	23.06.80	MARA, Trengganu	3
10	25.06.80	Kelantan SEDC	3
11	25.06.80	MARA, Kelantan	3
12	27.06.80	Pahang SEDC	4
13	27.06.80	MARA, Pahang	5
14	28.06.80	MIDA, Pahang	3
15	26.11.80	Institute Latihan Perindustrian Prai	15
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02	08.12.82	Bulging operation	4
03	30.10.82	Medal pin holder die	5
04	11.12.82	Automatic copper tube cutting device	4
05	18.01.83	Making of product samples	4
06	12.01.83	Progressive die repair	9
07	21.04.83	Try-out of the coining die for Syarikat Mariwasa Kraftangan	3
08	21.04.83	Progressive die for electrical terminal (setting and trial production)	3
09	22.04.83	Cam operated piercing die	5
10	23.04.83	Overhauling, maintenance, setting and trial production of 13 sets of dies	4
11	29.04.83	Design and fabrication of safety guard for the press brake	3
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13	27.04.83	Rubber dies for presswork	6
14	21.05.83	Know-how 100-1 (piercing and shearing)	6
15	11.05.83	Mislocation of pilot holes (progressive dies)	1
16	04.83	Press progressive dies	34
17	11.04.83	Design and operation aspects of progressive dies	94
18	12.05.83	Finish blanking	5
19	20.05.83	Shaving (I), (II)	11
20	20.06.83	Know-how 100-2 (piercing and shearing)	6
21	19.01.83	Finish marks	2
22	15.06.83	Heat treatment of machine structural steels	31
23	19.01.83	Limits and fits for engineering	13
24	19.01.83	JIS of fits	8
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27	22.01.83	Progressive die	2
28	29.07.83	Know-how 100-4 (pierce holes near the edge)	4
29	20.04.83	Physical characters of elements and metals	2
30	20.10.83	Know-how 100-5 (pierce and blank narrow slots and bridges)	5
31	03.11.83	How to make light post	4
32	21.11.83	Outline of heat treatment	28
33	21.11.83	Outline of progressive die	13
34	08.12.83	Know-how 100-6 (pierce hole as small as possible)	7
35	19.02.84	Press oil	
36	10.04.84	Spring back and remedies (I)	10
37	12.04.84	Remedies of spring back	
38	21.04.84	Know-how 100-25 (reduce spring back of side wall)	4
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01	30.11.80	Rubber tapping knife	14
02	30.12.80	Brass show eyelet	16
03	11.11.82	Air filter cover die	30
04	12.12.82	Prototype fabrication and trial production for Kementerian Sains.	24
05	20.12.82	Prototype fabrication for Mariwasa Kraftangan	19
06	25.06.83	Die repair work for ZAL Telecommunication	10
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05	30.07.79	Making press moulds	15
06	13.08.79	Metal stamping way to standardization	12
07	15.08.79	Towards a better future	12
08	16.08.79	Diemaking	8
09	17.08.79	Equipment for diemaking (I)	9
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02	04.01.83	Welding condition record	3
03	06.01.83	Operation of submerged arc welding (double V-butt welding)	3
04	20.01.83	Operation of plasma cutting machine	4
05	26.01.83	Shielded metal arc welding (horizontal uranami welding)	3
06	12.02.83	Shielded metal arc welding (flat and vertical)	4
07	26.02.83	Shielded metal arc welding (horizontal)	2
08	07.03.83	Shielded metal arc welding (vertical)	4
09	23.03.83	CO_2 arc welding of thin plates	2
10	18.03.83	Shielded metal arc welding (double vee butt joint in vertical position)	3
11	13.04.83	Shielded metal arc welding (overhead)	5
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13	25.04.83	CO_2 arc welding	3
14	05.05.83	Shielded metal arc welding (overhead)	3
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16	16.06.83	Submerged arc welding (tandem electrode method)	5
17	20.06.83	Submerged arc welding (practical information on application of Japanese consummables for SAW)	
18	06.83	Types and application of high strength steel	10
19	15.10.83	Gravity arc welding	3
20	08.11.83	Seam welding machine	10

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03	07.09.79	Welding of tank for LNG carrier	5
04	12.09.79	Welding process	4
05	15.10.83	Types and application of high strength steel	9
06	13.12.83	Welding of high tensile steel (I)	19
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03	27.08.82	Setting up of phrophosphate copper plating solution	4
04	10.01.83	Workshop on zinc plating technology	24
05	23.02.83	Factory adoption and model factory scheme report	16
06	09.04.83	Mirror finishing of hard chrome plating	8
07	20.04.83	Electroless Ni plating (I)	6
08	20.04.83	Electroless Ni plating (II)	4
09	20.04.83	Chrome Plating	43
10	20.04.83	Nickel plating	36
11	14.06.83	Copper-nickel-chrome plating (practice)	13
12	03.08.83	Waste water treatment for electroplating plants	46
13	12.10.83	Silver plating	10
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15	17.11.83	Gold and silver plating (practice)	11
16	02.12.83	Colour gold	4
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18	26.03.84	Test for white gold plating	3
19	02.05.84	Tin, lead and solder plating	7
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01	03.08.79	Electroplating equipment	3
02	04.08.79	Functions of electroplating equipment	2
03	18.08.79	Chromium plating (I)	8
04	20.08.79	Chromium plating (II)	2
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06	20.09.79	Nickel plating	5
07	10.12.79	Permascope	21

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08	11.12.79	Thickness tester	10
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02	"	Metal grinding process	181
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04	"	Electro-chemistry for electroplating	11
05	"	Electroplating equipment and layout	8
06	"	Aspects of designing the hook jig for plating	19
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10	"	Gold plating (other precious metal plating)	25
11	"	Plating of plastics	48
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14	"	Quality control hcart	9
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TRANSFER OF TECHNOLOGY ON TEST AND INSPECTION

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03	11.08.79	Lecture note on Test and Inspection (III)	6
04	11.09.79	Lecture note on Test and Inspection (IV)	8
05	18.09.79	Lecture note on Test and Inspection (V)	4
06	19.10.83 – 10.11.83	Daily training report (Ultrasonic Inspection)	10
07	23.11.83 – 09.02.84	Weekly report of the training on the EPMA	14
08	26.01.84	Principle and application of the EPMA	44

TECHNOLOGY TRANSFER

	Technology Transfer Items	Achievement	Subject in future
DIEMAKING	1. Machining ability.	Capable for operation and routine maintenance.	Continuous on-the-job training to get a lot experiences (eg. adjustment of complicated die.)
	2. Simple die fabrication.	Very capable.	
	3. Repair and maintenance of die.	Capable for simple dies.	
	4. Design of die.	Capable for single, compound, combination and progressive dies.	
	5. Making of operation work standard.	Work standard has been carried out.	
	6. Heat treatment.	Capable of treating various requests from local industries.	
	7. Test and checking of die materials and die.	Capable of operation on profile projector and hardness tester.	
PRESSWORK	1. Selection of materials.	Knowledgeable with standards and usage of materials.	Continuous on-the-job training.
	2. Design af product.	Capable for various types of product.	
	3. Design of production process.	Desirable level has been achieved.	
	4. Fabrication of jig and tool.	Sufficient understanding on design and fabrication of safety devices, loading and ejecting tools.	
	5. Pressworking.	Capable of operating various types of dies.	
	6. Control of safety operation.	Safety devices were installed. Good awareness of safety system and operation.	
	7. Test and checking.	Capable of operating various measuring instruments.	

	Technology Transfer Items	Achievement	Subject in future
WELDING	1. Welding design.	Gained high level of confidence.	Continuous on-the-job training on the special case of the case to be required high-level welding technology.
	2. Selection of welding method.	Very capable.	
	3. Selection of welding materials.	Very capable.	
	4. Material cutting and edge preparation.	Very capable.	
	5. Welding performance.	Very capable on flat welding, horizontal welding and vertical welding. Still needs improvement on overhead welding.	
	6. Welding inspection.	Competent to supervise, inspect and qualification procedures, welding and welding works.	
ELECTROPLATING	1. Selection of materials.	Capable by hull cell test, chemical analysis.	Continuous on-the-job training on the special case or the case to be required by high-quality techniques.
	2. Design of plating process.	Capable by judgement of thickness, rust proof, form and cost.	
	3. Design and fabrication of jig and racking.	Capable of making electroplating jig and racking.	
	4. Derusting and degreasing.	Capable for various methods of treatment on materials and products.	
	5. Pollution control.	Capable of treating chemicals for waste treatment.	
	6. Electroplating work.	Very capable, but needs improvement on silver, hardchrome plating.	
	7. Analaysis and inspection.	Very capable.	

	Technology Transfer Items	Achievement	Subject in future
TEST & INSPECTION	1. Non-destructive test.	Capable of testing by x-ray, ultrasonic flaw detector and EPMA.	Continuous on-the-job training, concerning test and inspection of materials.
	2. Destructive test.	Capable of operating destructive testing equipment.	
INFORMATION	1. Information service system.	Capable to provide technical information services.	Improvement of information service system with utilization of micro-computer. To increase compilation of technical information.
	2. Publication and exhibition.	Capable.	
	3. Making of visual materials.	Capable.	
	4. Planning and management.	Capable of coordinating training courses and seminars.	

資料－3

日本人専門家による自己評価

カウンターパートへの技術移転実施状況を日本人専門家が自己評価した概要を総括した一覧表（昭和59年7月）

（昭和59年7月）

〔MITECプロジェクト〕		カウンターパートへの技術移転実施状況	〔専門家による評価〕
部門	項目	現状（昭和59年7月）	今後の課題
金型製作	1. 工作機械の操作	・テクニシァンを含め，経験年数が約4年であるため，その習熟度は中級程度（日本の技能職国家検定の2級程度）。	・今後ともOn the Job Trainingで経験を積んでゆくことが重要である。 ・機械のメンテナンスは多岐にわたるので，その対応も重要な課題である。 ・困難度の高い金型の調整については今後，相当の経験が必要となる。
	2. 金型の設計	・単型，深絞り型から順送型まで，それぞれ設計の実績があるので，応用例もこなす能力がある。	
	3. 金型の製作	・簡単な金型の製作は十分可能，精密な金型についても製作可能。 ・但し，テスト，調整等のノウハウについては，経験が浅く，十分に対応できるとはいえない。	
	4. 金型の補修	・金型製作と同様。	
	5. 熱処理	・ローカル企業からの依頼に対しても，すべて対処できる能力があり，技術習得度は中の上程度。	
	6. 試験検査	・投影機，硬度計等の試験検査装置の操作はマスターしている。 ・金型の検査法，工作機械の検査法は中級程度。	
プレス加工	1. プレスの操作	・テクニシァンを含め，経験年数が約4年であるため，その習熟度は中級程度。	・今後ともOn the Job Trainingで多くの経験を積んでゆくことが重要である。 ・機械のメンテナンスについても同様。 ・高度な製品設計についても同様。
	2. 材料の選択	・十分に対処できる。	
	3. 製品の設計	・プレス部品の製品設計から金型構想まで，多種類にわたり可能であり，設計能力は中級程度。	
	4. 生産方式の設定	・カム方式，順送方式，トランスファー方式など，ほとんどの方式について経験済みであり，設定能力は十分である。	
	5. 治具・工具の加工	・プレス用治具・工具の加工，製品サンプルの製作等が可能であり，習熟度は中級程度。	

部門	項目	現状（昭和59年7月）	今後の課題
プレス加工	6. プレス加工	1) 抜き 26面 について修得ずみ 2) 絞り 15面 〃 3) 曲げ 15面 〃 4) トランファー 2セット 〃 5) 順送 5面 〃 6) コイニング 10面 〃	
	7. 安全作業	・安全装置の着用・点検等，安全意識の向上が目立つ。	
	8. 試験・検査	・各種測定器の使用法，検査法については修得ずみ。	
溶接	1. 製品に対する溶接設計能力	・日常のOJT及び製品試作等により，溶接設計，図面の読みとり等については修得済み。	・一般的・標準的な溶接に関しては十分に対応できるが，特殊なケースあるいは高度な溶接技術が要求されるケースについては，さらに多くの経験と技術修得を重ねてゆくことが必要である。
	2. 溶接方法の選択	・経済性を含めた溶接方法の選択については修得済み。	
	3. 材料・溶接棒の選択	・各種材料に対する溶接棒，ワイヤー，フラックスの選択については修得済み。	
	4. 材料切断と開先加工	・修得済み。	
	5. 溶接能力	・溶接能力は平均して，日本の溶接技能検定3級程度。 1) スポット溶接 技術修得済み 2) シーム溶接 〃 3) 被覆アーク溶接 下向，立向，横向，上向，立向下進について技術修得済み 4) CO_2アーク溶接 下向，立向，横向について技術修得済み 5) エレクトロスラグ溶接 技術修得済み 6) TIGアーク溶接 〃 7) MIGアーク溶接 〃 8) サブマージアーク溶接 〃 9) グラビティ溶接 〃	
	6. 試験・検査	・技術修得済みで，とくに問題はない。	

部門	項目	現状（昭和59年7月）	今後の課題
電気メッキ	1. 材料と薬品の選択能力	・ハルセルテスト等により，判断可能で，選択能力修得済み。	・一般的・標準的な電気メッキ技術に関しては十分に対応できるが，特殊なケース，高度・高品質が要求されるケースについては，さらに多くの経験と技術修得を重ねることが必要である。
	2. メッキ方式の設定能力	・材料の厚み，耐錆，形状等によるメッキ方式の設定が可能。	
	3. 治具・工具の設計と加工	・多少，拙劣なところもあるが，設計・加工技術は修得済み。	
	4. さびおとしと脱脂	・技術指導済み。	
	5. 公害防止技術	・MITEC内の施設については修得済み。	
	6. 電気メッキ技術	1) 亜鉛　技術修得済み，ローカル企業への指導可能。	
		2) ニッケル・クロム　〃　〃	
		3) 硬質クロム　〃　〃	
		4) 錫・ニッケル　〃　〃	
		5) 金・銀　〃　〃	
		6) プラスチック　〃　〃	
	7. 分析・検査	・分析・検査技術については修得済み。	
試験検査	1. 非破壊検査技術	1) X線による試験検査　短期専門家により指導済み。	
		2) 超音波　〃　〃	
		3) EPMA　〃　〃	
	2. 破壊検査技術	・各種材料試験装置による試験検査技術については修得済み。	
情報	1. 文献情報サービス	・情報提供サービス体制，情報収集管理体制等については確立されている。マレイシア金属工業実態調査も実施された。	・マイクロコンピュータの導入等による情報サービス機能の拡大・充実。 ・技術情報に関し，内外からの収集能力の拡大・充実。
	2. 広報活動	・各種広報資料の出版，情報機器の活用等により実施している。	
	3. 教材の作成	・セミナー，トレーニングコース等での教材作成に十分，対応している。	
	4. 企画・運営	・企画課・業務課的な機能を十分に発揮している。	

資料－4

カウンターパートによる自己評価

日本人専門家から伝授された技術移転の状況をマレイシア側カウンターパートが自己評価した結果を収録したもの（昭和59年5月）

TECHNICAL ACHIEVEMENT ACQUIRED BY MALAYSIAN COUNTERPART PERSONNEL THROUGH A SELF-EVALUATION CONDUCTED AT END OF MAY, 1984.

DIEMAKING

1. Operation and maintenance of machine
   - good in the aspect of operation and routine maintenance but got to be handled by the manufacturer in major breakdowns.

2. Simple die fabrication
   - since a number of dies have been fabricated, we are capable of making bending, blanking, piercing, drawing, coining and embossing dies.

3. Repair and maintenance of die
   - although we have learnt a lot through several repair works carried out with Japanese Experts but this subject needs a lot of experience to be proficient.
   - continuous training and exposure are needed.

4. Design of die
   - as mentioned in (2) above, quite satisfactory for design of single, compound, combination and progressive die.

5. Making of operation work standard
   - satisfactory. Work standard has been carried out.

6. Heat treatment
   - heat treatment of die and consultancy on this subject are quite satisfactory but we feel more time should be spent to update ourselves on recent development in this area.

7. Test and checking of die materials and die
   - satisfactory.

PRESSWORK

1. Selection of materials
   - good, quite knowledgeable with standards and usage of materials.

2. Design of product
   - although we have learnt a lot on product design, the variety and range of product to be designed should be increased in future.

3. Design of production process
   - desirable level of understanding and grasp of this subject has been achieved.

4. Fabrication of jig and tool
   - not much fabrication work has been done but sufficient understanding on design and fabrication of safety devices, loading and ejecting tools has been achieved.

5. Pressworking
   (1) blanking, bending
   - good

   (2) drawing
   - good

   (3) bulging
   - good

   (4) transfer
   - satisfactory. We are confident and capable of operating any transfer dies.

   (5) progressive
   - satisfactory. We are capable of attaining better achievement.

6. Control of safety operation
   - attained desirable level of achievement.

7. Test and checking
   - satisfactory.

8. Machine maintenance
   - capable of handling routine maintenance but not for major breakdowns.

WELDING

1. Welding design
   - gained high level of confidence in dealing with this subject.

2. Selection of welding method
   - good.

3. Selection of welding materials
   - good.

4. Material cutting and edge preparation
   - good.

5. Welding performance
   (1) flat welding
   - good.

   (2) horizontal welding
   - good.

   (3) vertical welding
   - good.

(4) overhead welding
- satisfactory. But still needs improvement and practice.

6. Welding inspection
- good. Competent to supervise, inspect and qualify procedures, welders and welding works to any standard or code of practice in fusion welding.

ELECTROPLATING

1. Selection of materials and chemicals
- satisfactory.

2. Design of plating process
- satisfactory. But still needs more industrial exposure and practice.

3. Design and fabrication of jig and tools
- satisfactory.

4. Derusting and degreasing
- good.

5. Pollution control
- satisfactory. But still needs more guidance in handling the plant process.

6. Electroplating work
(1) copper, nickel, chrome, tin
- good, capable of making up solutions, chemical analysis, plating process and quality control.

(2) gold
- good.

(3) silver, hardchrome
- successfully in silver plating
- needs more guidance in hardchrome and plastic plating.

7. Plating on plastic (ABS)
- fair, due to lack of time at the end of MITEC Project.
- needs more guidance and exposure.

TEST AND INSPECTION

1. Operation of testing
(1) NDT equipment
- capable of operating but need more practice and certificate of competency.

(2) DT equipment
- capable of operating.

(3) Measuring equipment
- capable of operating.

(4) Erichsen machine
- capable of operating but need more practice and training.

(5) Electron probe micro analyser (EPMA)
- capable of operating.

(6) Dynamic and static strain meter
- incapable of operating.

2. Maintenance of testing equipment
- maintenance is done by refering to the machine manual. Certain machines need to be maintain or to be verified and calibrated by the manufacturer annually.

3. Interpretation of result
- able to interpret various types of defects but still a lot of references has to be made since there is no expert to refer to (need more training and exposure). Microstructure examination - need special training.

INFORMATION

1. Information service system
- MITEC been able to provide technical information services thus far more effective services would be given with the introduction of advanced systems.

2. Publication and exhibition
- satisfactory.

3. Making of visual materials
- satisfactory. Understand the processes of planning, shooting, editing and dubbing.
- need more practice.

4. Planning and management
- coordinating training courses and seminars have given practice in this area.
- need improvement on management system.

資料－5

技術移転評価会議議事録

MITECプロジェクトの終結が1年3カ月後に予定されていた昭和58年5月，2日間に亘り専門家とカウンターパートとの間で，プロジェクト発足以来の技術移転の実施状況について評価する会議が開催された。本資料はその会議議事録であるが，この会議でカウンターパートから要請された事項のうち，妥当と思われる部分については以後の1年3カ月間で精力的に対処し，実効ある技術移転の実施を目指して日マ両サイドは努力を重ねた。

TECHNOLOGY TRANSFER REVIEW MEETING

Date : 5th May 1983

Time : 9.45 a.m. - 12.45 p.m. (1st Session)
2.00 p.m. - 03.45 p.m. (2nd Session)

Place: MITEC Conference Room

Attendance:

1) Dr. Kenji Tomita
(Chief Adviser)

2) En. Ryohei Nonaka
(Electroplating Expert)

3) En. Kazuhiko Tanaka
(Information Expert)

4) En. Isakazu Inoue
(Welding Expert)

5) En. Shigeaki Sugiyama
(Press-die Expert)

6) En. Kazuo Mori
(Press-die Expert)

1) En. Faisal Ismail (Chairman)
(Acting Head of MITEC)

2) En. Ahmad Zakaria
(Research Officer)

3) En. Look Tian Fook
(Research Officer)

4) En. Mustaza Ahmadun
(Research Officer)

5) En. Abd. Ghalib Tham
(Research Officer)

6) En. Syed Hisham Wazir (Secretary)
(Research Officer)

7) En. A. Karunaneethi
(Research Officer)

8) En. Nor Rashid Ismail
(Research Officer)

9) En. Ahmad Yunus
(Research Officer)

10) En. Mohd. Fuad Isa
(Research Officer)

11) Cik Chen Sau Soon
(Research Officer)

12) En. Azmi Idris
(Research Officer)

The Chairman welcomed the Japanese Experts to this meeting and expressed his appreciation for their presence and support.

AGENDA A) REASONS FOR THE NEED OF REVIEW ON TECHNOLOGY TRANSFER AT MITEC

To gauge and evaluate the technology transfer to date from the Japanese experts to the counterparts and from MITEC to local metal-working industries.

The Japanese experts and the Malaysian counterparts agreed on this Agenda.

AGENDA B) GENERAL DEFINITION OF TECHNOLOGY TRANSFER

It is the impartation of one's knowledge and experience to another in order to upgrade the capability of the latter.

Dr. Tomita said that the general definition of technology transfer as defined above is appropriate but he would like the counterparts to take note that the transfer of one's knowledge and experience is not only the natural flowing of these from higher potentials to lower potentials but, something that requires self-effort, initiative and a positive attitude on the part of the person requiring the technology. The Chairman said that, willingness and positive attitude of both sides is essential to ensure the success of it.

En. Nonaka informed the meeting that, so far as technology transfer at MITEC is concerned, he is satisfied with the achievement made by the counterparts. He added that a certain level of technology and expectation as drawn up in the Work Plan in 1978 has been successfully achieved and now MITEC is taking a step closer to self-reliance. However, he said that the technological development is still in progress all over the world and the technology to be acquired by MITEC Officers and local industries seems to be endless.

AGENDA C) OBJECTIVE AND TARGET OF TECHNOLOGY TRANSFER

Objective: To enable the effective implementation of the various services of MITEC to the local metal-working industry.

Target: To uplift the existing technological level of local industry with special emphasis on small and medium scale enterpreneurs in the field of die-making, presswork, welding and electroplating.

En. Nonaka reported that, to ensure the objective of technology transfer is successfully implemented, MITEC has in the past and at present conducted as

many factory visits as possible through out Malaysia and in view of this, MITEC has a great role to play in future. Local industries will be requesting MITEC services once the various services of MITEC has been effectively introduced.

On the question of the target of technology transfer, Dr. Tomita agreed that MITEC's target of technology transfer should be emphasised on the small and medium scale enterpreneurs and therefore MITEC should foster closer rapport with these industries.

On the definition of small and medium scale companies, En. Look clarified that according to the Ministry Trade & Industry, these fall under the category of companies having an authorised capital of $500,000 and below and less than 50 employees. The meeting took note that MITEC has not drawn up yet any definition on small and medium scale companies. On the services to Bumiputra companies, the Chairman said that MITEC will operate in line with the Government's New Economic Policy.

AGENDA D1) TECHNOLOGY TRANSFER FROM EXPERTS TO COUNTERPARTS

(A) LECTURES/TRANSLATION

En. Ahmad Zakaria of the Die-making Division reported as follows:-

From the period of 1979, July to August there were five lectures conducted by En. Furui (the then Die-making Expert) for the Officers of this Division. The topics chosen covered the basic techniques of die-making processes, machining and filing.

From the period of 1980/81, En. Ahmad went for a year of training in Japan but while he was away, the Chairman (who was the officer in the Presswork Division) informed the meeting that several lectures on die design were given by En. Furui. At this time, En. Furui's health was deteriorating.

In the year 1982, En. Sugiyama joined the MITEC Project as the new Die & Press Expert. He managed to give four lectures to the officers in this Division in the same year. In 1983, nine lectures were conducted jointly with En. Mori who is also a new Die & Press Expert for the MITEC Project.

The meeting took note that all the lectures have been documented. En. Mori informed the meeting that the hours of lectures given by Experts to the counterparts does not always indicate the progress of technology transfer. En. Syed Hisham replied that the lecture hours are gauged to evaluate whether how much have been transferred theoritically to the counterparts and whether it has been beneficial or not.

On these lectures, En. Ahmad evaluated them as being very useful.

En. Look Tian Fook of the Presswork Division reported as follows:-

From July 1979 to April 1980, the Presswork Officers concentrated their efforts on the setting up of the press workshop, preparation of specifications for the purchase of equipment and materials and conducting pre-survey visits through out Malaysia. En. Hasegawa was then the Presswork Expert and the lectures were conducted for the benefit of the Presswork Officers in the presence of both En. Furui and the Die-making Officers and technicians. The Presswork and Die-making Officers attended the lectures conducted by En. Sugiyama and En. Mori.

En. Look evaluated that, on the whole, the lectures provided by these experts are beneficial and therefore should be continued.

Regarding the translation of Japanese technical articles, En. Look informed the meeting that, on and off, assistance were provided by the Experts but he has no proper records. Most of these articles are on safety systems, technical know-hows in presswork, related charts and diagrams. En. Look admitted that it would be easier if both the Expert and Officer could be together during the translation period and also the Officer possessed some working knowledge on the subject. At the moment, the translation of a book, " 100 Know-hows " is in progress.

En. Ghalib Tham of the Welding Division reported as follows:-

From the time of late 1979 until early 1980, En. Hattori, who was the then Welding Expert gave some lectures to the Welding Officers and other Officers as well with the aid of slides and information acquired from relevant sources. This totalled four in number. The topics chosen were mostly on the basic aspects of welding technology. From early 1981 until the end of En. Hattori's term of services at MITEC, En. Ghalib said that there was no record of formal lectures, however, occasionally lectures on the job did take place. The meeting took note that En. Inoue, the new welding expert has not given any theoritical form of lectures but provided long-term on-the-job training in the form of practical demonstrations and identifying the key points on welding to improve the Officers and technicians skill.

Three articles, "Off-shore Welding Platform", "Stainless Steel Furnace Brazing" and "CO_2 Manufacturer Notebook" in Japanese were translated for the benefit of the Welding Officers.

En. Ghalib evaluated that the lectures given were fundamental. He also requested for formal lectures to be conducted on slightly advanced welding technology.

En. Mustaza Ahmadun of the Electroplating Division reported as follows:-

From 13.8.1979 until 14.12.1979, nine lectures including three practicals were given by En. Nonaka and from 1980 to 1981 during his training in Japan, En. Mustafar was given lectures by En. Nonaka. In the year 1981, the first Electroplating Course was conducted and all the Electroplating Officers and technicians attended the course. En. Nonaka conducted the lectures. A technical advisory course which was conducted during that year for Malaysian Sheet Glass was also attended by the Division's Officers with En. Nonaka conducting the lectures.

In 1982, lectures on the Waste Water Disposal System was given by En. Nonaka whereby study was made using the operation manual. Early this year until to-date, the Officers also attended lectures conducted during the Special Courses on Zinc and Nickel Chrome Plating. He added that the Division personnel meet every morning and at these sessions, some informal lectures were also given. Translation of several operation manuals and technical articles to English were also made.

En. Mustaza evaluated that, during the time of receiving the theoritical lectures, the Officers in this division have no basic knowledge on the subject and therefore these lectures have in a way proved to be useful and beneficial. He added that the notes provided sometimes were very concise. He expressed his hope for more lectures to be conducted which should include Silver and Gold plating.

En. Syed Hisham of the Test and Inspection Division reported as follows:-

In the late 1980, the Officer of this Division participated in lectures given for the other Officers. As far as welding is concerned, slides were shown on welding inspection which is an important area of test and inspection. These lectures were found to be satisfactory. En. Syed Hisham suggested that formal lectures should be given by short-term experts on specific equipment operation and maintenance.

Cik Chen of the Information Division reported as follows:-

From the start of the MITEC Project until mid-July 1981, Cik Aini and the late En. Adnan were the Officers-in-charge for this Division. No records of any lectures conducted for the benefit of the Information staff have been documented.

At present, Cik Chen feels that there is no need for lectures to be conducted for her but concerning translation, whenever the needs arose from the Officers or for the publication of MITEC Bulletin, En. Tanaka provided

the assistance.

AGENDA D1 (E) OPERATION AND MAINTENANCE OF MACHINERY AND EQUIPMENT

En. Ahmad Zakaria of the Die-making Division reported as follows:-

In the earlier part of 1979, when En. Furui was the die-making expert, there was no equipment at MITEC. But En. Furui did take the initiative to teach the Officers to make some dies and punches using the existing RBF machinery. Once the installation of equipment was completed, the Officers in this Division occassionally operated the machines as per instructions in Operation Manuals. Techniques of setting of machines and machining operation were also taught.

The two new experts provided knowledge on some equipment operation with emphasis on safety. En. Ahmad evaluated that the assistance given was very satisfactory and has improved the overall situation in the Division.

En. Look Tian Fook of the Presswork Division reported as follows:

En. Hasegawa who was then the expert gave some training on the skillful operation and maintenance of the power press machines. Short-term experts who installed the two press machines at MITEC also provided the necessary know-how on the subject. Safety operation measures was also taught. En. Sugiyama has also been providing regular guidances on safety measures. Dismantling and reassembling of machines to identify critical parts for maintenance was also conducted by the experts.

En. Look indicated that En. Sugiyama is a very experienced man in the operation and maintenance of machines and equipment available at MITEC Press workshop and his contributions so far have been significant.

En. Ghalib Tham of the Welding Division reported as follows:-

When the equipment were received by MITEC in 1980, the Installation experts assisted in installing the Seam and Spot Welding machines. The rest of the machines especially the Portable ones such as the MIG, TIG and Submerged Arc Welding machines were installed to a certain extend with the assistance of En. Hattori. En. Hattori also provided the necessary tips on the operation based on the catalogues and operation manuals.

En. Inoue arrived at MITEC when all the welding equipment were already installed but he did some repair and maintenance on the MIG, Submerged Arc Welding Machine and Plasma Arc Cutting Machine. He also provided necessary tips on the operation and maintenance of several welding equipment. The meeting took note that the Welding Officers can operate all the machines at

the Welding Workshop except for the Electroslag which is at the moment not functioning due to the lack of some components which cannot be purchased in Malaysia. But, these components are scheduled to arrive together with the donated spare parts soon.

En. Ghalib evaluated that participations of experts was good and the advices given were valuable and useful.

En. Mustaza Ahmadun of the Electroplating Division reported as follows:-

En. Mustaza reported that he was undergoing training in Japan during the installation of electroplating equipment at MITEC and could not account for the work done. The meeting took note that the equipment at this workshop are in good condition as the Officers do regular servicing and maintenance on the equipment. However, the Officers face some difficulties to operate certain equipment such as the Ultrasonic Cleaner, Dust Counter, BOD & COD Measuring Equipment, Water Honing Machine, Chrome Refiner and the Permascope and lastly the Betascope due to lack of guidance on operation and maintenance.

En. Nonaka said that a complete set of instruction manual for these equipment are in the library. He added that instructions on operation of certain equipment will be given. On the Waste Water Disposal System, he added that the Installation Expert has provided the Officers with the necessary operation know-how. He also informed that a seminar on Waste Water Treatment will be held at MITEC towards the middle of this year.

En. Syed Hisham of the Test and Inspection Division reported as follows:-

On the operation and maintenance of machinery and equipment in the Division attempts were made by En. Hattori to transfer the operation know-how such as the Ultrasonic Tester, EPMA and Sound Vibration Meter but they were unsuccessful. Most of the equipment in this Division can be operated by the Officers except for one or two which really requires specialized training after familiarizing with these equipment themselves.

Maintenance is done weekly in this Division by the Officers. It is also hoped that more accessories for the Erichsen Machine could be supplied in order to carry out different types of testing. The meeting took note that the Cathode Ray Tube (CRT), High Voltage Power Supply Unit (HVP) of the EPMA is not functioning. Replacement of the required parts will be sent as soon as possible.

En. Azmi who has undergone six months of training on the EPMA addmitted that the training received were mainly on the maintenance and alignment of the main body of the EPMA. This was insufficient when it involves other parts of the EPMA.

En. Syed Hisham indicated that in the ASEAN regions, there are 4 or 5 units of the EPMA and it is advisable for the company to station one Service Engineer around this region. The Chairman reported that during his study tour recently with the Controller, Shimadzu Corporation agreed to do the maintenance and servicing of the EPMA when their Service Engineers go out on a maintenance trip to the neighbouring countries.

AGENDA D1 (C) PROTOTYPE FABRICATION, TRIAL PRODUCTION AND TESTING SERVICES

En. Ahmad Zakaria of the Die-making Division reported as follows:-

In 1979, the Division managed to fabricate a burring die for air-condition fin with the assistance of En. Furui. From 1981 to-date, more than 26 dies were fabricated jointly with the Presswork Division. Last year, the Division fabricated 20 dies and hope to fabricate more this year. However, the meeting took note that all the dies fabricated are simple dies.

En. Ahmad evaluated that even though the dies are simple, a lot of know-hows and techniques are involved in the fabrication.

En. Look Tian Fook of the Presswork Division reported as follows:-

The presswork division provides supporting services to the die-making division and all the prototype fabrication or trial production carried out in the Die-making Division, in a way, also involved them. Services provided include trial setting, trial production and trouble shooting. The Experts have assisted them too. On their own, the Division had fabricated some simple tools and incidental equipment.

En. Look evaluated that the services and guidelines in this area provided by the Experts had been useful. En. Sugiyama praised the Officers for keeping good reports of these technology transfer, which include details on designs, fabrication and costings. En. Look added that whatever reports prepared, so far, had been distributed to all concerned. The meeting took note that so far such reports on fabrication of dies and technical know-hows totalled 12 in number.

The Officers of all Divisions agreed that such documented reports should be kept in the library for the benefit of those interested.

En. Inoue of the Welding Division reported as follows:-

En. Inoue informed the meeting that in the Welding Division, few prototype fabrication and trial production had been carried out but the Division had provided numerous fabrication services for internal requests. En. Ghalib

said that general welding fabrication work can be performed by the Officers and technicians themselves. These have been reported at the weekly meetings.

En. R. Nonaka of the Electroplating Division reported as follows:-

The Officers in this Division are capable of executing trial production and advices are provided by expert from time to time. They have conducted trial production successfully upon request from outside as well as inside.

En. Mustaza informed the meeting that the plating services on the paper knife, medal and ash tray was in a way classified under trial production. He added that the Officers had occassionally at their own initiative successfully experimented several different methods to obtain better quality of plating. On prototype fabrication, the Officers had managed to fabricate a chair and table but however, it required some supporting services from the other divisions.

En. Nonaka informed the meeting that the making of solutions can also be termed as trial production because trial analyses has to be conducted before it can be used. Mini plant for gold plating have also been set-up. On the basis of self-reliance, the Officers of this Division are very independent and will only approach the Expert if any assistance is required.

En. Syed Hisham of the Test and Inspection Division reported as follows:-

Self-training using the equipment and facilities available at the Division has been carried out at the Officers' own initiative. There is no long-term Expert for this Division.

AGENDA D1 (D) TECHNICAL TRAINING BY JAPANESE SHORT-TERM EXPERTS AT MITEC

Dr. Tomita informed the meeting that JICA had despatched 11 short-term experts in 1981, 8 short-term experts in 1982, 2 short-term experts in 1983 for the installation of equipment, machine maintenance and specific technical guidance . Dr. Tomita added that in this meeting, we would like to evaluate the effectiveness of technology transfer conducted by two short-term experts; En. Y. Awaji for Die design and En. A. Muto for X-ray testing.

En. Ahmad Zakaria of the Die-making Division reported that En. Y. Awaji was despatched in 1982 and the technology transfer in the field was superficial.

En. Syed Hisham of the Test and Inspection Division reported as follows:-

The short-term expert, En. A. Muto who was despatched in 1982 has provided

satisfactory guidance in X-ray testing techniques. He has in fact given a report on the training given by En. A. Muto to the Chairman and Dr. Tomita.

AGENDA D1 (E) ADVISORY AND CONSULTANCY SERVICES

The meeting was informed that the number of advisory and consultancy services conducted are as follows:-

The number of factory visits made were 74 in 1979, 105 in 1980, 35 in 1981, 48 in 1982 and 11 so far this year.

The number of consultancy services received were 36 in 1979, 76 in 1980, 78 in 1981, 114 in 1982 and 34 so far this year.

The number of samples tested were also reported for reference.

The testing services for the year 1980 was 10, in 1981 it was 500, and it was increased to 1272 in 1982 and 159 so far this year.

From these visits, important and relevant datas were collected. The counter-parts learnt from the experts the required techniques of conducting advisory services on the spot. En. Nonaka added that, through these advisory services the transfer of technology reports were made by Officers and counter-checked by the experts. These reports are kept in the Information Division. The meeting took note that suitable forms are prepared for such purposes and they are kept in the Information Division.

En. Syed Hisham would like the experts to evaluate the situation of the Malaysian local metal-working industries, and the ways to improve or up-grade the situation.

En. Nonaka commented that initially during factory visits, the counter-parts were not able to identify problem points. But now the Officers have increased their capability and they are in the position to provide effective assistance to the local industry.

En. Mustaza enquired whether the reports made by the Experts or any JICA mission could be circulated to the Officers as references. Dr. Tomita said that if he received any reports compiled by JICA mission on the local industries status, it will be circulated.

En. Look enquired whether, according to the Experts' opinion, there are any major changes in the local metal industries since 1978 until now. Did MITEC play an effective part and whether it is enough. En. Nonaka replied that MITEC has played a role sufficiently for the time being in transferring the technology to these industries but there is still technological

insufficiency which could be provided by MITEC.

En. Look enquired whether there are any feedback from the factories visited. En. Nonaka said that there are feedbacks but the response is slow. He quoted an example, even if we give them 10 suggestions, they only react to two or three.

En. Ahmad Zakaria of the Die-making Division reported:-

En. Furui did a good job as an expert in the transferring of die-making technology to factories visited. Only 2 factories responded to the advices given. They are Ngai Chong and PATCO.

En. Look Tian Fook of the Presswork Division reported as follows:-

The division visited factories together with the Die-making Section in 1979 and in 1980 with the other divisions too. All these factories are in the nearby areas. Suggestions were given on-the-spot such as layout of factory, identify the problems, materials, etc. So far there are few feedbacks. The factories that responded are Ngai Chong PATCO and recently Kejuruteraan Emas and Mariwasa Kraftangan. During En. Sugiyama's time, most of the advices provided to factories were followed.

En. Ghalib Tham of the Welding Division reported as follows:-

During En. Hattori's time, MITEC Officers and Experts made extensive visits throughout Peninsular Malaysia and advices were given.

During En. Inoue's time, the Welding Division has reduced the number of factory visits. This is due to other on-going activities in the Division. Advices given by En. Inoue in the advisory and consultancy services were technically sound and effective.

En. Mustaza Ahmadun of the Electroplating Division reported as follows:-

The Division thanked the Electroplating Expert for effectively advising the factories and the Officers as well. On the feed-back from the factories, En. Nor Rashid informed the meeting that most of the suggestions and recommendations provided were taken up by the factories. However, the positive attitude of the local industry is essential for technology transfer in order to upgrade their capability.

En. Syed Hisham of the Test and Inspection Division reported as follows:-

MITEC had conducted extensive advisory services but still there was lack of follow-up services. He suggested that MITEC should put more emphasis on the

upgrading of the small and medium scale industries. He suggested a different approach be made in order to ensure that the small and medium scale metal-working industries really benefit. The Chairman agreed that on the aspect of MITEC's target, more services should be given to the small and medium scale industries.

Cik Chen of the Information Division reported as follows:-

The feed-backs from the factories that had been visited were normally reported at meetings by the Officers. There are also cases, where MITEC also learn from the factories during the visits. Follow-up of the participants from our MITEC Training Courses are also important.

En. Look suggested that we contact the Metal Working Association for list of factories. En. Syed Hisham further suggested that for every factory visit report done by the respective officers, the expert who participated during the visit should also write a technological overview about the visit. Thus, the reports could be compiled together and any insufficiency of facts on the part of the officers would be substantiated by the experts report. En. Nonaka said that the ability to write a complete report on advisory service is important in view of the technological self-sufficiency.

The meeting was postponed to Saturday, 7th May 1983 at 9.00 a.m. because En. Nonaka has a pressing appointment in Kuala Lumpur at 3.30 p.m.

CONTINUATION OF THE TECHNOLOGY TRANSFER REVIEW MEETING ON 5TH MAY 1983

Date : 7th May 1983

Time : 9.15 am to 1.15 pm

Place: MITEC Conference Room

AGENDA D1 (F) ON THE JOB TRAINING BY LONG-TERM EXPERTS

Dr. Tomita commented that on-the-job training is an important aspect of the transfer of technology from the experts to the counterparts in MITEC. Therefore, the MITEC Officers must know how to evaluate and provide technical advices to the factories. On the job training is also the same as case study, for example factory visits or consultancy services and test and inspection services or either information services and others to the local industries. For example, initially the Officers cannot conduct technical survey, but now the situation has improved, the Officers can now identify the problem points in factories

and provide necessary advices. Knowledge and experiences accumulated by the Officers since the implementation of the MITEC Project has been very valuable. En. Nonaka agreed and added that on-the-job training has also been recorded through slides, photos and VTR. The Officers has also improved greatly in their technical capability. He encouraged the Officers to understudy the experts during factory visits so that they can learn as much as possible from the experts.

The MITEC counterparts reviewed as follows:-

En. Ahmad Zakaria reported that on-the-job training in the Die-making Division needs good human relationship between counterparts and experts. This is to instil closer cooperation. So far in the Die-making Division, there has been no barrier between experts and counterparts.

En. Mori would like to visit more factories especially die-makers to know about their technical capability. Together with the Officers, he could assist them and by visiting he can also draw up a suitable programme. The Chairman agreed to look into this.

En. Look Tian Fook reported that, for on-the-job training in the Presswork Division, En. Sugiyama has been greatly involved in the prototype fabrication, die repair, assemblying and setting of dies, machine operation and maintenance and fabrication of safety equipment. En. Sugiyama always assist the counterparts in the daily workshop activities.

En. Ghalib Tham reported that on-the-job training during En. Hattori's period has occured during factory visits when on the spot advices are given. Now, at present, a training scheme has been drawn up by En. Inoue. They are in the form of improving workmanship in the fields of CO_2 Welding, SMAW welding, Sub-merged arc welding, TIG, MIG & Electroslag. This is the most outstanding contribution by the expert to raise the level of the counterpart skill and this is initiated by the expert himself. The Welding Officers found that the training programme has been useful in the upgrading of skills of the welding staff. So far 12 technical reports has been compiled for future references.

The Chairman enquired about the welding skills in difficult and complex positions. En. Ghalib replied that once the basic skill of welding is acquired, that person is able to weld and only require practice to obtain better weld. The meeting took note that the Welding Officers can instruct the technicians to do higher level of welding and both the Officers and technicians have sufficient knowledge and techniques. They agreed that they

do not require skill re-training but recognition from certified bodies to enable them to become certified welding inspectors.

En. Mustaza Ahmadun reported that on-the-job training in the Electroplating Division has improved the Officers and technicians skill through practices such as factory visits, making of jigs and preparing solutions. However, the programme for the transfer of electroplating technology have been delayed. En. Nonaka explained that due to certain unavoidable circumstances, the programme set up could not be implemented as scheduled.

Dr. Tomita replied that the schedules made by expert were only targets and due to the budget limitation and other unavoidable circumstances such as installation of equipment, etc, these schedules were not fully implemented. However, the meeting took note that the important techniques on nickel chrome, zinc plating and hard-chrome plating, nickel-chrome plating on zinc are taught. It is the technology on gold, silver, tin plating and also plastic plating which he assured can be transferred by 1984 August.

The electroplating division would like their expert to go to the workshop more often so the officers and technicians could benefit more from his frequent participation. En. Nonaka explained that he did not go to the workshop as often now as he did before because he feels that the Officers are now capable of doing most of the electroplating work. He said the Officers would only seek his advice if they encountered problems. He added that when the electroplating workshop was just set up, he used to have daily meeting with officers and technicians every morning to discuss the daily activities. But now, as MITEC approaches the self-reliance stage, he gradually reduce the number of meetings and his involvement in the daily workshop activities so that he could concentrate on the transfer of new electroplating technology.

The meeting took note that self-reliance is only limited to certain activities and divisions of MITEC. Where the jobs are common and easy, the Officers independently executed them. It is only the difficult ones that require the expert's assistance.

En. Fuad Isa informed the meeting that even though we are in the stage of self-reliance, it is still advisable for all the experts to be at the workshop to provide on-the-job training and supervision. He cited an example, the counterparts may think that the method he is using to execute a job is correct and the best method. However, if the expert is around to inspect the job, he would be able to suggest easier method or identify problem points. There are always some minor problem points which the counterparts may not realize. It will only take an experienced person to see them.

En. Azmi Idris and En. Look Tian Fook agreed with En. Fuad Isa and suggested for closer relationship between both sides.

En. Syed Hisham reported that on-the-job training at the Test and Inspection Division, a training programme was drawn up by the counterparts when En. Hattori was acting as the expert. It was submitted to the expert twice but not implemented.

En. Ghalib Tham suggested that the Information Division plays a more effective role in promoting the services of MITEC.

AGENDA D: TECHNOLOGY TRANSFER FROM MITEC TO LOCAL METAL-WORKING INDUSTRIES

(A) DIRECT SERVICES TO INDUSTRIES (CONSULTANCY, PROTOTYPE FABRICATION, TRIAL PRODUCTION, TEST AND INSPECTION, INFORMATION)

En. Ahmad Zakaria of the Die-making Division reported that the Division received a lot of requests from the local industries but due to the lack of man-power and certain type of equipment, they are not able to provide prompt and efficient services to industries.

En. Look Tian Fook of the Presswork Division reported that direct services to industries in the division, in the form of advices given were sometimes acceptable and valuable but there are cases where they do not help at all. But the Presswork officers and experts tried their best in giving consultancy and technical guidance. As in the case of trial production, a list of the products can be obtained from the Information Division. Most of the products are simple.

En. Ghalib Tham of the Welding Division reported that the Welding Division depend on a lot of the direct and indirect requests. The consultancy services has been increasing from year to year. So is the need for trial production and prototype fabrication. Requests for technical information on equipment, welding techniques, materials, etc have also been increasing. Testing of electrodes has been increasing. For indirect services, the Division received most requests from SIRIM H.Q. and also internally and the Officers' themselves carried out these services basing on their technical capability and references (books, journals, etc.) However, En. Ghalib added that the services rendered to the metal-working industries are still limited because MITEC services are not widely known to them. En. Look suggested that the names and addresses of the metal-working factories be obtained from

the Metal-working Association of Metal industries and also the Chinese Companies Association.

En. Mustaza Ahmadun of the Electroplating Division reported that the Division has conducted numerous services including testing plating thickness, preparing solution and trial plating, advisory and consultancy. Factory Adoption Schemes which is a form of assistance where intensive advisory and consultancy services are given has also been conducted by the Electroplating Division.

On the advisory and consultancy services, the companies are happy with the services rendered. Generally the services to industries by the electroplating division is satisfactory but this year, the meeting took note that the number is declining.

The Test and Inspection Division has given testing services worth $12,363.00 so far.

AGENDA D (B) INDIRECT SERVICES VIA SIRIM H.Q. (TESTING, FABRICATION, DEMONSTRATION, INFORMATION, ADVISORY)

This is confined to the Test and Inspection and Welding Divisions.

En. Ghalib Tham of the Welding Division said that no technology transfer took place in these services but mainly welding fabrication work. However, these services provided practices for the upgrading of technicians' skill.

The Test and Inspection Division carried out $16,785.00 worth of indirect services so far.

AGENDA D (C) TRAINING COURSES (GENERAL & SPECIAL COURSES)

The meeting took note that the response from the local industries according to the die-making division has been increasing and the courses conducted are sometimes joint-effort with the Presswork Division.

Dr. Tomita informed the meeting that the evaluation of these training courses are important especially from the participants. The files are with the Information Division. The Chairman agreed and said that some of the trainees have returned for more technical advices. En. Ghalib disagreed because he said the evaluation will depend on the academic and technical background of

the participants. The meeting took note that the courses at MITEC are conducted for the upgrading of basic skills in the four metal-working fields.

However, in the Die-making Division, there has been complaints that the course lacks practical exercises. This cannot be remedied as there is lack of equipment (ie. there is only one of each type). Dr. Tomita said that MITEC is not a vocational centre, therefore the number of each type of equipment is limited.

AGENDA D (D) PARTICIPATION IN EXTERNAL COMMITTEES (LLPPKK, MWS)

The Chairman reported that our participation in these Committees has in a way provided technical assistances to the local industries through their activities. The meeting took note that MITEC is involved in the Lembaga Latihan Perindustrian Dan Persijilan Ketukangan Kebangsaan (LLPPKK), Malaysian Welding Society (MWS) and Lembaga Kraftangan Malaysia (LKM).

Dr. Tomita enquired about the objectives and functions of such Committees and suggested that it be circulated for the benefit of others.

AGENDA D (E) TECHNICAL PUBLICATION (MITEC BULLETIN)

Cik Chen of the Information Division reported that the MITEC Bulletin is published quarterly but always not on schedule. This is due to the workload in the Printing Section in SIRIM H.Q.

En. Nor Rashid suggested that names of Officers be mentioned in the Bulletin for any articles provided. This, in a way, helps to compliment the Officers for their contributions. Cik Chen said that unless the articles from the Officers are originated by them, then the names will be published.

Regarding the mailing list of these bulletins, the Information Division was advised to revise it and include companies or organisations that are more relevant.

AGENDA D (F) INTERNAL TECHNICAL COMMITTEES (NEP, LCP)

The Chairman informed the meeting that the above two Committees will be called to meet when the need arises. The aim of such Committees is to find ways and means to assist the small and medium scale establishment especially the Bumiputras.

The 1st New Economic Policy Meeting was held when En. Aziz Manan was acting as the Chairman and there has been no follow-up until now. Three meetings have been called for the Local Contents Programme. Dr. Tomita requested for the activities and guidelines of these Committees for the benefit of the experts.

AGENDA D (G) TECHNICAL PROJECTS

The meeting took note that technical projects initiated by both sides have been going on at MITEC. They are the progressive die, automatic Die, Berryllium Copper Spring die, Blanking die and others.

The Information Division reported that very few reports have been received for the projects.

AGENDA D (H) DEMONSTRATIONS (TO LOCAL METAL-WORKING INDUSTRIES)

The Chairman indicated that there have been only very few demonstrations held at MITEC for the metal-working industry. But, the few outstanding ones are the Metal Symposium Demonstration, demonstrations for the entrepreneurs from the East Coast. The Welding Division has also demonstrated to visitors the machines available at MITEC. Some has also come to see certain equipment and the demonstration of their operation prior to their purchase. The Electroplating Division has also conducted demonstrations at exhibitions. The Chairman said that MITEC has provided some technical assistance to the industries through demonstrations.

AGENDA E: FUTURE EXPECTATIONS

(A) JOINT PROJECTS BETWEEN EXPERTS AND COUNTERPARTS FOR THE BETTERMENT OF LOCAL METAL-WORKING INDUSTRIES

The Chairman said that there should be more joint projects between experts and counterparts that would benefit MITEC and the local metal industry.

En. Ghalib Tham said that the different section had different priorities. In the case of the welding division, a few projects were carried out at their own initiative and efforts. The Chairman said that the themes of any projects must be aimed towards the acquirement of slightly higher technology and also the areas that could benefit the local metal-working industry.

AGENDA E (B) NEW TECHNOLOGIES AND INFORMATION

The Chairman said that the technologies and technical information that have been acquired by MITEC is insufficient. Therefore, there is a great need to up-grade the technical capability of MITEC in the metal-working areas through the introduction of new technologies. It is hopeful that the experts would guide MITEC in acquiring new technologies where possible.

On the machines usage, En. Nor Rashid suggested that more books and technical articles be supplied to improve their capability.

The meeting took note that the counterparts would like to receive the latest technological information through journals, reports and other technical publications.

Dr. Tomita said that information on new techniques could be obtained from :-

1) long-term experts
2) possibily the short-term experts.
3) lectures and technical publications
4) attending seminars overseas

He added that monthly technical publication from Japan are sent to MITEC and kept in the MITEC Library.

En. Syed Hisham suggested that reports on the new technologies be compiled here for the benefit of the counterparts and local industries.

AGENDA E (C) QUALITY CONTROL CIRCLE (QCC) CONCEPT TO BE INCORPORATED WITH MITEC ACTIVITIES

The counterparts feel that the QCC Concept should be introduced in MITEC. En. Syed Hisham added that the counterparts have high expectation of this concept as Japan herself progresses and advances through QCC.

En. Look informed the meeting that since we have the Leadership Campaign going on, QCC is best to be introduced to instill effectiveness among the counterparts through the examples set by the experts.

En. Mori offered to conduct QCC lectures in MITEC for the benefit of the counterparts which in turn will also benefit the local industries. En. Mustaza added that at INTAN, there is a 2-weeks course on QCC and suggested that an Officer attend the course and subsequently impart this knowledge to others. On this matter, En. Ghalib reported that most of the Officers returning from

courses have yet to teach the others. Sometimes, reports were not made.

AGENDA E (D) CLOSER COOPERATION AND CONSULTATION BETWEEN EXPERT AND COUNTERPART

The Chairman said that the experts and counterparts should work together closely in carrying out the activities of MITEC. This was agreed unanimously.

AGENDA E (E) MORE ACTIVE PARTICIPATION BY MITEC TO ACHIEVE THE OBJECTIVES OF NEP & LCP COMMITTEES

On this matter, the Chairman said that the experts guidances and assistances would be needed to implement the programmes set up by NEP and LCP Committees. En. Syed Hisham said that the two Committees are geared to cater for the small and medium scale industries.

AGENDA E (F) ENHANCEMENT OF MORE EFFICIENT SERVICES BY MITEC TO LOCAL METAL-WORKING INDUSTRIES

The Chairman said that greater emphasis on efficient services should be made in order to achieve greater success. En. Nonaka said, due to the insufficient mailing list, some factories are unaware of the services rendered by MITEC. The Chairman suggested that other sources of information on the local metal working industries be identified to increase the factory list. The charges of the services are slightly too high to encourage more participation from the industries. It is agreed that the charges of certain services be reviewed.

The meeting took note that MITEC will give more assistance to small companies as they are the ones who really need the services.

AGENDA E (G) TRANSLATION OF JAPANESE TECHNICAL INFORMATION IN ENGLISH

The Chairman suggested that the books donated by the Japanese be kept in the library for reference. En. Tanaka said that most of the books are in the library but there are however a few with the experts. Dr. Tomita suggested that the books be classified and kept in the library and therefore requested that all books kept by the experts to be returned to MITEC Library.

The Chairman said that the contents of each books should be translated for the benefit of the Officers. Knowing the contents, it is easy for the Officers to select the useful subjects for reference and then translate them with the help of the experts.

AGENDA E (H) REQUEST FOR ADDITIONAL EQUIPMENT FROM JICA

Die-making

CNC Wire-cut, CNC Milling Machine, Computer Aided Design/Drafting, Induction Hardening Equipment.

Presswork

Automatic press 60T, Punch Press Machine, Corner Ear Cut Machine, NC unit for the press brake, Fine Blanking, Multi Slide.

Welding

Low cost welding robot for demonstration purposes, Friction Welding Unit, Positioners, Sub-merged Welding machine, TIG or MIG, SAW (portable ones which can be used for factory visits).

Electroplating

Vibratory polishing machine, Chemical Vapour depositioner, Physical Vapour dispositioner, Compact waste water treatment module.

Test and Inspection

Autograph machine for the sheet metal, accessories for the existing Erichsen Machine, Eddy Current Tester, Gamma Ray Unit and 3D Coordinate measuring machine, Roundness Measuring Machine, Accessories for the Universal Testing Machine, Strain Pacer, Enlarger, EDAX.

The Chairman said that the list compiled by the Officers in each division above covers almost the request for additional equipment and hoped that Dr. Tomita would convey the request to JICA H.Q. However, Dr. Tomita informed the meeting that the list will be passed to JICA H.Q. as MITEC future expectations.

AGENDA 5 (I) ANY OTHER MATTERS

En. Ahmad Zakaria enquired about short courses in Japan for the counterparts (1 - 2 months). Dr. Tomita will forward this matter to JICA H.Q. and informed the meeting that approval depend on the budget for the MITEC Project.

On the schedule and programmes for the training, En. Ahmad Zakaria enquired whether it is possible for the counterparts to select the places to be trained. Dr. Tomita said that the suggestions by the Officers will be taken into consideration.

CONCLUSION

Dr. Tomita on behalf of the Japanese Experts said:-

"This review has been very useful and valuable on the implementation of technology transfer. During the discussion, we have many good opinions from the experts and counterparts and please take note that technology transfer is self-effort. This cooperation will end in August 1984, therefore there is only one year and 3 months left. Regarding this, it is hoped that the counterparts will try their best to acquire the know-how from the experts as much as possible."

The Chairman agreed with Dr. Tomita and thanked the experts and counterparts for their sincere opinions and suggestions. It is hoped that steps could be taken to improve and develop areas that lacks participations. It is also important that the counterparts cooperate and have the positive attitudes towards the acquirement of technology from the experts.

This review set us back on the right track and also revealed the problem areas that had prevented effective technology transfer. The Chairman urged the Officers to work closely with the experts and utilise the available resources to develop the Centre through this technical cooperation.

Lastly, the Chairman expressed his appreciation to the experts and officers for their support to make this review a success.

資料－６

ＭＩＴＥＣプロジェクト評価会議議事録

昭和59年5月，ＭＩＴＥＣプロジェクトの終結と評価調査団の到着を目前にして，日本人専門家とマレイシア側カウンターパートとの間でＭＩＴＥＣプロジェクトの実績を評価する会議が２日間に亘って開催された。本資料はその会議議事録であり，その討議内容は評価調査団とＳＩＲＩＭとの間で実施された合同評価作業に大きく寄与している。

SUMMARY OF THE MITEC EVALUATION MEETING HELD ON 23RD AND 25TH MAY, 1984 AT THE MITEC CONFERENCE ROOM, TIME: 09.30 AM

Attendance

MITEC Officers

01) En. Mustafar Sudin (Chairman)
(Acting Head of MITEC)

02) En. Look Tian Fook
(Research Officer, Presswork)

03) En. A. Karunaneethi
(Research Officer, Welding)

04) En. Abdul Ghalib H. K. Tham
(Research Officer, Welding)

05) En. Abd. Halim Abd. Rahman
(Research Officer, Diemaking)

06) En. Nor Rashid Ismail
(Research Officer, Electroplating)

07) En. Ahmad Hj. Yunus
(Research Officer, Presswork)

08) En. Mohd. Fuad Isa
(Research Officer, Diemaking)

09) Cik Chen Sau Soon
(Information Officer, Information)

10) En. Azmi Idris
(Research Officer, Test and Inspection)

Japanese Experts

01) Dr. Kenji Tomita
(Chief Adviser)

02) En. Ryohei Nonaka
(Electroplating Expert)

03) En. Kazuhiko Tanaka
(Information Expert)

04) En. Isakazu Inoue
(Welding Expert)

05) En. Shigeaki Sugiyama
(Press-die Expert)

06) En. Kazuo Mori
(Press-die Expert)

1. OBJECTIVES OF MITEC PROJECT

Dr. Tomita briefed the meeting on the objectives of the MITEC Project as follows:-

a) Establishment of MITEC as a technological centre for the local metal-working industries.

b) Training of MITEC personnel to assist the local metal-working industries.

c) To up-grade the production techniques of the local small and medium metal-working industries.

2. IMPLEMENTATION OF MITEC PROJECT

2.1 JAPANESE CONTRIBUTION

i) DISPATCH OF JAPANESE EXPERTS AND JAPANESE MISSION TEAMS
ii) TRAINING OF MALAYSIAN PERSONNEL
iii) PROVISION OF MACHINERY AND EQUIPMENT

The above were prepared by the Japanese experts with assistance from the Malaysian counterparts and distributed to everyone present.

2.2 MALAYSIAN CONTRIBUTION

i) BUILDING RENOVATION
ii) RECRUITMENT OF MALAYSIAN PERSONNEL
iii) LOCAL PURCHASES

The above are to be prepared by the counterparts.

3. ACHIEVEMENTS OF MITEC PROJECT

3.1 ESTABLISHMENT OF A TECHNOLOGICAL CENTRE

3.2 TO ENSURE GOOD WORKING ORDER OF MACHINERY AND EQUIPMENT

i) CONDITION OF FACILITIES
ii) UTILIZATION
iii) OPERATION ABILITY OF OFFICERS
iv) MAINTENANCE
v) OPERATION MANUALS

3.3 UPGRADING OF TECHNOLOGICAL CAPABILITIES OF MALAYSIAN COUNTERPART PERSONNEL

i) TRAINING IN JAPAN
ii) IN-HOUSE TRAINING
   a) BY LONG-TERM EXPERTS
   b) BY SHORT-TERM EXPERTS
iii) ON THE JOB TRAINING

Diemaking

En. Fuad informed the meeting that from 1978 until now, MITEC has been established as a technological centre and is something to be proud of.

On the hardware side, the equipment and facilities donated by the Japanese Government for MITEC is sufficient to facilitate MITEC as a technological centre. Regarding the software side, there are not enough printed references in the form of datas on the latest development of the metal industries at MITEC to be referred to. The counterparts also do not have sufficient knowledge and skill especially in trouble-shooting to back up the Centre.

En. Halim added that MITEC has the necessary facilities to cater for its needs but it would be better and more advantageous should the Japanese Government donate additional equipment. He also agreed with En. Fuad that there is lack of information at MITEC to be referred to.

Cik Chen informed the meeting that there are two reasons that accounted for the lack of references at MITEC. She listed them as follows:-

a) MITEC has written in many letters to several societies to request for the necessary information but was always rejected as MITEC is not a member of these societies.

b) There is also no budget for MITEC to enroll as member of these selected societies.

Cik Chen added that the latest technological development in the field of metal-working however can be found in Japanese publications but they are all in the Japanese language. The Central Library in SIRIM also do not have much informative articles related to MITEC's activities. She suggested that another request for the necessary budget be forwarded to the new Controller as much could be benefited through the association with these societies.

En. Fuad informed the meeting that the condition of the facilities available at the diemaking workshop is satisfactory. All of them at the moment are fully utilized except for one or two of the equipment. The Officers and technicians are capable of operating these equipment available at the workshop. Maintenance of these equipment can be done too by the Officer with assistance from the short-term experts that were despatched by JICA on and off. All the equipment are also equipped with operation manuals. It is hoped that in future, training in Japan can be provided to the Officers in the division in specialised areas or on the latest development of metal-working technology. In-house training are always provided by the long-term expert and they can be considered good and beneficial. The diemaking division really appreciated these in-house training. On the whole, the short-term experts too has given the necessary technology transfer to the personnel of the diemaking division.

Presswork

En. Look informed the meeting that MITEC has achieved to a certain extent, a certain level of success. The setting up of MITEC is also a right step towards industrialization following the Malaysian Government's policy. The facilities available at MITEC now is sufficient but in future, it might not be so because technology moves at a fast pace and therefore more sophisticated

equipment and technology should be acquired for the centre. The counterparts too require more exposure in the form of training and the availability of information from related fraternities. Training can be in specialised areas or any other related fields related to MITEC's activities and it should not only be confined to Japan but as well as other countries. Locally, we should always be on the move, such as the visiting of old and new factories. The counterparts can also gain from the short term experts despatched by JICA H.Q. from time to time.

En. Ahmad Yunus added that on the hardware side, training in the maintenance of the equipment should be emphasized. Breakdown of the equipment always poses problems as it held up many of the activities. Spare parts should also be made available because machines are sure to break down in the long run.

The meeting was also informed that the condition of the facilities at the presswork workshop is satisfactory. Utilization of the equipment is seasonal depending on the number of request received by the division. The officers in the division are capable of operating the equipment available at the workshop. On the maintenance of these equipment, the officers are also capable except for the maintenance of the hydraulic press which require specialized knowledge. All the equipment are fully equipped with operation manuals. The upgrading of technological capabilities for the officers should be a continuous process. In-house training too is provided by the long and short-term experts and considered satisfactory.

Dr. Tomita informed the meeting that JICA H.Q. is willing to provide training for the MITEC officers provided it is under the Regional Training Programme. For the coming Regional Training Programme, two MITEC Officers have been officially accepted to undergo a three months training in Japan. Therefore JICA H.Q. can provide training for the MITEC Officers; two of them yearly under this Programme provided the Programme is conducted annually. Short-term experts would also be despatched on and off by JICA to MITEC.

MITEC can also utilize international programme such as UNIDO and UNESCO. Short-term experts for the maintenance of equipment will also be despatched by JICA from time to time. MITEC has sufficient spare parts at the moment for the equipment at MITEC, in future, spare parts could be requested under the budget for the Regional Training Programme.

En. Azmi informed the meeting that re-training would only be given to officers involved in the Regional Training Programme, but not to officers from the supporting divisions example the Test and Inspection and Information Divisions and also to the new officers.

Dr. Tomita informed the meeting that training of new officers is not possible because after August 1984, the MITEC Project will be self-reliance by the Malaysian counterparts. Training of officers under the Regional Training Programme will only depends

on the field of courses selected.

Welding

En. Ghalib informed the meeting that as far as the establishment of MITEC as a technological centre, he agreed with the other officers that MITEC has up-to-date facilities required for such a centre. The condition of these equipment in the centre are still good and functional since the rate of utilization is below par. The welding division is capable to undertake more requests from the local industries. The officers in the division are trained and capable to operate all the facilities available. The stock of spare parts available at MITEC is sufficient to sustain maintenance of these equipment, as the division has always been making effort to purchase them from time to time. Most of the spare parts can be obtained locally, however, they may also require the assistance of the Japanese expert to coordinate the purchase of those spare parts that are not available here in Japan in future. Although the MITEC Project will end this August, the welding division wish to suggest that formal training be provided to any new officers that may join the section in future. As for in-house training, this has been carried out from time to time with the full participation of the welding expert at MITEC. The welding division received regular fabrication services from both the local industries and internal divisions. These offer a wealth of opportunities for the welding division to exercise technological knowledge in solving welding problems. The number of requests received by the welding division can be considered satisfactory but the division is capable to handle more sophisticated welding problem. The skill of the welding personnel is developed on a wide range of welding application and they have good access to up-to-date welding technology information in Malaysia through welding texts and research information. They had been on self-reliance in presentation of consultancy service since 1982.

En. Karunaneethi added that the welding machines are getting more and more sophisticated, therefore if possible the division would like to put forward a request to JICA to make available catalogues of the latest welding machines at present in the market. These catalogues explain in detailed the functions or capabilities of these machines and are useful to the officers when giving advisory and consultancy services. On the skill and capabilities of the officers, there has been no real test so far.

Dr. Tomita commented that information regarding the latest welding machines in the market can be obtained from JETRO K.L. through a monthly publication which is sent to MITEC every month. MITEC can also contact JETRO K.L. for further assistance or another organisation called JACTIM (The Japanese Chamber of Trade and Industry, Malaysia). Individual training under the MITEC Project is not possible as the Project will end this August. Therefore it is advisable for the officers to apply for JICA training programme through the P.S.D.

Electroplating

En. Mustafar informed the meeting that as far as the establishment of the centre is concerned, the electroplating division played

a major part. The division received quite a number of requests from the local industries, thus making full utilization of the facilities available at the workshop. However, there are still some of the equipment donated by the Japanese Government that have not been operated completely. The conditions of the equipment available at the workshop until now have been satisfactory as maintenance is done periodically. All the equipment are also fully equipped with its own operation manuals. Where training is concerned, all the officers in the division have been trained in Japan for a year and two of the technicians in the division have also undergone a six months training in Japan. Sufficient practice at the own initiative of the personnel in the division have provided satisfactory in-house training and both the long-term and short-term experts despatched by JICA have proved useful.

En. Nor Rashid added that as far as the establishment of the MITEC Project as a technological centre is concerned, this has been achieved only up to a certain degree. This is done mainly through the MITEC courses and assistance given to the local industries. Where higher technology in the field of metal finishing is concerned, for example hot-dip zinc galvanising, aluminium anodizing and colouring, the MITEC electroplating personnel are still very limited in these areas. The facilities available at the workshop are still in good condition and all the personnel are able to operate them. Utilization however, is not constant. On the maintenance of these equipment, the officers have not gone deep into this area but periodic servicing of them is done based on the operation manuals. Training for the officers in specialized areas should be emphasized but in the meantime, at their own initiative, the officers have been following the latest development in the field of electroplating technology through bulletins received by the library.

Test and Inspection

En. Azmi informed the meeting that the contribution of the Test and Inspection Division towards the establishment of MITEC as a technological centre is satisfactory. Information on test and inspection are available at MITEC but most these references are in Japanese. The Japanese Government has donated sufficient supply of JIS books on test and inspection. The condition of the facilities available in the division is satisfactory and have been put to good use through the services received from both the local industries and internal divisions. The staff in the division are also capable of operating the equipment. On the maintenance, the equipment like the Universal Testing Machine and Charpy Impact Machine require yearly calibration and verification by any authorised companies. The calibration of the Universal Testing machine can be done by the Metrology Unit in SIRIM but for the verification of the calibration of the Charpy Impact machine, standard charpy impact samples of known charpy impact value are required. The division hope that JICA can supply the standards samples from Japan yearly so that the verification can be done by the Metrology unit in SIRIM according to JIS standards. The EPMA and x-ray machines also need to be checked regularly and it is hoped that JICA will despatched qualified engineers from the manufacturers of both machines to do the job.

JICA has despatched short-term experts to train the officers in

the division to improve their technological capabilities both in the handling of complicated machine and also in the NDT area. It is hope that these experts can act as examiners and issue certificates of proficiency to the officers in the test and inspection division on behalf of the recognized certification bodies in Japan. These certificates would enable the staff in the division to have the confidence in conducting certain tests. It would also be beneficial if JICA is willing to provide training for the new officers of the Test and Inspection division.

Information

Cik Chen informed the meeting that the local industries, at present have recognised MITEC as a technological centre that is able to provide the technical assistance required by them. MITEC should seriously consider and work towards becoming members of related societies as this not only contributes to boost the image of the centre but also to upgrade the officers' capabilities through the easy availability of up-to-date information. Enquiries have been received from the local industries regarding the capabilities of the officers and presently, the presence of the long-term experts greatly account for the recognition that MITEC has received. The MITEC officers must be continuously trained in the latest development in order to gain the confidence from the local industries. Visitors to MITEC are always impressed with the facilities available in the centre.

The equipment available in the Information Division are still operational and have been put to good use. The sophistication of audio-visual equipment increases with each new model but it will not be feasible to continually change the equipment although they are better. The existing models at MITEC though out-dated are still usable. The Information Division is sometimes overloaded with too much paperwork thereby have not been able to launch into more audio visual practice. It is hope that this can be rectified. On the maintenance of the equipment, there are no problems as it can be done locally. All the operational manuals are kept.

The training in Japan provided the counterpart with the necessary practical experience and exposure and has been beneficial and fruitful. As for in-house training so far there have been no lectures conducted for the personnel as the scope of this field is very wide and is very different from other sections of the centre. However, training is normally done by the counterpart through observation on the work done by the expert. The Information division hopes to venture into the more specialized areas of audio-visual and computer management. JICA H.Q. will be donating a personal computer soon (Model NEC) which will be put to good use for recording all of MITEC activities, information acquisition, data management and etc.

4. ACTIVITIES OF MITEC

4.1 EXTENSION SERVICES

i) ADVISORY SERVICES
ii) TECHNICAL CONSULTANCY
iii) TEST AND INSPECTION
iv) PROTOTYPE FABRICATION
v) TRAINING COURSES/SEMINARS
vi) INFORMATION

Diemaking

En. Fuad informed the meeting that from the years 1979 to 1981, quite a number of factory visits were conducted by the diemaking division. During these visits, advices were given. However, towards the years 1982 - 1984, the numbers of factory visits declined to a great extent. The diemaking division would like to request for more visits to get to know more about the existing metal-working situation in Malaysia and also to gauge their level of technology in certain aspects and also at the same time to judge the officers' level of technological skill compared to the local industries. Therefore, the diemaking officers who joined MITEC at a later date are not satisfied about the above matter because they are not given much exposure.

A lot of technical consultancy services given by the diemaking division are mostly combined efforts with the Presswork Division and the officers really learned a lot from these services. On prototype fabrication, the officers are lucky to have a good press-die expert who assisted the officers in every possible way that he can. Most of the requests are received from the local industries in the form of die fabrication especially blanking die, forming die, etc. Sometimes due to limited facilities and manpower, a few requests had to be turned down because of their urgency.

The diemaking division is also very satisfied in areas of conducting training courses and seminars for the local industries. At the beginning, there was a lack of response but now the diemaking division receive good response from the local industries for the courses. Information provided by the division are mostly in the form of matters pertaining to machine layout, suppliers, materials, die design, heat treatment, etc.

Presswork

En. Look informed the meeting that recently, a lot of new factories have been set up and the presswork division have not visited many of these new factories. However, some of the personnel of these new factories have attended the MITEC training courses and in fact requested the division to visit their factories. The division is also satisfied with the technical consultancy services it rendered to the local industries as most of the requests are received from the local factories visited by MITEC personnel and even from the entreprenuers who came to know about MITEC through other sources. Most of the prototype fabrication and trial manufacturing services received by MITEC are taken up by the diemaking division. Therefore, in this aspect the presswork division would like to suggest that the leasing of the equipment available at the presswork workshop be encouraged. In this way, the presswork personnel can learn and acquire the necessary skill through

and actual practice. At the same time, since most of the facilities at the workshop are expensive, by leasing them out, we can get full value from the machines. However, one problem on this, is that the local industries sometimes worry about the charges to be levied by MITEC so it is advisable to take into consideration that only a token sum be charged for such cases. At the same time, it is also advisable to have more in-house projects to keep the personnel fully occupied.

Training courses and seminars conducted regularly by the press-work division have received satisfactory response from the local industries. Information in the form of matters such as machine layout, suppliers, machine specification, etc are provided frequently to the local industries too.

En. Ahmad added that he agreed with the diemaking division that there is not much emphasis on factory visits for the officers who joined MITEC at a later date. Follow-up to the factory or either from the factories is very important because either way, the officers would be able to know whether the advices offered were successful or not to the factories concerned.

Welding

The welding division also suggested the increased number of factory visits around the Klang area and if possible throughout Malaysia. In this way, advisory and technical consultancy to the local industries can be enhanced. The officers expressed interest to apply their all round knowledge of welding technology in heavy industries such as in the oil and gas industry where welding technology is very prominent. To date the welding officers have achieved internally recognised qualification in welding inspection and are in the position to offer professional inspection and qualification services to welding industries.

The division also hope to receive more prototype fabrication requests as it would provide more opportunities to train and develop the technological capabilities of the centre. As far as training courses and seminars are concerned, response from the local industries is fair. There are suggestions that the courses be conducted on a shorter duration to encourage wider participation among Malaysian metal industries as such due consideration will be given to satisfy the industrial needs in planning of technology courses. The welding division frequently encountered requests for information on welding application, selection of machines and consummables. To add convenience in transfer of technical information, welding technology can be effectively presented by the means of video methods and computerised information system.

The Chairman commented that factory visits should be increased to enable sufficient exposure for the new officers but due to budget constraint, the number of visits had to be cut down. He hope that this would be solved as early as possible. On the duration of the training courses organised by MITEC, En. Look agreed that most private companies are not willing to release their staff for long period. Therefore he suggested that any

companies wishing to obtain the training send an official request to MITEC. Arrangement can then be made to train the personnel of the company if not on an attachment basis. Dr. Tomita too commented that the MITEC Officers coordinate with SIRIM H.Q. to obtain more films related to their fields and added that screening of technical films is done by SIRIM H.Q. every Thursday.

Electroplating

En. Mustafar informed the meeting that in the beginning of the establishment of the MITEC Project, the electroplating personnel concentrated their efforts in the installation work and paper work such as preparing the necessary specification for the purchase of equipment. After these, the division made preliminary survey in areas where there are metal-working industries. Reports of these survey were compiled. However, during that time, advisory and technical consultancy services were limited to a few selected factories and response for such services can be considered fair considering the fact that MITEC was not so well known at that time. It has been increased and can be seen that the number of requests from the local industries is picking up.

On test and inspection, the electroplating division conducted thickness testing, solution analysis, chemical testing and other relevant tests with regards to electroplating technology. Where prototype fabrication is concerned, the electroplating division was involved in several projects, both in-house and for the local industries namely, the paper weight, paper knife and pencil holder. The division also participate in the training courses and seminars. Information regarding electroplating technology are also provided to the local industries. Internally, the division had compiled reports on technology transfer.

En. Nor Rashid added that as far as advisory services and technical consultancy services are concerned, since 1983 requests for such services can be considered fair; at an average of five per month. Test and inspection services for the local industries had been declining too towards the end of 1982. Where prototype fabrication is concerned, it is seasonal, the division is only involved when there is an on-going project. The electroplating division however, is pleased with the response from the local industries for the courses and seminars conducted by the division. As for providing information in the areas of electroplating technology, response for them is regular. Such requests are mainly through the phone or sometimes through direct approach.

Test and Inspection

No comments on the advisory and technical consultancy services as the Test and Inspection division is not directly involved with such areas. The number of test and inspection services rendered by the division is satisfactory. However, the division is capable of handling more requests and in this aspect, it is hoped that promotion of the division and the facilities available be made through the MITEC Bulletin. Some industries are not aware of the facilities available here. The test and inspection division so far had only conducted one seminar on the EPMA otherwise the officer is only involved when he is invited to present one or two lectures on welding inspection during the welding courses.

The test and inspection division however would welcome training for the new officers which would enable them to obtain the necessary qualification or certification such as certificate of competency. In such matters, it is felt that the local industries would have confidence in the division. The division would also like to suggest for more factory visits.

Information

In (4.1) and (4.2), the Information division has no direct relation except when the officers concerned are not around. In this matter, the information division would like to request that reports made or compiled by the other divisions be handed regularly in to the information division. The information division would like to have a copy each of all the technical reports if possible as these could be fed into the data bank of the computer. At the moment, the reports handed up are too brief. It is hoped that the reports may contain further elaboration for future references. The information division hopes to prepare a proper format of questionaires to assist the officers in this matter.

The factory visits made by officers in the past seldom receive any feedback, therefore it is not known whether the advices given were useful to the companies concerned or not. With regards to the training courses and seminars conducted by MITEC, response from the local industries can be considered fair. The officers at the same time should be well prepared as the participants sometimes complained that lecture materials were handed up late and caused unnecessary wastage of time. This has been gathered from the evaluation reports handed up by participants at the end of the courses. Courses that are cancelled is mainly due to inadequate number of participants. At the moment, the training courses conducted by MITEC has to cover for expenses on lecture claims, training materials, etc. The division is willing to compile the lecture notes for the various division provided sufficient time is given and will also assist in the presentation of the audio-visual materials.

5. TO EVALUATE SUCCESS OF MITEC IN CARRYING OUT TECHNOLOGY TRANSFER TO LOCAL METAL-WORKING INDUSTRIES

i) EFFECTIVENESS OF EXTENSION SERVICES
ii) RESPONSE FROM LOCAL INDUSTRIES
iii) TECHNOLOGICAL CAPABILITY OF OFFICERS
  i) DIEMAKING
  ii) PRESSWORK
  iii) WELDING
  iv) ELECTROPLATING
  v) TEST AND INSPECTION
  vi) INFORMATION

Diemaking

On the results of the prototype and trial production services provided by the diemaking division, it can be considered as very successful. This is taken from the viewpoint, that we have

received numerous requests from the local industries for such services to fabricate different type of dies. The only regret is that due to manpower and urgency of the request, it sometimes have to turn down a few. In such cases, however it refer these companies to private sectors who are capable of assisting them in machining. Consultancy services provided by the diemaking division is fair, they are mainly in the form of designing aspects and repair of dies. For die repairs, the officers of the division can only handle the easy ones as it usually take a lot of years of experience to be able to handle the job and also skill is required to do trouble shooting. The diemaking division is now assisted by a good press-die expert. Training courses conducted by the diemaking division is satisfactory. There is a demand from the local industries for more advanced or specialised courses related to diemaking technology.

En. Halim being new to the diemaking division added that the extension services provided by the division can be considered satisfactory. A lot of the assistance however still have to be depended on the experts.

Presswork

En. Look informed the meeting that the extension services provided by the presswork division is quite effective in the sense that it has achieved to a certain level of what was expected. At this junction, in areas of consultancy, prototype fabrication, and information services, it can be only considered fair based on the number of requests the division received either through phone or direct approach. However, there is need to intensify the advisory services by visiting more factories. The officers of the presswork division however are weak in areas such as trouble shooting and remedies as this requires a lot of skill and accummulated experiences which can only be obtained after many years of practice. At the moment, in this aspect, the division is dependent on the long term experts, in certain specialized areas of presswork such as trouble shooting and remedy. The presence of the experts have inspired the local industries to come to MITEC. Products manufactured are also getting more complicated and sophisticated. Therefore it is hope that training of officers be provided in specialized areas in order to be ahead of the local industries in terms of expertise and knowledge as MITEC is a technological centre, the officers have to progress continuously to keep in pace with the latest development.

En. Ahmad Yunus agreed with En. Look on the above statement.

Welding

The welding division reported that from the years 1979 - 1982, extension services to the local industries during the factory visits helped in the promotion of MITEC. The officers expressed the opinion that factory visits should be conducted regularly to gauge the need and development trend of the local industries. Information on welding technology are presented verbally or in writing to local industries both in the West and East Coasts. With the qualification in CSWIP welding inspection recently, the welding division is able to offer professional welding

services and supervision on qualifications of welders and procedures for welding projects.

Considering the number of the prototype fabrications and trial productions undertaken by the welding division, the division has experienced and solved a wide varieties of welding problem faced by metal industries. Training courses and seminars conducted by the welding division are designed to upgrade the technological knowledge and maintenance of sound quality control. The division [illegible] that because of the limited promotional exercise, majority of the local industries are still not aware of our facilities and capabilities to serve them. This should be remedied by all means available.

Mr. Karunaneethi agreed with En. Ghalib that as far as extension services is concerned, it had been effective and resourceful to those that have approached the division.

Electroplating

The electroplating division reported that the effectiveness of the extension services provided by the electroplating division to the local industries is only to a certain degree. They have feedbacks from the factories where the technical advices the division have assisted helped a great deal whereas in some cases, it was not useful at all. In cases where it was not successful, the division try their best to give another alternative. Most of the extension services provided are also only to a few common companies like Mariwasa Kraftangan, Sri Menanti, Taba Silver and Kejuruteraan Emas or sometimes to Electrobrite and Guan Hin. There are requests too from Bank Negara or new companies, requiring the division to assist them in the set up of new lines/electroplating lines and sometimes also to analyse their plating solutions.

However, the electroplating division would also like to comment that the effectiveness of the extension services to the local industries could be partly due to the training the officers have received in Japan and also through the training received under the supervision of the long term expert.

En. Nonaka, the long-term expert of the electroplating division would like to comment as follows:-

Effectiveness of the division was reflected by the ability of companies who develop techniques and increased capacities through MITEC's guidance.

Many companies have benefited from MITEC through its training courses, advisory services, factory visits but problems of quality and cost especially industrial parts plating still exist.

Test and Inspection

The test and inspection services conducted from the years 1981 - 1984 are mainly concentrated in DT such as tensile, bending, etc.

There is also an increased in the later parts of the year on the utilization of the EPMA. A sharp decline can be seen in the request for charpy test because the charpy impact machine in the test and inspection division has not been calibrated. However, effort has been made to get the machine verified, and it is hope that this will encourage the local industries to come back to MITEC. However, on the whole, the response for test and inspection services from the local industries actually depends on the projects that is going on in Malaysia. Samples are sent by companies for DT when the companies doing big projects have to abide to certain requirements.

Information

At the moment, MITEC is regarded as a technological centre by the local industries, a place where they can obtain the necessary technical expertise that they require. In Japan, 'human resources bank' have been set up by various institutes. The people whose names have been selected for these banks are mostly technically qualified, either academic or through experience. The officials selected are also either from the government or private sectors and are paid by the Government. The officers' working in the technological centre normally act as coordinators between these experts and the private entrepreneur who is experiencing some technical problems. Forums are also a good activity to adopt as they enable exchange of information among the private entrepreneur. It is hope that MITEC would be able to follow this good example.

On the response from local industries regarding MITEC as a technological centre, promotion gadgets like films and symposiums and exhibitions have brought in visitors to MITEC but the percentage of them who actually refer back to the centre again is small. Most of the requests now come from the bigger companies. The problems of smaller companies often centres around financial management and marketing, these are areas where MITEC is not in the position to offer much help. The smaller companies have financial problems as our charges are quite high and partly because they are satisfied with their own level of technology. Regarding training courses and seminars, most big companies nowadays are setting up their own training departments and emphasis on training have become more prominent accounting for the increase interest in MITEC training courses. The smaller companies however cannot afford to release their staff off for long courses example of two weeks duration.

Lastly, MITEC's effectiveness is especially in the assistance rendered to set up new companies and this has been successful.

資料－7

「マレイシア中小金属加工業への技術移転」講演要旨

昭和59年3月2日，JETRO主催の“Japan Technofair 84”においてチーフアドバイザーがMITECプロジェクトの活動状況について講演を行ない，併せてMITEC紹介の映画を上映した。本資料はその際の講演要旨である。

TECHNOLOGY SEMINAR AT " JAPAN TECHNOFAIR '84 "

" TRANSFER OF METAL-WORKING TECHNOLOGY TO SMALL AND MEDIUM SCALE INDUSTRIES IN MALAYSIA "

by

Dr Kenji Tomita, Chief Advisor,
Metal Industry Technology Centre, SIRIM

(March 2nd, 1984 at the Seminar Room of
Changkat Pavilion, Kuala Lumpur)

* * * * *

INTRODUCTION

It is a great pleasure for me to be present here today, and to have an opportunity to be able to introduce our experience on the transfer of metal-working technology to small and medium scale industries in Malaysia through the activities of the Metal Industry Technology Centre (MITEC) Project.

I think you know all about the economic development of Japan. Today, you can see and understand much more things on the present situation of Japanese industry by the exhibitions of " Japan Technofair '84 ". And on the cause of the success of Japan, I know many kinds of opinions and views are proposed by many people. However, I should like to say that one of the most important factors on the Japan's success is the results of the efforts and hardwork by enterprisers in Japanese small and medium scale industries.

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AN IMPORTANT ROLE OF SMALL AND MEDIUM SCALE INDUSTRY

Today, the Japanese industry is a strong competitive power in the world market. One of the reason that has caused her to achieve this status is the efforts and technological capabilities of local small and medium scale industries. A good example is the automobile industry which has become a leading exporter for Japan.

A major contributing factor to its success is the cooperative work with small and medium industries. That means while foreign automobile firms make most of the components within the factories themselves, Japanese firms sub-contract them to those cooperative factories. Even though the various car components are manufactured by small and medium scale industries, Japanese cars are still known world-wide for efficiency and low costs. This is because each cooperative factory is equipped with the required know-how for different specialised fields including quality control, productivity and cost management.

However, it was not long ago that Japanese-made components and products became well-spoken of in terms of quality and economy. In the 1950's Japanese made cars had a reputation for frequent break-downs and troubles because of low quality components, for example, even a low quality bolt and nut can enhance the degradation rate.

Nowadays, Japanese made cars have become popular in view of their good performance and lower frequency of trouble.

To achieve this reputation, a great deal of effort was put into the manufacturing of every piece of product with severe inspection attitudes by assemblers and concerted efforts of the sub-contractors to meet the requirements of the former.

The important thing here is that the people engaged in the actual work realized that they had to change their technique, and thus acquire the necessary knowledge and technology.

The awareness of technological insufficiency is then the first step towards achieving these goals. Although it might seem a long way off before the results of technological improvement could surface, it can surely be steadily built up.

With these attitudes, Japan achieved her goals in only 15 years. Perhaps these attitudes may be relevant in developing the small and medium scale industrial sector in Malaysia, in order that they can contribute to the overall progress of the country.

* * * * *

THE ROLE OF LOCAL RESEARCH AND TESTING CENTRE IN JAPAN

Development of small and medium scale industry is considered an essential pre-requisite to a balanced growth of society and it is growing in importance all over the world supported by various promotional measures.

The Japanese Government of course, has a comprehensive policy for the promotion and development of small and medium scale industries for a long time.

Apart from giving financial and marketing support, many kinds of technical support are given to local firms. And one of these technical supports is the technological services by local research and testing centres which belong to local government.

A number of local institutes exist in perspective to cater for local needs. These institutes maintain close contact with industries, particularly those in need of technical help to upgrade their products. Services provided include technical advice, testing and technical information. The local institute also provide them with relevant information and manpower in order to promote development and act as the parent to the local industries. So that, we can say, the local institutes play a major role in establishing Japan as one of the leading manufacturers in the world.

* * * *

In this country, however, the significance of this industrial sector gained its general recognition only recently. Therefore, the formation of definite policy measures is greatly hampered on account of an acute shortage of reliable data base.

With a view to overcoming this need and setting out solution for adiversity of problems encountered in developing this sector at the grassroot level, Metal Industry Technology Centre (MITEC), SIRIM, has conducted a comprehensive survey to more than 800 metal-working firms located in the whole of Malaysia in late 1983.

Today, I cannot disclose the results of this survey, because the analysis of collected data are still now under-going by the staff of MITEC.

Meanwhile, with the same view to our MITEC's survey, a joint research was conducted by Japan International Cooperation Agency and Technonet Asia in 1980 to 1981, applying new techniques of data collection and analysis in order to represent the actual situation of the small and medium scale metal-working firms on a micro-level.

The various findings generated from this survey have been systematically aggregated to faciliate the generation of recommendation on the various areas of the small and medium metalworking industries in this country. And one of the conclusions in this survey shows the necessity of the setting up of a governmental technical centre in the field of metal-working technology.

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THE SETTING UP OF THE METAL INDUSTRY TECHNOLOGY CENTRE.

Today as Malaysia embarks on its industrialization programme to further strengthen its economy, it must follow the trend of other industrialised nations of the world by moving towards higher technology and a more diversified industry. The challenge of the era is to meet the demand for high quality products for a sophisticated market. As such, a technical centre to enhance upgrading and development of the existing technology in the fundamental industrial sectors such as the metal working industries, is imperative to speed up the industrial activities in Malaysia.

In view of this necessity, steps to set up the Metal Industry Technology Centre in the Standards and Industrial Research Institute of Malaysia, (SIRIM) started in late 1978 to cater mainly for specialised aspects of the metal industries such as die-making, presswork, welding and electroplating. The metal industry plays a key role in industrial development in that it is a basic industry which assists nearly all other industries, to name some such as mining, construction, automobile works, plastics and a host of others. To catalyse industrial growth would then mean providing the technical support to produce spare parts, machine components, machinery repairs and other associated engineering works which have to be internationally competitive in quality and price. MITEC is therefore, an appropriate Centre to meet this challenge of technology dissemination to Malaysian metal entrepreneurs.

The Metal Industry Technology Centre (MITEC) is set up under the Standards and Industrial Research Institute of Malaysia (SIRIM) through a

bilateral aid programme with the Government of Japan. Efforts to establish the Centre commenced after the signing of the Record of Discussions on 11th August 1978 between the Governments of Japan and Malaysia.

The services rendered, though diverse in nature have been streamlined so as to focus on the expansion of modern technological knowledge in the fields of die-making, presswork, welding, electroplating, test and inspection.

* * * *

ORGANIZATION OF MITEC

1. Die-Making Division

The die-making division is equipped with the most advanced machining facilities available in Malaysia featuring sophisticated equipment like Jig-borer, the Copy Milling Machine which is capable of machining 3 dimensional complex shapes, the Die Spotting Press for die repairs which is so designed to contain adjustable table and movable clapper enabling very accurate and precise matching of the upper and lower dies, such salient features has qualified it to be placed among the rare equipment list available in the country presently. Other facilities in this division include the Drip Feed Heat treatment which can be programmed according to the time set, the Electric Discharge Machine (EDM) and the Optical Profile Grinding machine which has the capacity to produce high precision dies such as those required for electronic components and cannot be produced by ordinary machining.

2. Presswork Division

The presswork division has been sufficiently equipped to carry out most of the presswork operations known, as well as to initiate research interests into the areas of safety, and increased efficiency along production lines.

Consonance with the demand for small-lot productions aimed at achieving reasonable inventories of blanks, semi-finished and finished

goods and space saving arrangements, technology has come up with the transfer press machine which is able to cope with the above requirements such as replacement and adjustment of dies. The transfer press, among the first of its kind to be imported into the country has just been installed in the Presswork Workshop.

The 150 ton Hydraulic Press ideal for deep to very deep drawing with adjustable speeds and time lengths and the versatile 45 ton Pneumatic Clutch Power Press capable of performing a wide variety of operations ranging from blanking, forming, shallow drawing to deep drawing and equipped with a photo sensor safety device, are among the facilities that have been systematically built up in the division.

3. Welding Division

A wide selection of welding facilities is made available in MITEC and they include the common shielded metal arc welding, semi-automatic CO_2 arc welding, semi-automatic MIG arc welding, TIG arc welding, arc air gouging, resistance spot welding and resistance seam welding, submerged arc welding, oxy acetylene gas cutting, and automatic plasma arc cutting and electroslag welding.

This division also offers a range of training courses in arc welding particularly that of shielded metal arc welding and CO_2 arc welding for untrained welders and any personnel directly involved with welding production and inspection. The course content has been so designed as to be equivalent to the level and expectations set by welding international authorities. The training is industrial

oriented and well balanced with lectures on up-to-date welding know-how.

4. Electroplating Division

To instill technological development in electroplating would necessitate the introduction of modern equipment,plating facilities and chemical currently being used in metal finishing industries of advanced industrialized nations. The electroplating division has been equipped with various types of sophisticated plating process inclusive of copper-nickel-chrome,zinc,nickel and tin barrel, plastics (ABS), gold, silver and hard chrome platings.

To comply with the future implementation of government regulation whereby all electroplating plants must be equipped with a waste disposal system, a sophisticated waste treatment system consisting of ion exchangers and filter presses that is capable of detoxicating cyanide, acid, alkali and metallic residues has been installed in the Centre. There is also a scrubber for toxic gas treatment. Besides plant facilities, this division is also supported by an analytical laboratory where up-to-date testing facilities are available.

5. Test & Inspection Division

The activities of this division is integrated into the other four major divisions of MITEC by providing the testing facilities speci-

fically used in the metal working fields. The laboratory is equipped with a sophisticated Electron Probe Micro Analyser (EPMA) for spectrometric qualitative and quantitative analysis. The latter is restricted to the standard samples of metals available, eg. Mn, Ni, Cr and Si. It is applicable to all elements up to boron in the periodic table for qualitative analysis.

The ultrasonic flaw detector and the X-ray radiography of 250KV are used to detect internal defects in welded products. Also available are the Dye Penetrants for surface defects and the Magnetic Partical Tester for sub-surface defects of ferrous materials.

The equipment catering for destructive testing are the Universal Tensile Testing Machine capable of withstanding loads up to a maximum of 200 tons, a Charpy Impact Tester, Rockwell and Microbickers Testers for the hardness test and a Metallurgical Microscope with a magnification of 1000 times.

6. Information Division

This division provides up-to-date technological information on a wide range of subjects of interest to the metal entrepreneurs. The technological dissemination services of a technical library which houses a host of reference books pertaining to specialised metal working fields of the Centre as well as other relevant topics covering factory management, organizations, safety, pollution control and quality control. MITEC also has an audio visual library facilitated with an editing and dubbing machine, slide projector, film

projector, overhead projector and video tape recorders. MITEC is also equipped with a collection of appropriate technical video tapes and slides that will furnish interested parties with up-to-date information on the metal technology advancements already in the grasp of the highly industrialised countries of the world.

A quarterly bulletin 'Berita MITEC' and information brochures keeps the industrialists informed of the activities and development of the Centre.

* * * *

VARIOUS TECHNOLOGICAL DISSEMINATION SERVICES

1. Factory Visit Service

On site advisory services to overcome technical problems as well as proposals to improve on manufacturing techniques, production processes, quality control and safety management are provided by MITEC officers and Japanese experts during factory visits.

Since 1979, the number of factories visited amounts to more than 300 and the mileage of MITEC bus used by factory visit is more than 200,000 km.

2. Consultancy Service

MITEC provides the technical assistance required in the adaptation of new technology and know-how to upgrade product quality through up-to-date technical information, reference book, video tapes, slides and films.

Since the official opening of MITEC in September 1981, the number of consultancy services amounts to more than 500.

3. Test and Inspection Service

Test and inspection services including a wide range of testings and analytical works, among them, destructive and non-destructive testings, chemical analysis, metallurgical analysis at the micro level and precision measurements are provided by request from the local firms. Since 1980, the number of samples tested amounts to more than 2,600.

4. Prototype Fabrication Service

In product development, MITEC assists the local metal industries by undertaking prototype product fabrication, improvement of jigs and tools to encourage the growth of local fabrication capabilities. This fabrication service is helpful in the local firms, who have not latest machinery and equipment for financial difficulty. Since 1980, the number of fabrication service amounts to more than 100.

5. Training Courses and Seminars

Practical training courses to industries to upgrade technical expertise as well as to impart modern manufacturing techniques and processes in the field of die-making, presswork, welding, electroplating and test and spection are among MITEC's prime activities.

Seminars featuring topics ranging from applied basic know-how to recent technological innovations in specialised areas of the metal working industry are held from time to time. Since 1981, the number of participants to training courses and seminars amounts to more than 300.

6. Information service

MITEC through its library makes available to the manufacturers technical information on manufacturing techniques, processes, equipment manuals, quality control and a host of other relevant technical subjects related to the metal fields. Video tapes, slides and films on technical subjects are also available. To keep abreast with recent technological development, technical pamphlets and MITEC bulletins are published periodically and distributed to the metal industries.

* * * *

CONCLUSION

In conclusion, I believe that the transfer of metal-working technology to the local small and medium scale industries is now in progress steadily through the implementation of MITEC project during the past six years.

At the beginning of MITEC project, the mission of this project was defined as follows:

1. Establishment of the technical centre which is helpful to local industries.

   This means that we are learning of successful activities at the local research and testing centre such as Chiba Machinery and Metal Research Institute, Chiba Prefecture, Japan.

2. Training of consultants for metal-working industry

   One of the main purpose of the MITEC project is to train Malaysian counterpart personnel to improve their technique and to acquire modern technique on management and technology for development of the local industries as a technical consultant in the Centre. Therefore we, Japanese experts and Malaysian counterparts, are making every effort to improve and increase the technological self-sufficiency of MITEC personnel by conducting lectures and practical training in the Centre, technical training in Japan, and on-the-job training through the MITEC daily activities.

3. Up-grading of the production technology at the local small and medium scale industries.

This means that the up-grading of production technology should be progressed gradually from the first stage, that is the accurate operation by using the existing facilities, to the second stage , that is the ample and steady supply of machine parts to the assembly plants. This means that the increase of local content ratio, that is an important policy of this country.

Activities at MITEC project can be classified as 4 stages, that is preparation stage, basic establishment stage, development stage, and self-reliance stage.

I think that MITEC project is now in progress at the self-reliance stage. This means that fruitful success by the sincere cooperation of Japanese experts and Malaysian counterparts will be expected in the near future.

* * * * *

資料－８

MITECプロジェクト討議議事録（RECORD OF DISCUSSIONS）

MITECプロジェクトの実施に関し，実施協議調査団長とマレイシア科学技術環境省次官との間で署名交換した討議議事録（R／D）（昭和53年８月11日）

THE RECORD OF DISCUSSIONS BETWEEN THE JAPANESE IMPLEMENTATION SURVEY TEAM AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF MALAYSIA ON THE JAPANESE TECHNICAL COOPERATION FOR THE METAL INDUSTRY TECHNOLOGY CENTRE PROJECT

August 11, 1978.

THE RECORD OF DISCUSSIONS BETWEEN THE

JAPANESE IMPLEMENTATION SURVEY TEAM AND THE

AUTHORITIES CONCERNED OF THE GOVERNMENT OF MALAYSIA ON THE

JAPANESE TECHNICAL COOPERATION FOR THE

METAL INDUSTRY TECHNOLOGY CENTRE PROJECT

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Minoru Sayama, visited Malaysia from July 31, 1978 for the purpose of working out the details of the technical cooperation program concerning the Metal Industry Technology Centre (MITEC) Project in Malaysia.

During its stay in Malaysia, the Team exchanged views and had a series of discussions with the Malaysian authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the above-mentioned Project.

As a result of the discussions, the Team and the Malaysian authorities concerned agreed to recommend to their respective Governments the matters referred to in the Attached Document hereto.

August 11, 1978

M. Sayama.

Minoru Sayama
Head of the Japanese
Implementation Survey Team

Mohd. Hashim bin Sam Abdul Latiff, JMN
Secretary General
Ministry of Science, Technology and
Environment, Malaysia.

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of Japan and the Government of Malaysia will cooperate with each other in implementing the Metal Industry Technology Centre Project (hereinafter referred to as "the Project") for the purpose of development of management and technology in the metal industry in Malaysia.

2. The Project will be implemented in accordance with the Master Plan which is given in Annex 1.

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in Annex II through the normal procedures under the Colombo Plan Technical Cooperation Scheme.

2. The Japanese experts referred to in 1 above and their families will be granted in Malaysia the privileges, exemptions and benefits in accordance with General Circular No. 1 of 1969 of Government of Malaysia.

III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials necessary for the implementation of the Project as listed in Annex III, through the normal procedures under the Colombo Plan Technical Cooperation Scheme.

2. The articles referred to in 1 above will become the property of the Government of Malaysia upon being delivered c.i.f. to the Malaysian authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with

the Japanese experts referred to in Annex II.

IV. TRAINING OF MALAYSIAN PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to receive at its own expense the Malaysian personnel connected with the Project for technical training in Japan through the normal procedures under the Colombo Plan Technical Cooperation Scheme.

2. The Government of Malaysia will take necessary measures to ensure that the knowledge and experience acquired by the Malaysian personnel from technical training in Japan will be utilized exclusively for the implementation of the Project.

V. MEASURES TO BE TAKEN BY THE GOVERNMENT OF MALAYSIA

1. In accordance with the laws and regulations in force in Malaysia, the Government of Malaysia will take necessary measures to provide at its own expense:

(1) Services of the Malaysian counterpart personnel and administrative personnel as listed in Annex IV;

(2) Land, buildings and facilities as listed in Annex V;

(3) Supply or replacement of machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under III above;

2. In accordance with the laws and regulations in force in Malaysia, the Government of Malaysia will take necessary measures to meet :

(1) Expenses necessary for the transportation within Malaysia of the articles referred to in III above as well as for the installation, operation and maintenance thereof;

(2) Customs duties, internal taxes and any other charges, imposed in Malaysia on the articles referred to in III above;

(3) All running expenses necessary for the implementation of the Project, such as personal expenses of the project staff, office expenses, purchase expenses of materials & equipment, operation expenses, etc.

VI. ADMINISTRATION OF THE PROJECT

1. The Secretary General of the Ministry of Science, Technology and Environment through the Controller of Standards and Industrial Research Institute of Malaysia (hereinafter referred to as SIRIM) as the executing agency of the Project will bear the overall responsibility for the implementation of the Project.
2. The Head of the Project, under the supervision and direction of the Controller of SIRIM will be responsible for the administration of the implementation of the Project.
3. Japanese chief advisor will take appropriate care on technical matters and will provide necessary technical and managerial advice on the Project to the Controller of SIRIM in close coordination with the Head of the Project.
4. Japanese experts will give technical instruction and advice related to matters concerning the implementation of the Project.
5. For the effective and successful implementation of the Project, the SIRIM Council and the Controller of SIRIM will coordinate Malaysian organizations concerned.

VII. CLAIMS AGAINST JAPANESE EXPERTS

The Government of Malaysia undertakes to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official duties in Malaysia except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VIII. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from or in connection with this Attached Document.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be four years from August 11, 1978.

Function of the Project

(1) Advisory Service to Industries

i) to study the present status of local industries and market potentials, and to identify their managerial and technical problems;

ii) to give assistance to industries in solving technical problems;

iii) to give to local industries appropriate advice on management and technology;

iv) to conduct test and checking their products in the industries;

v) to hold lectures and seminars in industries;

vi) to transfer manufacturing techniques to industries visited through their own equipment

(2) Test and Checking

i) to provide the service of testing and checking local products to improve its quality;

ii) to study the technical level and to introduce technical know-how of quality control;

iii) to train counterpart personnel;

iv) to provide testing and checking facilities to local industries willing to conduct their own test and checking routine.

(3) Information Service

i) to furnish information data on new technology, modern machinery and equipment to the local industries;

ii) to provide filming service for the local industries in modern management and techniques.

(4) Training Program

to train Malaysian counterpart personnel to improve their technique and to acquire modern technique on management and technology for development of the local industries as an

technical consultant in the Centre.

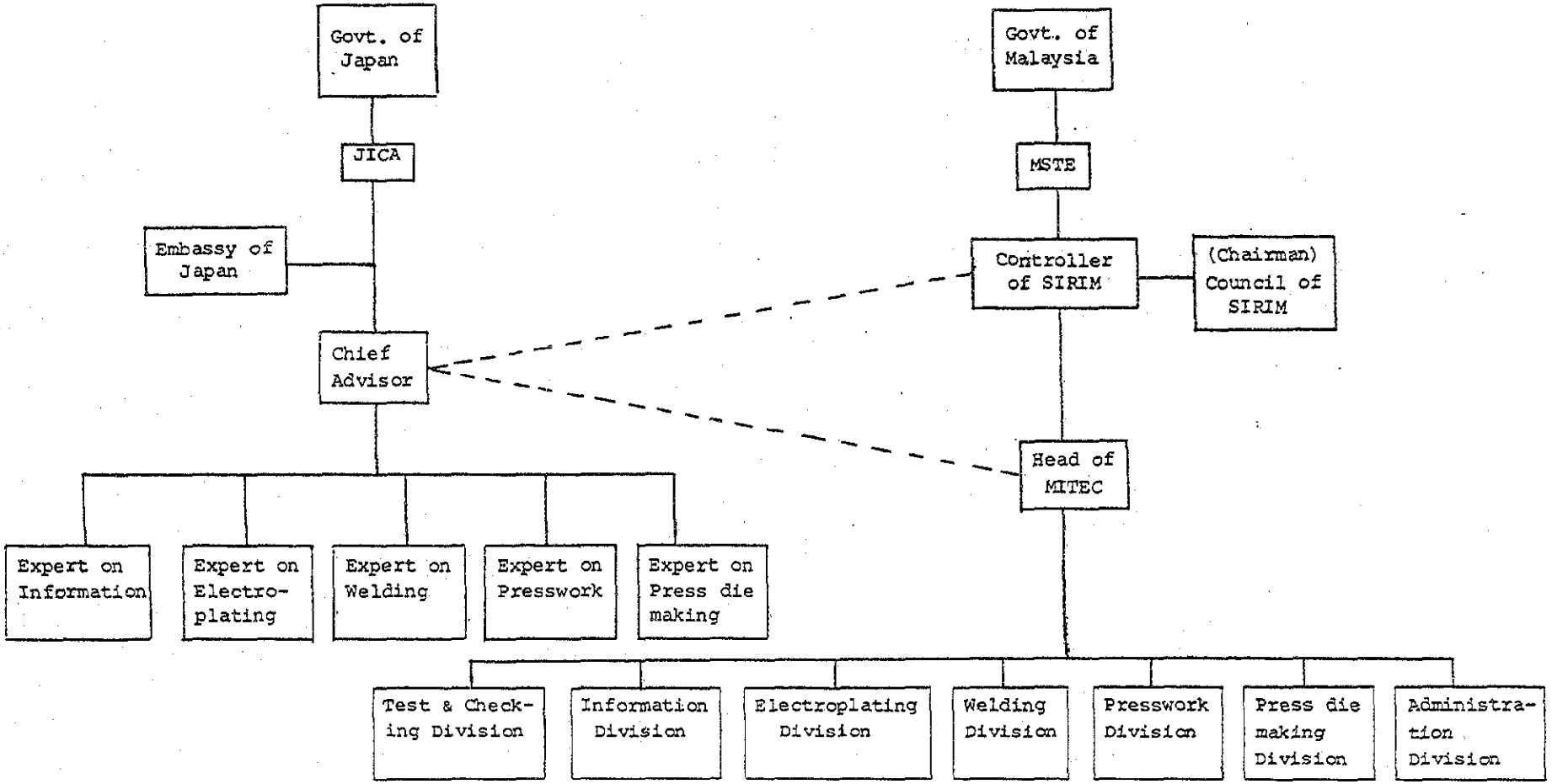
(5) Lecture and Seminar in the Centre

to hold lecture and seminar in the Centre after furnishing all equipment provided by Japanese Government, upon the data and the needs of local industries.

(6) Other Activities

to provide any other related activities required.

Organization of the Project



ANNEX II

List of Japanese Expert

1. Chief Advisor
2. Expert in the field of:
   (1) Electroplating
   (2) Press-die
   (3) Presswork
   (4) Welding
   (5) Information & Coordination

Note: (1) Short-term experts other than those experts will be sent, when necessity arises.

(2) Experts in mould making will be dispatched in case of necessity.

ANNEX III

LIST OF THE ARTICLES

List of the Equipment

In the field of :

(1) Advisory service

(2) Test & checking

(3) Die-making

(4) Presswork

(5) Welding

(6) Electroplating

(7) Information Service

ANNEX IV

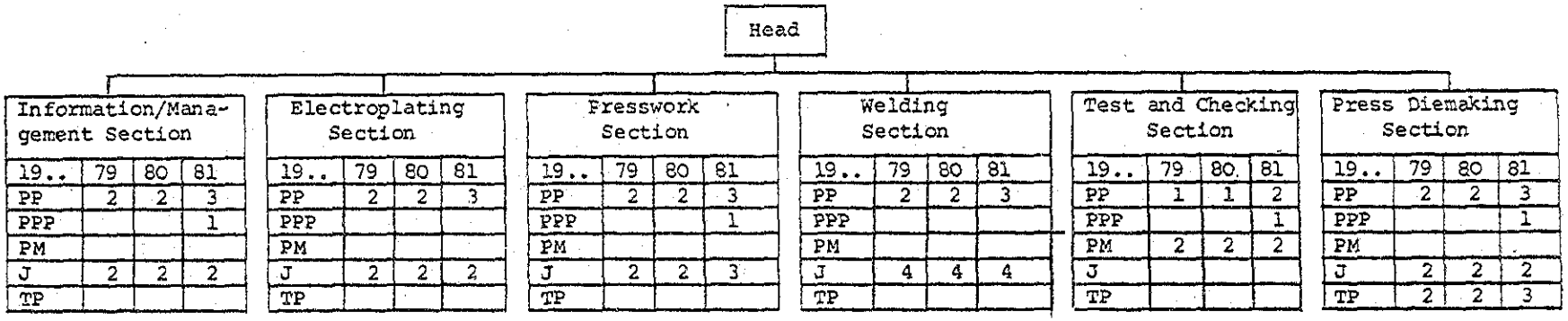
LIST OF MALAYSIAN STAFF

List of Malaysian staff

1. Project Head
2. Technical staff in the field of:
   (1) Techno-Economy
   (2) Press-die
   (3) Presswork
   (4) Electroplating
   (5) Welding
   (6) Test & checking
   (7) Information
3. Administrative staff
   (1) Administration
   (2) Accounting
   (3) Clerical work
   (4) Others

Note: Tentative Malaysian staffing schedule is attached herewith.

Staffing Plan



Information/Management Section			
19..	79	80	81
PP	2	2	3
PPP			1
PM			
J	2	2	2
TP			

Electroplating Section			
19..	79	80	81
PP	2	2	3
PPP			
PM			
J	2	2	2
TP			

Presswork Section			
19..	79	80	81
PP	2	2	3
PPP			1
PM			
J	2	2	3
TP			

Welding Section			
19..	79	80	81
PP	2	2	3
PPP			
PM			
J	4	4	4
TP			

Test and Checking Section			
19..	79	80	81
PP	1	1	2
PPP			1
PM	2	2	2
J			
TP			

Press Diemaking Section			
19..	79	80	81
PP	2	2	3
PPP			1
PM			
J	2	2	2
TP	2	2	3

LEGEND

PP = Research Officer

PPP = Asst. Research Officer

PM = Laboratory Assistant

J = Technician

TP = Draughtsman

GENERAL ADMINISTRATION SECTION			
19 ..	79	80	81
Administration Officer	1	1	1
Clerk	1	1	1
Store Keeper	1	1	1
Stenographer	1	1	1
Typist	3	3	3
Telephone Operator	1	1	1
Office Cleaner	1	1	1
Office Receptionist	1	1	1
Chauffeur	1	1	1
Labourer	2	2	2

ANNEX V

LIST OF LAND, BUILDINGS AND FACILITIES

1. Space of land and buildings for:
   (1) Workshop
   (2) Office rooms
   (3) Library
   (4) Conference & lecture room
   (5) Drawing room
   (6) Test & checking room
   (7) Canteen
   (8) Other necessary rooms for operating the Project.
2. Incidental Facilities
   (1) Electrical facilities
   (2) Drainage system
   (3) Foundation & floor arrangement
   (4) Water supply facilities
   (5) Air conditioning facilities
   (6) Pressured air supply system
   (7) Others