





Annual Technical Cooperation Program (ATCP)

Calendar Year	1999												2000												2001												2002												2003												2004																																																																																			
	Japanese Fiscal Year												Japanese Fiscal Year												Japanese Fiscal Year												Japanese Fiscal Year												Japanese Fiscal Year												Japanese Fiscal Year																																																																																			
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PO 2-2 Implement technology transfer to the C/P																																																																																																																																																
V Laser Cutting																																																																																																																																																
1 Knowledge of Laser																																																																																																																																																
1.1-1 Laser Oscillator																																																																																																																																																
(1) Generation Mechanism of Laser																																																																																																																																																
(2) Characteristics of Laser																																																																																																																																																
(3) CO2 Laser Oscillator																																																																																																																																																
(4) Nd-YAG Laser Oscillator																																																																																																																																																
(5) Kind and Feature of Laser																																																																																																																																																
1.1-2 Optical Devices of Laser Processing																																																																																																																																																
(1) Lens																																																																																																																																																
(2) Mirror																																																																																																																																																
(3) Processing Head																																																																																																																																																
1.1-3 Standard of Laser Equipment																																																																																																																																																
1.1-4 Safety and Health																																																																																																																																																
(1) Influence on Eyes																																																																																																																																																
(2) Influence on Skin																																																																																																																																																
(3) Safety Standard																																																																																																																																																
1.2 Outline of Laser Thermal Processing																																																																																																																																																
1.2-1 Welding																																																																																																																																																
(1) Welding Mechanism																																																																																																																																																
(2) Absorption of Laser to Plasma																																																																																																																																																
(3) Shape of Weld Penetration																																																																																																																																																
(4) Depth of Weld Penetration																																																																																																																																																
(5) Weld Heat Cycle																																																																																																																																																
(6) Hardening and Carbon Equivalent																																																																																																																																																
(7) Cold Crack																																																																																																																																																
(8) Hot Crack																																																																																																																																																
(9) Welding Deformation																																																																																																																																																
(10) Application Cases																																																																																																																																																
1.2-2 Overlay Welding																																																																																																																																																
(1) Laser overlaying																																																																																																																																																
(2) Dilution of Overlaying																																																																																																																																																
(3) Application Cases																																																																																																																																																
1.2-3 Laser Hardening																																																																																																																																																
(1) Prediction of Quench Cooling Rate																																																																																																																																																
(2) Hardness Distribution																																																																																																																																																
(3) Residual Stress																																																																																																																																																
(4) Application Cases																																																																																																																																																
1.3 Knowledge Laser Cutting																																																																																																																																																
1.3-1 Principle of Thermal Cutting																																																																																																																																																
(1) Oxyfuel Gas Cutting																																																																																																																																																
(2) Cutting Gas																																																																																																																																																
(3) Plasma Arc Cutting																																																																																																																																																
(4) Laser Cutting																																																																																																																																																

Annual Technical Cooperation Program (ATCP)

Calendar Year	1999												2000												2001												2002												2003												2004																																																																																			
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(2) Methods of micro-analysis of steel																																																																																																																																																
(3) Micro-structural analysis and its interpretation [Use Met. Equip.]																																																																																																																																																
(4) Metallurgical factors controlling the physical properties of plain carbon steels																																																																																																																																																
(5) Metallurgical factors controlling the physical properties of tool steels																																																																																																																																																
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(7) Metallurgical factors controlling the physical properties of cast materials																																																																																																																																																
(8) Strength, toughness and fracture of metals																																																																																																																																																
(9) Quality control of metal products																																																																																																																																																
(10) Mechanics: Testing of Materials																																																																																																																																																
(11) Metallurgy, Fractography and Failure Analysis of Metals																																																																																																																																																

note:  Terms of Technology Transfer by Long-Term Experts
 Terms of Technology Transfer by Short-Term Experts
 Terms of Technology Transfer through Training in Japan
 Terms of Technology Transfer by C/P themselves without Japanese Experts

B. 2

Annual Technical Cooperation Program (ATCP)

Japanese Fiscal Year	2000												2001												2002												2003												2004																						
	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2
Term of Technical Cooperation																																																																							
PO 2-2 Implement technology transfer to the C/P																																																																							
III Heat Treatment																																																																							
2 Surface Hardening by Carburizing and Carbonitriding																																																																							
2.1 Theory of Carburizing and Carbonitriding																																																																							
2.1-1 Materials for Carburizing and Carbonitriding																																																																							
2.1-2 Micro-structure of Carburized and Carbonitrided																																																																							
2.1-3 Application																																																																							
2.2 Methodology of Carburizing by Gas Process																																																																							
2.2-1 Process																																																																							
2.2-2 Equipment																																																																							
2.3 Methodology of Carbonitriding by Gas Process																																																																							
2.3-1 Process																																																																							
2.3-2 Equipment																																																																							
2.4 Practice of Carburizing																																																																							
2.4-1 Generation and Control of Carburizing Gas																																																																							
2.4-2 Heat treatment after Carburizing																																																																							
2.5 Practices of Carbonitriding																																																																							
2.5-1 Generation and Control of Carbonitriding Gas																																																																							
2.5-2 Heat treatment after Carbonitriding																																																																							
2.5-3 Application of Carburizing and Carbonitriding																																																																							
2.5-4 Performance of Carburized and Carbonitrided Steels																																																																							
2.5-5 Application and Required Case Depth																																																																							
2.6 Heat Treatment Course for MSE Engineer																																																																							
2.6-1 Material Preparation																																																																							
2.6-2 Training Course Implementation																																																																							

 Terms of Technology Transfer by Long-Term Experts
 Terms of Technology Transfer by Short-Term Experts
 Terms of Technology Transfer through Training in Japan
 Terms of Technology Transfer by C/P themselves without Japanese Experts

B.2

Annex21 Monitoring and Evaluation Sheet for TCP

Subject of TCP	Final Status Point	Annual Progress Status				Method of Implementation					Comments by Japanese Experts	
		1st	2nd	3rd	4th	LE	SE	CPTJ	EQP	Others		
I Control of Mechanical Properties and Quality Control												
(1) Basis of phase transformation (incl. CCT & TTT Diagram)	4	1/1	/2	/3	/4	⊙			○			Lectures on (1), (4) has been conducted. Some consultation on (10), (11) has been performed. Most of the items are to be conducted from the second year. The final status that can be assured by three years technical transfer will be level 3 for these subjects because these subjects need enough experience that can be obtained only through the on-the-job training. However, since CMIRDI is not a production sector, such on-the-job training can not be conducted. The level of the knowledge of the counterparts on these subjects varies depending on the personnel. This evaluation is based on the lowest level of the counterparts.
(2) Methods of micro-analysis of steels	2	0	/1	/1	/2	○						
(3) Micro-structural analysis and its interpretation	3	0	/1	/2	/3	⊙			○			
(4) Met. factors controlling the properties of carbon steels	3	1/0	/1	/2	/3	⊙			○			
(5) Met. factors controlling the properties of tool steels	3	0	/1	/2	/3	⊙			○			
(6) Met. factors controlling the properties of stainless steels	3	0	/1	/2	/3	⊙			○			
(7) Met. factors controlling the properties of cast materials	3	0	/1	/2	/3	⊙			○			
(8) Strength, toughness & fracture of metals	3	0	/1	/2	/3	○			⊙			
(9) Quality Control & evaluation of Metal Products	3	0	/1	/2	/3	⊙						
(10) Mechanical Testing of materials	3	1/0	/1	/2	/3	○			⊙			
(11) Metallography, Fractography & Failure Analysis of Metals	3	0	/1	/2	/3	○			⊙			
II Casting												
1. Aluminum High Pressure Die Casting												
(1) Knowledge of Die Casting Process	4	1/1	1.5/2	/3	/4	⊙			○			The final status point was set to level 4 about the acquisition of the knowledge of the die casting and the operation. The maintenance of the oil pressure control and the computer control of the casting machine are necessary the guidance and practice of the expert of a long term. Therefore, the final status point of this item was set to level 1 of the knowledge acquisition. Moreover, the final status point at the knowledge acquisition level was set to level 1 about the die design and the die production technology.
(2) Practice of Die Casting	4	1/1	1.5/2	/3	/4	⊙			○			
(3) Practice of Maintenance / Repair of Die Casting Machine & Dies	2	1/1	/2	/2	/2	○			⊙			
(4) Knowledge of Designing & Making Dies (Provision of Information)	1	0	0.5/1	/1	/1	○			○			
(5) Approach to Industries' Demands	3	0	/1	/2	/3	⊙			○			
2. Chemically Bonded Sand Molding												
2.1 Shell Mold Process												
(1) Knowledge of Shell Mold Process	3	0	/2	/3	/3	○			⊙			The knowledge of the shell molding does the guidance to the instructor level by the lecture. Practice is forming of a main die by an existing machine alone. The shell molding machine is the United States machine, and this machine is not used in Japan. Therefore, maintenance and the repair are assumed to be only a lecture within the known range.
(2) Practice of Shell Mold Process	3	0	/2	/3	/3	○			⊙			
(3) Practice of Maintenance / Repair of Shell Mold Machine	1	0	/1	/1	/1	○			⊙			
2.2 Cold Box Process												
(1) Knowledge of Cold Box Process	3	1/1	1.5/2	/3	/3	○			⊙			The knowledge of a cold box was guided from a short-term expert by the lecture. Practice guided core's forming method and the characteristic evaluation method of the test specimen made of a cold box by OJT. Because maintenance and the repair have prepared necessary parts, the level improvement is achieved by the experience of the future.
(2) Practice of Cold Box Process	3	1/1	1.5/2	/3	/3	○			⊙			
(3) Practice of Maintenance / Repair of Cold Box Machine	2	1/1	1.5/2	/2	/2	○			⊙			

III Heat Treatment									
1. Austempering of Ductile Cast Iron									
(1) Knowledge of Austempering									
4	2/1	/2	/3	/4	△	⊙	○	○	○
(2) Practice of Austempering									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(3) Practice of Maintenance / Repair of Heat Treatment Equipment									
4	1/1	/2	/3	/4	△	⊙	○	○	○
2. Surface Hardening by Carburizing & Carbonitriding									
(1) Theory of Carburizing and Carbonitriding									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(2) Methodology of Carburizing									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(3) Methodology of Carbonitriding									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(4) Practice of Carburizing									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(5) Practice of Carbonitriding									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(6) Application of Carburizing & Carbonitriding									
3	0	/1	/2	/3	△	⊙	○	○	○
(7) Heat Treatment Training Course for MSE Engineer									
3	0	/1	/2	/3	⊙	○	○	○	○
IV Fatigue Evaluation of Welded Joint									
(1) Knowledge of Fatigue Theory									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(2) Knowledge of Fatigue Test Procedure									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(3) Practice of Investigation of Fractured Part									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(4) Practice of Fatigue Testing of Carbon Steel Welded Joint									
4	1/1	/2	/3	/4	△	⊙	○	○	○
(5) Practice of Fatigue Testing of Cast Iron Welded Joint									
3	0	/1	/2	/3	△	⊙	○	○	○
(6) Practice of Fatigue / Fracture Mechanics of Steel Structure									
3	0	/1	/2	/3	△	⊙	○	○	○
V Laser Cutting									
(1) Knowledge of Laser									
4	1/1	/2	/3	/4	⊙	○	○	○	○
(2) Practice of Laser Processing (Operation and Maintenance skill)									
4	1/1	/2	/3	/4	○	⊙	○	○	○
(3) Practice of Laser Processing (Arrange. of Cutting Work Standard)									
3	1/1	/2	/3	/3	⊙	○	○	○	○
(4) Off-line Teaching Operation									
2	0	0	/1	/2	○	○	○	○	○
(5) Approach to Industrie's Demands									
3	0	0/1	/2	/3	⊙	○	○	○	○

Lectures and seminars on ADI has been conducted. The ADI equipments has been implemented and maintained in good conditions. At the initial stage, the problem of decarburization has occurred but the problem has been solved. The main part of the technical transfer of ADI is scheduled on the second year.....

Carburizing/carbonitriding facilities have been installed and maintained in good condition. The counterparts became capable of operating the furnaces. The application and theory of the treatment will be conducted on the second. The discussions and analysis on the training course program has started.

The plane bending fatigue test machine has been implemented. One of the twomachine had an production defects, which had to be repaired. The repairs has been completed and both two machines are now operating in good condition. Lectures and training on the fatigue testing has been conducted. The lecture covered not only the plane bending fatigue test but covered the fatigue test in general.

Now, C/Ps just knew the principles and technical terms of laser technology and didn't reach to level of understanding. In here, the understanding means their capability to make reports or materials with their own express. In the last half term of project, I will assist C/Ps to get such a level as well as to make investigation of companies' demands.

Note1: Progress Status: 1=Basic Level 2=Practical Level 3=Instructor Level 4=Consultant Level

Note2: LE = Long-term expert SE = Short-term expert CPTJ = Counterparts training in Japan EQP = Equipment provision SP = Self-practice by counterparts

Monitoring and Evaluation Plan

Name of the Project	The Project on Upgrading Metal Processing Technology in the Arab Republic of Egypt
Duration of Cooperation	From 1 st October, 2000 ~ 30 th September, 2004

I Activities and Contents of the Project

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

1 Project Design Matrix (PDM)

Project Design matrix for the Project was formulated by the Implementation Study team in consultation with the Egyptian side.

2 Plan of Operations (PO)

Plan of Operations for the Project was formulated by the Implementation Study Team in consultation with the Egyptian side.

3 Annual Plan of Operations (APO)

Annual Plan of operations for the Project was formulated by the Implementation Study Team in consultation with the Egyptian side.

4 Technical Cooperation Program (TCP)

Technical Cooperation Program for the Project was formulated by the Implementation Study Team in consultation with the Egyptian side.

5 Annual Technical Cooperation Program (ATCP)

Annual Technical Cooperation Program for the Project was formulated by the Implementation study Team in consultation with the Egyptian side.

II Monitoring and Evaluation System

1 Monitoring

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

(1) Periodical Monitoring

The periodical monitoring is to be implemented, the contents of which are to be discussed on the occasion

Annex 22

of regular meetings in the Project, such as Weekly Technical Meeting to be implemented by Long-term technical experts and the Egyptian technical C/P including the Technical Coordinator and Weekly, Monthly and Quarterly Project Management Meeting to be implemented by Chief Advisor, Project Coordinator, Long-term experts as well as Project Manager, Egyptian Project Coordinator and Technical Coordinator.

(2) Monitoring

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

2 Evaluation

Evaluation of the Project will be conducted jointly by the two Governments through JICA and the Egyptian authorities concerned in the middle and during last six (6) months of the cooperation term in order to examine the level of achievement as stipulated in the R/D.

JICA will dispatch the final evaluation team and also the mid-term evaluation team. In any manner, any evaluation should be jointly implemented by both sides and the outcome should be submitted and reported at the JCC in the form of Joint Evaluation Report and are to be signed by both sides, if possible.

III Tentative Schedule for Monitoring and Evaluation

<i>Date</i>	<i>Monitoring or/ Evaluation and other related activities</i>	<i>Implementation</i>	<i>Reporting</i>
April 2000	Signing of the R/D	Implementation Study Team The Egyptian side	R/D, M/D
November 2001	Monitoring (1)	Japanese experts The Egyptian C/P To be confirmed by JCC members	JCC, Monitoring Report
April 2002	The Midterm Evaluation	Japanese experts The Egyptian C/P To be confirmed by Evaluation Team and JCC members	M/D at JCC, Monitoring Report
October 2002	Monitoring (2)	Japanese experts The Egyptian C/P To be confirmed by JCC members	JCC, Monitoring Report
April 2003	Monitoring (3)	Japanese experts The Egyptian C/P To be confirmed by JCC members	JCC, Monitoring Report
October 2003	Monitoring (4)	Japanese experts The Egyptian C/P To be confirmed by JCC members	JCC, Monitoring Report

Annex 22

April 2004	The Final Evaluation	Japanese experts The Egyptian C/P To be confirmed by Evaluation Team and JCC members	Final Evaluation Report, M/D at JCC, Monitoring Report
July 2004	Final Monitoring (5)	Japanese experts The Egyptian C/P To be confirmed by JCC members	JCC, Monitoring Report
September 2004	Completion of the Cooperation		

IV Criteria and Item for Monitoring and Evaluation

1 Criteria and Item for Monitoring

- (1) PDM (Project Design Matrix)
- (2) PO (Plan of Operations) and APO (Annual Plan of Operations)
- (3) TCP (Technical Cooperation Program) and ATCP (Annual Technical Cooperation Program)
- (4) Evaluation Sheet of Technology Transfer
- (5) Monitoring Sheet of Technical Cooperation
- (6) Others if necessary

If technology transfer does not progress as planned, the Project will study the interior/exterior factors to hamper, take necessary countermeasures and will revise the plan.

The above-mentioned charts will be confirmed on the occasion of the first monitoring scheduled in April 2001.

2 Criteria and Item for Evaluation

Criteria and Item for Evaluation will be prepared by the Project based on the Evaluation Grid and also be confirmed on the occasion of the first monitoring scheduled in April 2001.

List of attendees of the discussions

CMRDI

Prof. Dr. Bahaa Zaghoul Project manager

*Chief Counterparts of CMRDI

Prof. Dr. Abdel Monem El-Batahgy Laser group
Prof. Dr. Alber Sadek Heat treatment group
Dr. Ibrahim Mostafa Chemical mould group
Dr. Mohamed Waly Die casting group
Dr. Khalid Ibrahim Material Evaluation group
Dr. Khalid Abd-El Ghany Laser group

JICA

Mr. Taira Sunami Chief Adviser
Mr. Shinichi Osaka Coordinator
Mr. Masataka Suga JICA Expert for Mech.Prop.Control & QC
Mr. Toshio Suzuki JICA Expert for High pressure Al.Die casting
Dr. Makoto Kabasawa JICA Expert for Laser cutting

Mr. Naoto Mukai Assist. Resident Representative of JICA Egypt

Mid-term Evaluation Team

Mr. Takanori Tanaka Leader, UMPTP Mid-term Evaluation Team
Mr. Yoshio Yabunaka Technology Transfer Planning 1, M.E.T.
Dr. Moriaki Ono Technology Transfer Planning 2, M.E.T.
Mr. Kentaro Akutsu Cooperation Planning, M.E.T.

*M.E.T. = Mid-term Evaluation Team for UMPTP

Annex 24

Egyptian Industry: Modernization Plan

The Industrial Modernization Program (IMP) is an initiation of the Government of Egypt with the contribution of the European Union to help promoting the international competitiveness of the Egyptian industry in order to be qualified through this program to utilize the opportunities provided by the free Egyptian markets.

Industrial Modernization Center (IMC) was established by the Presidential Decree No. 477/2000.

The minister of industry proposed an modernization program based on groups of packages as follows:

- Marketing Package which includes:
 - Opening new export markets
 - Electronic commerce
- Human Resource Development Package which includes
 - Upgrading the skills and performance of workforce
 - Upgrading the management level of the organization
- Quality package which includes:
 - Upgrading the equipment efficiency and production improvement
 - Modernizing the laboratories and testing equipment
 - Improving the products' quality
- Reducing the production cost package.
- Equipment package which includes:
 - Replacement and rehabilitation of equipment and machinery
- Financial package which includes:
 - Risk exemption
 - Interest subsidy

The principal goals of IMP are to increase the average of National Production Growth and the competitiveness of the industrial sector within the framework of the progressive economic liberalization. It is natural that IMP will focus on creating new job opportunities and income increase in addition to merging into the global economy.

IMP'S OBJECTIVES ARE:

- To upgrade industrial technology skills to international standards
- To improve performance of workforce at all levels
- To enhance the industrial investment opportunities in Egypt
- To develop and improve the production climate in Egypt to upgrade the productivity(this will be implemented through executive programs aiming at improving the industrial production units at private sector through upgrading their efficiency level and competitiveness)
- To Upgrade the organizational structure of Ministry of Industry
- To Empower the system and service level of business institutions and industrial chambers
- To increase the industrial exports
- To help develop the policies and organizational frameworks which control the Egyptian industry.
- To increase the information availability of SMEs' industrial markets.

IMP CONSISTS OF MAIN FIVE COMPONENTS

- **First Component: Policies and Finance**

The unit in charge will study and identify the obstacles that face the industrial sector in the fields of policies and procedures. The unit will consultatively cooperate with ministry of industry and will prepare studies and reports on different sectors, their competitiveness level and how to upgrade them. Such reports will be as an accurate database on which ministry of industry can propose governmental policies and set modernization programs for factories.

There is a primary proposal to start with leather, textile and food industries.

- **Second Component: Development of Industrial Exports and Attraction of Industrial Direct Investment.**

The exporting capabilities of the Egyptian factories are far lower than those of similar countries despite the large size of the markets accessible to Egypt through full tax exempted agreements for Egyptian industrial products. The low numbers of the Egyptian industrial exports and their limited increase rate means that the Egyptian commodities don't meet the world markets' needs regarding product type, specifications, development and definitely competitive prices, not to say the lack of direct investment at the industrial sector despite the political and social stability in Egypt and its accessibility to the European union market and COMESA market.

Ministry of Industry should cooperate with all the country's different organizations in order to demolish the obstacles especially the additional burdens laid over the shoulders of the Egyptian producer compared to his competitors in other countries and to improve the factories' productivities. This necessitates reviewing the related laws and bureaucracy system and programs of Egyptian exports.

- **Third Component: Upgrade of the Competitiveness, Management and Training Capabilities**

Many of the Egyptian factories suffer from inability to benefit from the modern technologies in the field of Research and Development (R&D), product design, packing, computerized design production methods, international specifications and standards of waste and other factors which directly affect the productivity and raise the production cost and consequently inability to access to the world markets because of the low competitiveness.

Ministry of Industry started to deal with these challenges through planning to establish number of technology centers in priority sectors identified through intensive studies for such sectors which are: textile and ready made garment, leather products, food industries and information industry.

This component will also include programs for upgrade of managers' capabilities through training for promoting their skills in cooperation with reputable educational institutes in Egypt.

- **Fourth Component: Introducing the Consultancy Services to Factories:**

This component plans to establish number of consultancy service centers all over the country which introduce every consultative support to factories according to each factory's status after studied by experts and identifying its problems and suggesting solutions and programs necessary to overcome such problems.

- **Fifth Component: Modernizing the National Standardization System:**

This component aims at modernizing the standardization, testing and quality control and helping the factories to apply such standards and quality levels.