

Activity Completion Report
of the Short-term Expert on Management Capacity Development (Shinichi Mori)
for the Project for Balancing and Modernization of Workshop Facilities at PITAC

1. Background

JICA dispatched Mr. Shinichi Mori, a short-term expert in management capacity development, to PITAC from May 30 to July 8 2005 in order to identify necessary steps and actions to be taken to improve the management of the Project for Balancing and Modernization of Workshop Facilities at PITAC (the “Project”) and to ensure its sustainability. Mr. Mori reviewed the management structure of the Project, identified its constraints, and worked out an action plan that indicated necessary actions to be taken by the completion of the Project. It is reported that since then, some improvement has been observed in the management of training courses and that the methodology “management by objectives (MBO)” has been practically applied, which is leading to the strengthening of the technical capacity of counterpart personnel (C/P) of the Project.

Although the completion of the Project is just around the corner, the Project’s future orientation has not yet been defined. The Joint final evaluation, which was conducted in May 2006, reported that there are several views on the Project future orientation: one extreme view supports that the Project components, physical facilities as well as C/P are completely dismantled and absorbed totally into PITAC’s existing departments; and the extreme view on the other end advocates independence of the Project unit from existing management. It was agreed that an “internal committee” be created in order to examine the feasibility of possible alternatives and to prepare a proposal to be approved by TUSDEC (Technology Up-gradation and Skill Development Company) and the Ministry of Industry and Production.

The Project’s future orientation is totally dependent on what the Project can achieve in the future; in other words, the Project’s future perspective must be defined. The best people to discuss this issue should be those who are capable of having a market-driven perspective: the Project’s C/P. They have knowledge on the market of plastic molds, they know customers’ actual and imminent needs, they know exactly what technological level the Project has so far attained in the plastic mold industry, and they are rather free from old PITAC’s supply driven attitude. Involving C/P in the preparation of Project’s future plan is absolutely important since they are the main actors who will actually implement the plan.

In order to facilitate the discussions on the Project’s future perspective and to support PITAC’s management and C/P to reach consensus on the Project’s future orientation, JICA dispatched Mr. Shinichi Mori to PITAC from 2 to 28 July, 2006.

2. Activities Completed

(1) Assumption for the project’s future plan

In 2005, PITAC submitted to the Pakistan Government a request of budget (PC-1) for the purchase of new machinery and a proposal of a new by-law which includes new salary and incentive structures and the adoption of contract-based employment, both of which were aimed at improving PITAC's working environment. At the expert's meeting with the chairman and managing director of TUSDEC in July 2006, they strongly assured that both PC-1 and the by-law would be approved in due course by the Government, although they could not specify the timeframe. Since it is not likely that these two requests will be approved in a short period of time, it was decided that the Project's future plan be based on the assumption that the Project's current working environment, including the salary and incentive structures and the processing capacity, will be maintained as it is.

There was, also one year ago, an initiative to computerize PITAC's financial statement by compiling past three years' financial data and assessing PITAC's asset value. At that time, the necessity to monitor financial performance of each department was also being discussed. However, it was known, through an interview with the acting GM of PITAC, that the implementation did not materialize apparently due to budget limitation. As a result, there has been no change in the accounting practice – manual processing of financial data without separation of expenses made by each department. Therefore, although the Project is capable of estimating costs for each of its activities, it is deemed premature to have and manage its own financial account. Therefore, it was decided that the revenue projection based on the current manufacturing capacity, not the Project's financial management, be discussed in the future plan.

(2) Discussion and drafting of future plan of the Project

Brainstorming discussions ("KJ Method", a group discussion methodology developed by Dr. Jiro Kawakita which encourages participants to freely express their opinions to share problems and ideas and helps them reach a consensus) were conducted among the pre-selected Project's C/P (5 engineers, 1 designer, 2 assistant foremen and 1 technician) for two to three hours in the afternoons from Monday to Thursday. The problems and opportunities identified through the discussions were shared and discussed by all C/P through presentations on Fridays (7th and 14th July). After continuing the discussion for three weeks, the results were compiled as a draft future plan of the project, which is composed of: (1) guiding principles for the management of the Department; (2) future structure of the Department; (3) action plan for the expansion of activities; (4) organizational chart of plastic mold department; and (5) projection of revenues under the current manufacturing capacity. The draft future plan was presented by the discussion team to all Project counterparts, PITAC management and JICA experts on 20 July and after a series of discussion, all participants reached a consensus and the final future plan was prepared (see attachment).

(3) Presentation of the future plan to TUSDEC

The final future plan was presented to the TUSDEC's managing director on 26 July by PITAC management. The plan will be presented at PITAC's next governing body meeting for official approval.

FUTURE PLAN OF PLASTIC MOLD DEPARTMENT

PAKISTAN INDUSTRIAL TECHNICAL ASSISTANCE CENTRE

July 26, 2006

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1. Guiding Principles for the Management of the Department

- As a public entity, **the Department's objective is solely to benefit the Nation.** This is the primary guiding principle of the Department's management.
- **Priority should be given to the provision of training,** since only a few organizations are providing the same type of services in spite of the large size of the demand. Through training courses, technology can be disseminated effectively and efficiently. In order to maximize the number of beneficiaries of the Department, the training fees should be kept at the affordable level.
- Taking into consideration that (1) the manufacturing capacity of the Department is negligible compared to the large size of the demand, and (2) priority in allocation of human resources and machines is given to training activities. **The objective of mold making services is to maintain and up-grade the technical level of trainers while enhancing sustainability of the department by generating incomes through supply of high quality molds to the market.**
- Mold making services should be expanded to increase the revenues of the Department while keeping in view the limitations of the capacity of machines, equipment and human resources. Although prices of mold making services to the current PITAC customers are kept low, efforts will be made to increase the prices by increasing customers' satisfaction through shortened lead time.
- Self-motivation and competency of the personnel are the driving force of the Department. All individuals are expected to continuously propose and initiate actions of improvement ("Kaizen" approach).

2. Future Structure of the Department

Option 1: Dismantle and merge into PITAC.

- Advantages:
- Higher efficiency from mutual utilization of machinery and human resources between PITAC and the Department
- Disadvantages:
- Loss of a complete manufacturing line of plastic molds
 - Difficulties in improving customer-oriented services due to total dependency on PITAC's marketing and training Departments
 - Invisibility of the "good practice"

Option 2: Keep the same structure as it is now.

- Advantages:
- Easiness in continuation of current activities with the complete manufacturing line of plastic molds
 - Visibility of the "good practice" – positive influences on PITAC through day-to-day interactions
- Disadvantages:
- Loss of efficiency due to interactions with PITAC departments
 - Loss of efficiency due to rigidity of mutual utilization of machinery and human resources between PITAC and the Department

Option 3: Create an independent entity or merge with another organization.

- Advantages:
- Higher efficiency with less bureaucracy
- Disadvantages:
- Lengthy process of creating a new entity
 - Necessity of increasing machinery/equipment such as heat treatment
 - Necessity to increase staff for administration/procurement
 - Loss of opportunity to influence PITAC with the "good practice"

<Conclusion>

Option 2: Keep the same structure as it is now

Taking into consideration the advantage of the complete manufacturing line of plastic molding already established at the Department, the difficulty in creating a new entity and the opportunity to influence PITAC with the Department's "good practice", the Department will keep the same structure as it is now. It is assured that continuous efforts will be made, after completion of the Project, to make the present Leadership, Systems, Procedures and Activities more effective and efficient.

3. Action Plan for the Expansion of Activities

A. Improvement of Delivery of Services and Customers' Relations

Category	Item	Observation / Reasons	Actions / Implementation methods	Persons in Charge
A-1. Training Courses	A-1-1 Long-term training courses	<ul style="list-style-type: none"> Provision of long-term courses is cost-efficient, and it generates steady incomes to the Department. 	<ul style="list-style-type: none"> An integrated training course (6 months to one year) for plastic mold making will be designed, mostly targeted to new graduates of technical schools and universities. The possibility of conducting diploma courses will be explored. 	Admin, SME, Trainers
	A-1-2 High demand courses	<ul style="list-style-type: none"> There is a lot of demand in CNC and CAD/CAM courses. 	<ul style="list-style-type: none"> Frequency of high demand courses will be increased. Two shifts per day will be carried out. 	Admin, SME, Trainers
	A-1-3 Training courses in customer premises in or outside of Lahore.	<ul style="list-style-type: none"> Some customers have demanded the Department to conduct courses in their own premises. 	<ul style="list-style-type: none"> Training courses in customer premises will be designed and conducted on demand basis. 	Admin, SME, Trainers
	A-1-4 Low demand courses	<ul style="list-style-type: none"> Low demand courses such as mold design, injection molding and polishing are not attracting a sufficient number of customers. 	<ul style="list-style-type: none"> An introductory lecture of low demand courses (1 to 2 hours) will be included in high demand courses in order to draw participants' attention into low demand courses. Low demand courses will be offered to the participants of high demand courses as an optional course with a low fee. The duration and fee of low demand courses will be decreased. 	Admin, SME, Trainers
	A-1-5 3D modeling course	<ul style="list-style-type: none"> 3D modeling course is simply a practice of 3D CAD. 	<ul style="list-style-type: none"> 3D Modeling course will be maintained in the courses list as an independent training course and shall be conducted when the requisite maturity level in the industry is ensured. However, this topic may also be included as one of the content of 3D CAD course. 	Trainers
	A-1-6 Conventional machining courses	<ul style="list-style-type: none"> The conventional machining courses are conducted by another department of PITAC. Besides, there are many other institutions that offer the same type of course. 	<ul style="list-style-type: none"> In order to concentrate the resources of the Department more on advanced technology, conventional machining courses will be abolished. 	PM
A-2. Mold	A-2-1 Name of the service	<ul style="list-style-type: none"> The name "Backup Support Services" does not explicitly illustrate the features of the 	<ul style="list-style-type: none"> The name of "backup support services" will be changed to "mold making services", through which the following three types of the 	SME, Section Heads

Category	Item	Observation / Reasons	Actions / Implementation methods	Persons in Charge
Making Services		services that the Department provides. It could cause some confusion to customers.	services are provided: (1) Complete mold manufacturing (2) Partial mold making services: mold design services, modeling services, CAD/CAM data creation services, etc (3) Rental of components: customers will bring their materials, and request the Department to conduct a specific processing in their presence.	
	A-2-2 Charge of the quotation	<ul style="list-style-type: none"> Although the quotation process of mold making services is time-consuming and thus it generates some costs, quotation is given to (non-serious) customers for free of charge. 	<ul style="list-style-type: none"> Quotations will be charged (nominal fees) in order to avoid non-serious customers. IED will first show the customers rough estimates before proceeding to quotations. The SME promotion section will estimate the man-hours and prices of the molds in coordination with section heads. IED will revise the order sheet and charge nominal fees from the customers. 	IED/SME Section Heads
	A-2-3 Relationship with IED PITAC	<ul style="list-style-type: none"> Orders of mold making services are channeled through IED PITAC. Currently, after quotations were submitted to customers, no follow-ups have been made. 	<ul style="list-style-type: none"> The SME promotion section of the Department will be responsible for marketing, customers' relations and confirmation of the orders, while IED will handle the contracts. The SME section will systematize the whole procedures of mold making services through monitoring sheet. 	SME
A-3. Mold Making Advisory Services	A-3-1 Name of the service	<ul style="list-style-type: none"> The name "Advisory Services" does not explicitly illustrate the features of the services that the Department provides. It could cause some confusion to customers. 	<ul style="list-style-type: none"> Change the name of "Advisory Services" to "Mold Making Advisory Services". 	
	A-3-2 Procedure of mold making advisory services	<ul style="list-style-type: none"> The current practice – visit customers and discuss problems - is too time consuming. 	<ul style="list-style-type: none"> The Department will provide mold making advisory services only to the customers who visit the Department, and the following steps will be taken for the provision of services: Step 1: Receive a customer's visit. Step 2: Analyze the problem and give the customer, within one week, a quotation & time frame with solution ideas. Step 3: Sign a contract & receive a fee (IED) and deliver a solution within the determined deadline. <p>The SME promotion section is responsible for the monitoring of the process.</p>	SME/IED, Section Heads
	A-3-3 Fee for mold	<ul style="list-style-type: none"> Advisory services are currently given for 	<ul style="list-style-type: none"> Nominal fee will be charged for the services for the time-being. 	SME

Category	Item	Observation / Reasons	Actions / Implementation methods	Persons in Charge
	making advisory services	free.		
A-4. Marketing	A-4-1 Affiliation to Japanese educational mold making schools	<ul style="list-style-type: none"> Japanese educational institution's name on the Department's training certificate will increase the certificate's value. It will make the training courses more attractive to customers. 	<ul style="list-style-type: none"> Japanese educational institutions will be contacted and the opportunities to collaborate with them will be sought. Mr. Mori has very kindly considered the request and will try his personal efforts so that the request is taken up by the JICA Pakistan office and Dr. Sasaki in Japan. 	PM / GM / Mr. Mori
	A-4-2 Updating of Department website	<ul style="list-style-type: none"> The SME promotion section is updating the website regularly. 	<ul style="list-style-type: none"> Current practice will be continued. 	SME
	A-4-3 Advertisement of training courses	<ul style="list-style-type: none"> Direct mails to companies do not necessarily reach the Department's potential customers. Some companies do not even show the mail to their employees. 	<ul style="list-style-type: none"> The Department will put advertisements in a newspaper on a quarterly basis (Individual people will be better reached by newspaper). The Department's pamphlets will be distributed in industrial areas. The Department's advertisement will be put on notice boards of universities, colleges and other technical institutions. 	SME, Admin
	A-4-4 Advertisement of mold making services	<ul style="list-style-type: none"> No effective advertisement is currently conducted for mold making services. 	<ul style="list-style-type: none"> Introduction of mold making services will be included in the advertisement of training. The Department's pamphlets will be distributed in industrial areas. 	SME, Admin
	A-4-5 Target of the customers of mold making services	<ul style="list-style-type: none"> The Department's target customers are not been clearly defined. 	<ul style="list-style-type: none"> The primary target of the mold making services is the molds (medium technical level) of large enterprises such as affiliations of Japanese car makers. In parallel, the Department will process the orders already taken by PITAC's IED section in order to maintain its manufacturing skills and build up reputation of PITAC's existing customers. 	SME

B.

Strengthening of Resource Management

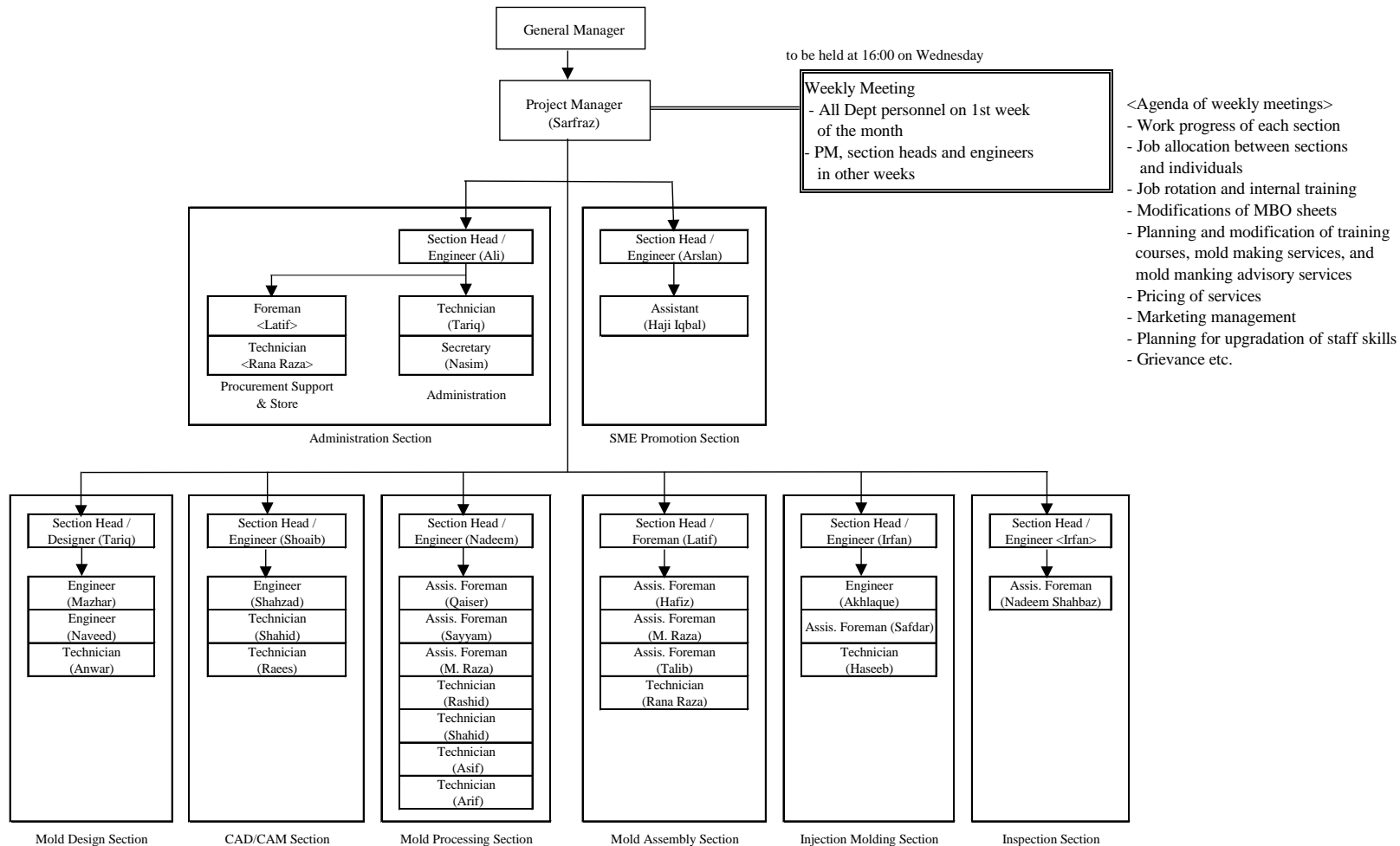
Category	Item	Observation / Reasons	Actions / Implementation methods	Persons in Charge
B-1. Overall management issues	B-1-1 Regular management meeting	<ul style="list-style-type: none"> There is currently no platform for the sharing of ideas on the management of the Department among Department officers and staff. 	<ul style="list-style-type: none"> Work progress and management issues will be discussed in weekly meetings. All Departmental personnel will attend the first weekly meeting every month. The Project Manager will attend Tool Box Meetings of each section alternately. 	PM, Section Heads
	B-1-2 Modification of Department organization	<ul style="list-style-type: none"> The SME promotion section, which plays a critical role for the future of the Department, is currently put under administration section. Procurement is slow, which constitutes a serious bottleneck against mold making services. 	<ul style="list-style-type: none"> The SME promotion section will be separated from the administration section. 	PM/GM
			<ul style="list-style-type: none"> Mr. Latif and Mr. Rana M Raza will be assigned (dual assignment) to facilitate the procurement of materials under the supervision of the Head of Admin. Section. 	PM/GM
	B-1-3 Proper allocation of jobs	<ul style="list-style-type: none"> There is imbalance of work between sections and individuals. Since most of the personnel hours of the SME promotion section are occupied by the administration of training courses, management and marketing for mold making services have not been initiated. 	<ul style="list-style-type: none"> Workload of each officer and staff will be analyzed and jobs will be properly allocated and included into MBO (Management By Objectives). The existing structure of SME section will be maintained and Admin section will be responsible for the implementation of training courses. Annual Planning of training courses will continue to be conducted by the SME promotion section. The SME promotion section will concentrate most of its efforts on the marketing and on streamlining of the management of mold making services. 	PM, Section Heads
	B-1-4 Conducive work environment in the workshop	<ul style="list-style-type: none"> There is no air-conditioning in the workshop, leading to a loss in efficiency. 	<ul style="list-style-type: none"> The whole workshop cannot be equipped with air-conditioners due to budget constraints. However, efforts will be continued to make the working environment more work-friendly. For example, water coolers, industrial fans, exhaust fans etc. may be installed. 	PM/GM
B-1-5 Revenue target of the Department	<ul style="list-style-type: none"> A revenue target - 4 million Rupees for 9 months – has been given by PITAC management. 	<ul style="list-style-type: none"> Revenue target must be <u>logical and achievable</u>. The current exaggerated and illogical target could give adverse effects. There should be step-by-step targets – milestones. Under the current 	PM/GM, Admin, SME	

			working conditions and limited resources available to the Department (high frequency of power failure, limited working hours per worker, unavailability of back-up machinery, dependency on the Government's lengthy procurement system, etc.), Rs. 2.0 million of revenue is expected from training courses and 4 moulds are expected to be manufactured annually (See section 4 for the estimation of revenues and production capacity)	
B-2. Prerequisite to proper work environment	B-2-1 Power failure	<ul style="list-style-type: none"> There are frequent blackouts, significantly disturbing Department operations. 	<ul style="list-style-type: none"> A power generator will be installed to make sure that the Department will be able to keep the deadline of production. A separate PC-1 will be initiated for power generator after the completion of technical cooperation. 	PM/GM
	B-2-2 Basic Telephone and other communication media such as internet.	<ul style="list-style-type: none"> Physical condition of telephone communication is quite bad; Department officers and staff are obliged to run around. Internet at PITAC is closed at 16:00. 	<ul style="list-style-type: none"> Highest priority will be given to basic communication tools such as telephone and fax in order to maintain proper customer services. PITAC has requested to PTCL to maintain the telephonic lines and the work is under-way right now. The Department will make use of the existing internet facility which will be made available for 24 hours. Computer network will be established in all the sections of the Department where necessary; annual maintenance contract with M/s. Infotech. is currently in process. 	PM/GM
B-3. Machinery	B-3-1 Necessity of basic machinery in the Department for self-sufficiency	<ul style="list-style-type: none"> There are too many backlogs in PITAC since PITAC is already overloaded. Jobs requested from the Department to PITAC are often stuck there, which makes the Department difficult to keep customers' deadlines. 	<ul style="list-style-type: none"> In order to process orders of mold making, the Department will be equipped with basic machines such as shaper machine, precision surface grinding machine, cylindrical grinder, radial drilling machines. The request will be initiated in future under New PC-1. 	PM/GM
	B-3-2 Check-up and preventive maintenance of machinery	<ul style="list-style-type: none"> Check-up and preventive maintenance are conducted in accordance with the check sheets prepared for each machine. 	<ul style="list-style-type: none"> Current practices will be continued. 	Section Heads
	B-3-3 Necessity of spare parts	<ul style="list-style-type: none"> Lack of spare parts could lead to a suspension of processing of orders. 	<ul style="list-style-type: none"> Backup for necessary spares such as PCB board, servo drive units, & other consumable parts will be provided. 	PM/GM
B-4.	B-4-1 Job rotation	<ul style="list-style-type: none"> All Department officers and staff should 	<ul style="list-style-type: none"> Department officers and staff should be principally rotated, for which 	PM,

Upgradation of skills		acquire multiple skills and knowledge to enable flexible and efficient operation.	<p>an appropriate rotation plan will be established.</p> <ul style="list-style-type: none"> Department officers and staff will be shifted to other sections for a short period of time to acquire multiple skills. 	Section Heads
	B-4-2 Quality circles	<ul style="list-style-type: none"> Department manager is the chairman of the TQC committee. TQC activities are conducted regularly. 	<ul style="list-style-type: none"> Current practices will be continued. 	PM, Section Heads
	B-4-3 Effective utilization of MBO	<ul style="list-style-type: none"> MBO is currently used by Japanese experts to monitor the achievement of technology transfer. 	<ul style="list-style-type: none"> PM and section heads will use MBO to monitor the performance of their subordinates. Each officer's and staff's jobs must be well defined in MBO, and be revised whenever necessary. 	PM, Section Heads
	B-4-4 Human resource development through continuous training	<ul style="list-style-type: none"> Continuous training is necessary to upgrade officers' and staff's skills. 	<ul style="list-style-type: none"> Collaboration with APO and NPO for training abroad will be sought. Officers and staff will apply long-term and short-term training courses of JICA's regular annual training programs. On-the-job training opportunities in high profile private industries (technology exchange) will be explored. "Skill Exchange Partner Companies" (formerly, "model companies") will be reselected and exchange of officers and staffs with these companies will be conducted once a month. Training opportunities within the country in high profile institutions/organizations such as PTC, APO, NPO, SMEDA, PIMS, LUMS, and Chambers of Commerce will be explored. Joining training courses in other sections will be encouraged. 	PM, Section Heads
B-5. Employment and Promotion	B-5-1 Absorption of C/Ps	<ul style="list-style-type: none"> The majority of the Department officers and staff are employed on a contract basis, which is going to expire on 14th September 2006. 	<ul style="list-style-type: none"> After the termination of the contract period in September 2006, PC-4 will be submitted on 15th of September and the permanent employment of Department officers and staff will be guaranteed. 	PM/GM
	B-5-2 Criteria for the promotion	<ul style="list-style-type: none"> Currently, even Department officers and staff upgrade their qualifications/skills and perform well, they do not get promoted. Promotion is currently not made according to the defined criteria. Department officers and staff are not promoted even a vacant post is announced. 	<ul style="list-style-type: none"> Criteria does exit. However, the last Departmental promotion committee (DPC) for Officers promotion took place in <u>1999</u>. It is strongly recommended that DPC for officers be held immediately and continue to be held on regular basis. Due incentive on improvement of qualification should also be awarded to employees. 	PM/GM
B-6. Salary	B-6-1 Officers' and	<ul style="list-style-type: none"> The Department officers' and staff's salary 	<ul style="list-style-type: none"> PITAC management and TUSDEC will continue to make maximum 	PM/GM

and Incentives	staff's salary	is low compared to their expected workload.	efforts to increase the salary of all the employees to compensate their hard work.	
	B-6-2 Certificate of training courses	<ul style="list-style-type: none"> Currently, certificates are not given to Department officers and staff who attended internal training courses. 	<ul style="list-style-type: none"> To be considered in Joint-Meeting with PITAC officials including Manager Training. 	PM/GM

4. Organizational Chart of Plastic Molding Department



<Agenda of weekly meetings>

- Work progress of each section
- Job allocation between sections and individuals
- Job rotation and internal training
- Modifications of MBO sheets
- Planning and modification of training courses, mold making services, and mold making advisory services
- Pricing of services
- Marketing management
- Planning for upgradation of staff skills
- Grievance etc.

Section Head / Designer (Tariq)

Engineer (Mazhar)

Engineer (Naveed)

Technician (Anwar)

Mold Design Section

Section Head / Engineer (Shoab)

Engineer (Shahzad)

Technician (Shahid)

Technician (Raees)

CAD/CAM Section

Section Head / Engineer (Nadeem)

Assis. Foreman (Qaiser)

Assis. Foreman (Savyam)

Assis. Foreman (M. Raza)

Technician (Rashid)

Technician (Shahid)

Technician (Asif)

Technician (Arif)

Mold Processing Section

Section Head / Foreman (Latif)

Assis. Foreman (Hafiz)

Assis. Foreman (M. Raza)

Assis. Foreman (Talib)

Technician (Rana Raza)

Mold Assembly Section

Section Head / Engineer (Irfan)

Engineer (Akhlauque)

Assis. Foreman (Safdar)

Technician (Haseeb)

Injection Molding Section

Section Head / Engineer <Irfan>

Assis. Foreman (Nadeem Shahbaz)

Inspection Section

- * The existing SME & Admin sections will continue to be lean, although the support to SME section may be extended as and when desired and justified.
- * When PM or section heads take a leave, they have to nominate someone who acts for them during their absence.
- * Section heads represent the voices of their respective sections and prepare discussion materials for each weekly meeting.
- * <> stands for dual assignment

5. Projection of Revenues under the Current Manufacturing Capacity

(1) Revenue from Training Courses

Course Name	Hours	Capacity (persons)	Expected # of Participants	# of Day Course	# of Even. Course	Total Courses	Total Participants	Fee (Rp)	Revenue (Rp)	Machining Centre hours used for training
	a	b	c	d	e	f = d + e	g = c * f	h	I = g * h	
2D3D AUTOCAD	60	12	6	1		1	6	6,000	36,000	
Mold Design, Beginners	45	12	6		1	1	6	4,500	27,000	
Mold Design, Basic	45	12	6	2	1	3	18	4,500	81,000	
Mold Design, Advance	45	12	6	1	1	2	12	4,500	54,000	
3D CAD	45	11	11	4	6	10	110	4,500	495,000	
3D CAM	45	11	11	5	5	10	110	4,500	495,000	
3D CAD/CAM Advance	45	11	11	1	1	2	22	4,500	99,000	
3D Mold Maker	45	11	11	1		1	11	4,500	49,500	
3D Modeling	45	11	11	1		1	11	4,500	49,500	
CNC Machining Center	60	8	8	8	7	15	120	7,000	840,000	450
EDM Sinker/Wire-cut	60	8	8	1		1	8	7,000	56,000	
Mold Polishing & Finishing	30	4	4	4		4	16	4,000	64,000	
Injection Molding, Beginners	45	8	4	2	3	5	20	5,500	110,000	
Injection Molding, Basic	45	8	4	3	1	4	16	5,500	88,000	
Total				34	26	60	486		2,544,000	

* The table shows the maximum number of training courses. The number will decrease if major machines break down or power supply fails.

(2) Manufacturing Capacity and Revenue from Mold Making Services

1. Manufacturing Capacity of a Machining Center

	Working Hours (Mon-Thu)	Working Hours Friday	Total Working Hours / Week	Working Hours / Week in Ramadan	Total Working Hours per Year	Machining Center Hours per year for Training (daytime)	Machining Center Hours per Year for Training (even. time)	Total Machining Center Hours per Year for Mold Making	Total Machining Center hours per Mold	Number of Molds per Year	Revenue (Rp)
	a	b	c = a + b	d	e = e * 46 + d * 4	f	g	h = e - f - g	i	j = h / i	k = i * j
Current	7	5	33	25	1,618	240	-	1,378	200	6	600,000
1.5 shifts	10	8	48	25	2,308	240	210	1,858	200	9	900,000
2 Shifts	13	9	61	25	2,906	240	210	2,456	200	12	1,200,000

2. Capacity of the Workforce at the Processing Section

	# of Workforce	Working Hours per Person per Year	Total Working Hours Available per year	EDM (hours)	Wire cut (hours)	Lathe (hours)	Milling (hours)	Surface Grind (hours)	Machining Center (hours)	CAD/CAM (hours)	Total Man-Hours per Mold	Number of Molds per Year
	l	m	n = l * m	o	p	q	r	s	t	u	v = sum (o : u)	w = n / v
Current	7	1,200	8,400	50	100	100	100	200	200	200	950	8

3. Capacity of the Workforce at Polishing & Assembly

	# of Workforce	Working Hours per Person per Year	Man-hours per mold	Total Man-Hours per Mold	Number of Molds per Year
Current	2	1,200	2,400	300	8

4. Capacity of the CNC Machine Operators

	Total Working Hours per Year	Number of Molds per Year
CNC Machine Operator 1	1,200	12
CNC Machine Operator 2	600	
CNC Machine Operator 3	600	
Total	2,400	

5. Capacity of the CAD/CAM Engineers

	Total Working Hours per Year	Number of Molds per Year
CAD/CAM Engineer 1	1,200	6
CAD/CAM Engineer 2 (6 months training is needed)	1,200	
Total	2,400	12

Remarks

- 6 is the maximum number of molds that can be currently manufactured per year under an ideal condition without the disturbing factors mentioned in No. 3 below since only one CAD/CAM engineer can be assigned for mold making (other CAD/CAM engineers are engaged in training courses). An additional CAD/CAM engineer must be trained to run a machining center for more than 1,200 hours per year (6 months of training period is needed).
- If the above is attained, 8 is the maximum number of molds that the processing section can manufacture under the current workforce with 1.5 shifts.
- Disturbing factors such as power failure, machine breakdown and delay in procurement of materials are not included in the manufacturing time. 20% to 30% reduction in productivity is likely unless decisive measures are taken.
- Further increase in mold manufacturing is only possible by (1) introducing a parallel operation of multiple machines by a single person (more experience/training is needed), (2) introducing overtime work by the current workforce, and/or (3) increasing more workforce at the processing section (training is needed).

Annual Plan Training Courses (Tentative)

 Evening Courses
 Daytime Courses
 Ramazan
 Eid
 Intensive course

Timings
Mon - Fri 1600 hrs - 1900 hrs
Mon - 0900 hrs - 1200 hrs / 0900 hrs - 1600 hrs
Thu 0900 hrs - 1200 hrs
Mon - 0800 hrs - 1600 hrs
Thu 0800 hrs - 1200 hrs

July 19, 2006

Rev-01

T. Hirao / M.Arslan

Fiscal Year 2007 - 2008

Month	2	9	16	23	30	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	4	Total		
Monday - Course Start	6	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	1	8	15	22	29	7	14	21	28	4	11	18	25	2	9	16	23	30													
Friday - Course End																																																													
Holiday																																																													
01 2D3D AUTOCAD																																																													
02 Mold Design, Beginners																																																													
03 Mold Design, Basic																																																													
04 Mold Design, Advance																																																													
05 3D CAD																																																													
06 3D CAM																																																													
07 3D CAD/CAM Advance																																																													
08 3D Mold Maker																																																													
09 3D Modeling																																																													
10 CNC Machining Center																																																													
11 EDM Sinker/Wire-cut																																																													
12 Conventional Machining,																																																													
13 Conventional Machining, Advance																																																													
14 Mold Polishing & Finishing																																																													
15 Injection Molding,																																																													
16 Injection Molding,																																																													
Total																																																													