



Roughing and polishing tools acquired through the project



MIRDC technician at work



Wire cutting equipment provided by the project



One of three plastic molding equipment found at the MIRDC



Technical personnel at work at the CAD/CAM Network Station at MIRDC



Some of the test molds designed and assembled at MIRDC

Ex-Post Evaluation Summary Sheet

1. Outline of the project	
Country: Philippines	Project Title: Upgrading Project for Plastic Molding Tool Technology (UPPMTT)
Issue/sector: Industry/General	Cooperation scheme: Project Type Technical Cooperation (PTTC)
Division in charge: First Technical Cooperation Division, Mining and Industrial Development Study Department	Total cost: 909 million Yen
Period of cooperation: 1 September 1997- 31 August 2002 (R/D)	Partner Country's Implementing Organization: Metal Industry Research Development Center (MIRDC)-Department of Science and Technology (DOST) Supporting organization in Japan: The Materials Process Technology Center Inc.
Related cooperation: Project-Type Technical Cooperation "Republic of Philippines Metallic Foundry Technology Center Project"	
<p>1-1. Background of the project:</p> <p>In order to improve the government's technical capability on metal casting, which was a key sub-sector of the "supporting industries" in the Philippines in 1970s, the Government of the Philippines (GOP) requested a technical cooperation from the Government of Japan (GOJ). In response to this request, the GOJ, through JICA, assisted the MIRDC in implementing the Metal Casting Technology Center Project under JICA's PTTC program from July 1980 to January 1986. In 1995, the Philippines realized the need to foster its "supporting industries" particularly the metal works industry sector to advance industrial promotion as a strategy for sustained economic growth. However, the government's available technology on this sector was found lagging behind with those of other newly industrializing countries. Under this circumstance, the GOP again requested GOJ for a technical cooperation to upgrade MIRDC's technologies on metal processing particularly on molding and casting. Responding to the request, the GOJ, through JICA offered a technical cooperation only in the field of plastic molding because the basic technology in the field of casting has already been transferred to MIRDC staff during the technical cooperation in the 1980s. The GOP authorities agreed on this suggestion and signed the Records of Discussions (R/D) in June 1997 regarding the implementation of the "Upgrading Project for Plastic Molding Tool Technology (UPPMTT)" under JICA's Project-Type Technical Cooperation (PTTC) Program. The project cooperation commenced in September 1997 and ended in August 2002. To complement the implementation of the UPPMTT, the MIRDC carried out the project titled, "Support to the establishment of Precision Tool and Die Center" from January 2000 to December 2001 with a grant funding from UNDP of \$320,000 which was accessed by UNDP from the Japan Human Resources Development Thrust Fund. This project was focused on training out-of-school youths while the UPPMTT was focused on training the technicians and engineers already working with industry companies.</p> <p>The Mid-Term Evaluation study for the Upgrading Project for Plastic Molding Tool Technology (UPPMTT) was carried out by JICA in August 2000, while the Terminal Evaluation study was undertaken in March 2002. This Ex-Post Evaluation Study was aimed at determining the Impact and Sustainability of the project.</p>	

1-2. Project overview:

In order to improve the training and technical support capability of MIRDC, the project transferred technologies to MIRDC counterpart staff on plastic molding in the following fields: (i) designing, (ii) processing, and (iii) assembling, repair and trial manufacturing.

(1) Overall goal

Technical level of engineers and technicians in the Philippines' Tool and Die industry will be upgraded. (The project was actually expected to contribute to the improvement of the Philippines' technical capability in the field of mold for plastic)

(2) Project purpose

MIRDC will be able to provide training and technical support related to plastic molding tool technology.

(3) Outputs

- 1) The project management and operation system will be enhanced
- 2) The machinery and equipment will be provided, installed, operated and maintained properly
- 3) The technical level of counterpart personnel will be upgraded
- 4) Training courses for the tool and die industry will be implemented systematically
- 5) MIRDC's technical support services to the tool and die industry will be implemented systematically

(4) Inputs

<Japanese side>

Long-term experts	=	10	Equipment	304million Yen
Short-term experts	=	32	Local cost	30 million Yen
Trainees received in Japan	=	19	Others	-

<Philippine side>

Assignment of counterparts	=	57		
Land and facilities	=	17 million Yen	Local cost	261million Yen

2. Evaluation team

Members of evaluation team	JICA-Philippines office	
	Commissioned to: Guru Technologies Corporation Consultant: Ms. Rosario Bantayan	JICA In-house Consultants providing technical guidance and supervision to the study: (1) Engr Rey Gerona (2) Engr Nick Baoy
Period of evaluation	November 8, 2005 – January 6, 2006	Type of evaluation: Ex-Post Evaluation

3. Results of evaluation

3.1 Summary of evaluation results

(1) Impact

The impact of the technical cooperation on the individual counterpart staff of MIRDC was highly significant, such that, compared to the time when the technical cooperation was not yet implemented, former project counterparts at MIRDC can now be considered highly competent in delivering lectures during trainings and in providing technical consultancy or advisory services to small and medium enterprises in the industry. As a result of an improved capability, the number of MIRDC's clients expanded from engineers and technicians in the small and medium enterprises to out-of-school youth trainees of vocational schools which are potential sources of skilled employees in the Philippines. To sustain the generation of positive impacts, however, there is a need for more advanced technologies using modern equipment in order to effectively cope with the rapid technological advancement of plastic molding and to appropriately respond to market demands. It certainly requires longer time to achieve the project's overall goal of "upgrading the technical level of engineers and technicians in the Philippines' tool and die industry" considering the varied fields involved in the whole tool and die industry. But the project is already contributing towards achieving this goal by "improving the Philippines' capability in the field of mold for plastic".

There was no negative impact produced by the project, and the production of the same is seen unlikely in the future.

(2) Sustainability

Institutional

The institutional sustainability aspect of the project is secured. MIRDC remains the only government agency in the Philippines directly supporting the metals and engineering industries through the provision of professional management and technical expertise on the training of engineers and technicians; information exchange; trade accreditation services; quality control and testing of metal products; and business economic advisory services. As such, MIRDC remains a relevant organization particularly on the Philippines' continuing effort of fostering "supporting industries" in the country. To further ensure its institutional sustainability, MIRDC successfully acquired ISO/IEC Guide25 accreditation for its laboratories in 1996, an ISO 9002 Certification of Precision Casting Section and Investment Casting Unit in 1998 and an ISO 9001 certification for its Industrial Training Section which was later upgraded to ISO certification: 2000 version that signifies a mark of excellence in addressing the demands or needs of training participants. Also in 1998, MIRDC got accreditation from NATA of Australia for its force and mass laboratory. The MIRDC had likewise acquired ISO 14001-Environmental Management System certification in 2001 that recognized the MIRDC's integration of environmental management, pollution prevention, health and safety in all its activities. With an average budget of 101 million provided by the central government every year, MIRDC is staffed with more than 290 permanent personnel, 79% of whom are technical staff. The Philippine Government remained committed to develop its human resources to achieve the goal of having highly trained and skilled manpower that can contribute to the achievement of Philippine industrialization in the future. These agenda are highlighted in the current Medium-Term Philippine Development Plan 2004-2010. Therefore, the continuing work of the MIRDC in upgrading the technical levels of technicians and engineers in the tool and die industry is considered vital.

Along this line, the MIRDC continues to enjoy a policy support from the national government, and as such, strengthens the institutional sustainability aspect of the project.

To help sustain project activities, the MIRDC maintains very close relations with the private industry sector such as the Philippine Die and Mold Association (PDMA) and the Metalworking Industry Association of the Philippines (MIAP) and the Philippine Metalcasting Association, Inc. In addition, MIRDC maintains a working partnership with the TESDA (Technical Education Skills Development Authority, a government agency attached to the Department of Labor and Employment) through which trainers of TESDA in plastic molding are continually trained by MIRDC staff in addition to assisting TESDA in prioritizing and formulating the occupational trade skills and competency assessments, and in evaluating the curricula of different vocational schools applying for accreditation.

Technical

The technical sustainability aspect of the project is likewise secured. Forty-eight (48) out of the 57 former project counterparts are still working at MIRDC and continue to work for plastic molding. Only eight (8) former project counterparts have left the government service since 2000, most of whom are either managing their own business enterprise or working for the companies in the metal and engineering and allied industries. At the time of evaluation, thirteen (13) out of the 19 project counterparts who were trained in Japan are still connected with MIRDC and performing functions related to plastic molding tool technology. The MIRDC staff are able to practice the learned knowledge and skills on plastic molding by continuously delivering lectures in training and seminars, workshops or conferences and through continued provision of consultancy services to medium and large companies that are equipped with more advanced technologies and modern equipment. The MIRDC had conducted at least 22 trainings related to plastic molding technology since the project cooperation ended in 2002. These trainings were attended by more than 700 participants from different industry companies. Former project counterparts at MIRDC are also providing continuously consultancy services on mold design, fabrication, assembly and processing to small and medium industry companies. The learnt knowledge and skills are also applied by former project counterparts in other MIRDC training courses, such as Analysis and Testing Course, Quality Management System, Productivity Improvement, Management and Supervisory course, and engineering production and planning courses. The MIRDC continues to serve as the secretariat of the Philippine Die and Mold Association and has been instrumental in strengthening linkages both local and abroad. Until at present, the MIRDC remains active in the Federation of Asian Die and Mold Association (FADMA), through which MIRDC former project counterparts had the opportunity to participate in technology upgrading activities with Asian counterparts in related international conventions that are held from time to time. The various sets of equipment provided by the project are still in good condition. All these equipment are regularly used during trainings, consultancy services, testing and technology demonstration activities for visiting students from different vocational schools and universities. However, the technology on plastic molding is fast-changing and as such there is an apparent need for MIRDC staff to be constantly exposed to new product designs and latest trends in tool and die technologies to keep pace with rapid technological innovations.

Financial

The financial sustainability aspect of the project is also secured. MIRDC gets a yearly budget ranging from 100 million to 110

million pesos from the national government starting in 2002. This budget allocation is bigger than those provided to MIRDC during the project cooperation period that ranged only from 92 million to 96 million a year. Because of the huge budget deficit the Philippine government is presently encountering, however, the budget allocation to MIRDC from the national government is gradually decreasing from 110.5 million in 2002 to only 101.9 million in 2005. This budget reduction however has not so far adversely affected the operations and activities of the MIRDC, except that MIRDC will not be able to acquire immediately modern equipment, which is seen necessary to advance its technologies on plastic molding. In addition to the budget provided by the national government, MIRDC generates revenues averaging 30 million pesos per year from trainings and consultancy services. Furthermore, an average of 10 million pesos every year is received by MIRDC from DOST as "grant-in-aid" for the purchase of accessories, fabrication, repairs and maintenance of equipment. Over the last 35 years, MIRDC has been consistently provided with an operational budget from the national government and that this budgetary support can be expected to continue in the future. As such, the financial sustainability aspect of the project is ensured.

3.2 Factors that have promoted the project

(1) Impact

The continuous linkage and support of the Metalworking Industry Association of the Philippines (MIAP) and the Philippine Die and Mold Association (PDMA) to MIRDC had contributed to the production of positive impacts by the project. These two associations have been instrumental in drumming up support and creating awareness of the project to industry members such that personnel from different industries as well as from other training and academic institutions have continuously availed of the training programs of the Center. Through the sustained partnership of the PDMA and MIRDC, the first international exhibition cum conference which brought together industry players of die and mold and other related industries in the country and the Asian region was held in 2003 to promote their products and services as well as expand business networks.

(2) Sustainability

The following factors had promoted the sustainability of the project: (i) Priority given by government to increasing productivity and enhancing global competitiveness of the industrial sector in which the MIRDC plays a vital role, (ii) low staff turn-over at MIRDC, and (iii) the continued existence of MIRDC as the sole agency of the government mandated to provide training and technical services to the metalworking industry in the Philippines.

3.3 Factors that have inhibited the project

The rapid technological advancement in the plastic molding industry, on one hand, inhibits the impact and sustainability aspects of the project because this requires the continuous upgrading of the knowledge, skills and equipment available at MIRDC to which the financial resources of MIRDC may not be able to respond appropriately. On the other hand, it poses real challenge to MIRDC to find ways to keep itself at pace of the technological innovations in the industry. Also, there are always possibilities that the trained technicians and engineers will leave for work overseas because of the more attractive job packages offered by tool and die companies abroad. Without functional mechanisms and motivational incentives adopted at the plastic molding companies in the Philippines, this poses another challenge to MIRDC's capability to expand its clientele coverage.

3.4 Conclusion

The project has brought about positive impacts to MIRDC's capability as evidenced by its continuing conduct of related training and technical support on plastic molding tool technology not only to industry companies but also to vocational schools and university students and out-of-school youths. If seen from the angle of the original statement of the overall goal of the project ("upgrading the technical level of engineers and technicians in the Philippines' tool and die industry"), the impact of the technical cooperation in the whole tool and die industry may be considered small because this objective requires more time to achieve considering that plastic molding tool technology is just a small segment of the tool and die industry. However, if viewed from the angle of improving the Philippines' capability in the field of mold for plastic, then the impact of the technical cooperation is highly significant. Sustainability of the project is likewise secured. The production of positive effects caused by the project is continuing.

3.5 Recommendations

To MIRDC

To ensure sustainability of project activities, there is need for MIRDC to explore possibilities of acquiring sufficient funding for the operations and maintenance of its facilities and equipment, upgrading of some obsolete equipment and in advancing MIRDC's plastic molding technologies to keep itself abreast with the rapid technological innovations in the plastic molding sector.

To GOJ-JICA

In order to strengthen the positive gains produced by the project, JICA may wish to study the possibility of providing a follow-up support for the upgrading of equipment and enhancing the skills of technical staff of MIRDC.

3.6 Lessons learned

Strong partnership between the government and the private sector particularly the stakeholders and other beneficiaries of the project is vital for the sustainability of project effects. This partnership, together with the commitment and support of the private sector, will redound to the achievement of purpose and the goal of the project.

Establishing the direct logical links between and among project objectives during the project designing stage helps clarify contribution of project purpose to over-all goal and thus facilitate effective project implementation and evaluation. In this project, the over-all goal of the project of "upgrading the technical level of engineers and technicians in the tool and die industry" appears too high for the plastic molding project alone to achieve, considering the fact that plastic molding is just one of the many areas under the entire tool and die industry. The overall goal statement could have been about "improving the capability in the field of mold for plastic", which can be easily linked to the project purpose statement of "providing training and technical support related to plastic molding tool technology."

1. Outline of the Ex-Post Evaluation Study

1.1 Background and purpose of the study

1.1.1 Background

Based on the request of the Government of the Philippines (GOP) in 1995, the Government of Japan (GOJ) through the Japan International Cooperation Agency (JICA) provided a technical cooperation to the Metals Industry Research Development Center (MIRDC) of the Department of Science and Technology (DOST) under JICA's Project-Type Technical Cooperation (PTTC) scheme from September 1997 to August 2002. The cooperation project was named "Upgrading Project for the Plastic Molding Tool Technology (UPPMTT)".

Three years after the cooperation ended in 2002, JICA selected the UPPMTT as one of the completed projects that will be subjected to Ex-Post Evaluation Studies for the Japanese Fiscal Year (JFY) 2005.

1.1.2 Purpose

The ex-post evaluation study seeks to assess the impact and sustainability of the project. It also aims to draw lessons from the project cooperation as well as derive recommendations for the improvement of the planning and implementation processes of similar projects in the future.

1.2 Evaluator and study period

1.2.1 Evaluator

To ensure objectivity of the evaluation and also considering time limitations, JICA commissioned the study to the Guru Technologies Corporation (GuruTech), a local consulting firm. GuruTech assigned its consultant, Ms. Rosario Bantayan, to undertake the study.

JICA assigned its In-house Consultants, Engr. Rey Gerona and Engr. Nick Baoy, to provide technical guidance and supervision to the study.

1.2.2 Study period

The ex-post evaluation study was carried out from November 8, 2005 to January 6, 2006.

1.3 Study scope and methodologies

1.3.1 Scope

The study concentrated in Metro Manila (or the National Capital Region) where the MIRDC and main offices of the plastic molding companies are located. The study also covered some areas of Region IV-A (provinces of Cavite and Laguna), where plant operations of some industry companies are found.

1.3.2 Methodologies

The study was guided by an Evaluation Grid, which was formulated by the study

consultants after grasping the project framework. The grid specified the evaluation questions on impact and sustainability and the corresponding methods applied by the study consultants in the survey. These methods were: (i) interview, (ii) focus-group discussion, (iii) survey questionnaire, and (iv) observation and inspection of the donated equipment.

Table 1: Study Methods Adopted in the Ex-Post Evaluation

Stakeholder	Respondents	Method applied
MIRDC	Executive Director (1)	Interview
	Deputy Director (1) (Engr. Eduardo R. Lacbay)	Questionnaire
	Division chiefs (1) (Engr. Butch Japitana)	
DOST	Director, Planning and Evaluation Services (1)	Interview
MIRDC counterpart staff	Designing group (3)	Focus group discussion & survey questionnaire
	Processing group (2)	
	Assembling, repair & trial manufacturing group (2)	
Industry associations	Officers of the Philippine Die and Mold Association (1) (Mr. Jimmy Chan, President)	Interview & survey questionnaire
	Officers of the Metalworking Industry Association of the Philippines (1)	
	Engineers and technicians who received training from the project (8)	
Note: Numbers in () are actual number of respondents		

Among the information sources used by the study are: (i) PDM and Plan of Operation, (ii) Mid-Term Evaluation report, August 2000, (iii) Terminal Evaluation report, March 2002, and (iv) various MIRDC project reports.

The study used the following definition of Impact and Sustainability as adopted by the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD):

Impact: the foreseen and unforeseen, favorable or adverse effect of the project on the target groups and persons possibly affected by the project

Sustainability: the perspective whether the positive effects as a result of the project are likely to continue after the external assistance ended.

2. Overview of the project

2.1 Background of the project

Since the 1970s, the Philippine Government has been actively promoting the productivity and competitiveness of the country's industries. In order to improve the government's technical capability on metal casting, which was a key sub-sector of the "supporting" industries at that time, the Government of the Philippines (GOP) requested the Government of Japan (GOJ) for a technical cooperation in late 1970s. Based on this request, the GOJ, through JICA, assisted the Metal Industry Research Development Center (MIRDC), one of the government institutions operating under the Department of Science and Technology (DOST), in implementing the Project-Type Technical Cooperation (PTTC) on Metal Casting Technology Center Project from July 1980 to January 1986. The project received an extended assistance from the GOJ through an Aftercare program from July 1988 to March 1989.

Six years after, the Philippines was faced with the need to foster "supporting industries", particularly the metalworks industry sector, as a strategy to advance industrial promotion for sustained economic growth. However, the government's available technology on this sector lagged behind with those of other newly industrializing

countries (NICs) in Asia. Considering this situation, the GOP again requested the GOJ, in 1995, for a technical cooperation to upgrade the MIRDC's technologies on metal processing particularly on molding and casting. Responding to the request, the GOJ, through JICA, dispatched a Preliminary Study Team in December 1996, which examined the appropriateness of the contents of the proposed project and the request. As a result of the examination, the study team recommended a technical cooperation only in the field of plastic molding because the basic technology in the field of casting has already been transferred to MIRDC staff during the technical cooperation in the 1980s, to which the GOP authorities agreed.

Following the recommendation of the Preliminary Study Team, JICA dispatched the Implementation Design Study Team in May and June 1997 that crafted the design of the project implementation. In June 1997, both the GOP and GOJ authorities signed the Records of Discussions (R/D) regarding the implementation of the PTTC through the "Upgrading Project for Plastic Molding Tool Technology (UPPMTT)". The project cooperation commenced in September 1997 and ended in August 2002.

From January 2000 to December 2001, the United Nations Development Program (UNDP) assisted the MIRDC through the project, "Support to the Establishment of Precision Tool and Die Center". The total input of UNDP in this project was \$ 320,000, 93% of which was a grant from the Japan Human Resource Development Thrust Fund. The project focused on the (i) development of training curricula, and (ii) in the production and packaging of training materials. The targeted beneficiaries were the out-of-school youth and high school graduates. The UPPMTT, on the other hand, focused on training courses on plastic molding targeting mainly the technicians and

engineers who were already working with industry companies. As such, the UNDP project was seen complementing the JICA-assisted UPPMTT project.

The Mid-Term Evaluation study for the Upgrading Project for Plastic Molding Tool Technology was carried out by JICA in August 2000, while the Terminal Evaluation study was undertaken in March 2002.

2.2 Project framework¹

In order to improve the training and technical support capability of MIRDC, the project transferred technologies to MIRDC counterpart staff on plastic molding in the following fields: (i) designing, (ii) processing, and (iii) assembling, repair and trial manufacturing.

Overall Goal

Technical level of engineers and technicians in the Philippines' Tool and Die industry will be upgraded.

(The project was actually expected to contribute to the improvement of the Philippines' technical capability in the field of mold for plastic).

Project Purpose

MIRDC will be able to provide training and technical support related to plastic molding tool technology

Outputs

1. The project management and operation system will be enhanced

¹ Lifted from the Summary Sheet of the Terminal Evaluation Report.

2. The machinery and equipment will be provided, installed, operated and maintained properly
3. The technical level of counterpart personnel will be upgraded
4. Training courses for the tool and die industry will be implemented systematically
5. MIRDC's technical support services to the tool and die industry will be implemented systematically

Inputs

<Japanese side>

- Long-term experts (10)
- Short-term experts (32)
- Filipino trainees received in Japan for training (19)
- Funds for the purchase of equipment (approximately, 304 million Yen)
- Share to local costs (approximately, 30 million Yen)

<Philippine side>

- Assignment of counterpart staff (57)
- Land and facilities (approximately, 17 million Yen)
- Share to local costs (approximately, 261 million Yen)

3. Study Results

3.1 Sustainability

3.1.1 Technical sustainability

The technical sustainability aspect of the project is secured. At the time of the

evaluation, 48 out of the 57 former project counterparts are still working at MIRDC and continue to work for plastic molding. Eight (8) former project counterparts have left the government service since 2000. Some of these counterpart personnel have migrated to other countries while the rest are either managing their own business enterprise or working for the companies in the metal and engineering and allied industries.

One of the thrusts of MIRDC is technology transfer through the conduct of trainings, through which the MIRDC generates income. As such, MIRDC trainers and staff have to update regularly the knowledge and skills they learned from the project as the technological innovations on the field of plastic molding is fast evolving. Although the MIRDC, owing to the budgetary constraints faced by the Philippine government, has limited opportunity to organize and conduct training for its own staff, the MIRDC staff are still able to update their knowledge and skills on plastic molding through (i) literature reviews, (ii) internet-based research, (iii) attending and delivering lectures in seminars, workshops or conferences organized by industry companies, (iv) sharing with colleagues at MIRDC, and (v) through continued provision of consultancy services to medium and large companies that are equipped with more advanced technologies and modern equipment. The former project counterparts continuously practice the knowledge and skills learned through the project by (i) conducting regular training courses particularly on “high machining technology” that includes application of CAD-CAM (40 hours), basic plastic injection mold design (38 hours), plastic injection molding machine programming and operation (40 hours), CNC EDM sinking, programming and operation (40 hours), CNC wire cutting EDM programming and operation (40 hours), (ii) through delivering lectures and hands-on training to trainers of

TESDA, (iii) through the appreciation courses for technical and engineering students, and (iv) through the application of knowledge and skills in their daily work at MIRDC and (v) by providing consultancy services to the metals and allied industries.

From 2003 to 2005, MIRDC had at least conducted 22 trainings, producing a total of more than 800 graduates in various fields of plastic molding (see Table 4). Out of the 19 counterparts who were sent to Japan for training and who still continue to work with MIRDC, 14 are providing regular consultancy or advisory work to around 32 small and medium companies. According to MIRDC, the number of companies who requested for MIRDC's consultancy or advisory services has been increasing.

The learnt knowledge and skills during project cooperation are also applied in other training courses by former project counterparts. Such other courses that are also regularly carried out by the MIRDC include the Analysis and Testing Course, Quality Management System, Productivity Improvement, Management and Supervisory course, and engineering production and planning courses, among others.

The MIRDC serves as the secretariat of the Philippine Die and Mold Association and has been instrumental in strengthening linkages both local and abroad. At present, Engr. Eduardo Lacbay, the former project manager and still the Deputy Executive Director of MIRDC serves as the Secretary-General of the Federation of Asian Die and Mold Association (FADMA), through which MIRDC former project counterparts had the opportunity to participate in technology upgrading activities with Asian counterparts in related international conventions that are held from time to time. FADMA is the regional grouping of die and mold manufacturers and precision engineering associations of 10

countries.

The various sets of equipment provided by the project are still in good condition manifesting proper care and maintenance on these equipments being executed by the MIRDC. All these equipment are regularly used during trainings, consultancy services, testing and technology demonstration activities for visiting students from different vocational schools and universities.

The project has transferred basic technology on plastic molding designing, processing and trial manufacturing. However, the technology on this field is fast-changing and as such there is a need for MIRDC staff to be constantly exposed to new product designs and latest trends in tool and die technologies to keep pace with rapid technological innovations. Thus, MIRDC budget for continued skills enhancement through staff training is necessary.

3.1.2 Institutional sustainability

The institutional sustainability aspect of the project is also secured. There is no change in the organizational structure and mandate of MIRDC since the cooperation ended in 2002. By virtue of Executive Order 494, MIRDC remains a government agency attached to the Department of Science and Technology (DOST). It is the sole government agency directly supporting the metals and engineering industries through the provision of professional management and technical expertise on the training of engineers and technicians; information exchange; trade accreditation services; quality control and testing of metal products; and business economic advisory services. Another mandate of the agency is metal industry research and development that includes tool

and die technologies. Plastic molding falls under the tool and die technologies.

In view of this, MIRDC aims to become an internationally competitive organization capable of providing quality technical services through training and other related technology development services. The MIRDC has already acquired ISO/IEC Guide25 accreditation for its laboratories in 1996. In 1998, MIRDC has also acquired ISO 9002 Certification of Precision Casting Section and Investment Casting Unit. At the same time, MIRDC got accreditation from NATA of Australia for its force and mass laboratory. An ISO 9001 certification for its Industrial Training Section was also acquired by MIRDC. This was later upgraded to ISO certification: 2000 version which signifies a mark of excellence in addressing the demands or needs of training participants. This was awarded by the TUV Product Services Management Asia. MIRDC's commitment towards environmental management, pollution prevention and control in all its activities as well as the promotion of environmental awareness, health and safety has gained for the Center an ISO 14001-Environmental Management System certification in 2001. MIRDC is presently staffed with more than 290 regular, permanent personnel. Seventy-nine percent (79%) of whom are technical staff while 21% are non-technical staff.

Table 2: Distribution of MIRDC staff according to educational attainment

Educational level		Number
1	PhD	4
2	MS Degree Graduates	33
3	BS Degree Graduates	140
4	College level	30
5	Technical, vocational & high school level	34
Source: MIRDC		

One of the top priority agenda of the Philippine Government is the development of human resources to achieve the goal of having highly trained and skilled manpower that can contribute to the achievement of Philippine industrialization in the future. These agenda are highlighted in the current Medium-Term Philippine Development Plan 2004-2010. Therefore, the continuing work of the MIRDC in upgrading the technical levels of technicians and engineers in the tool and die industry is considered vital. Along this line, the MIRDC continues to enjoy a policy support from the national government, and as such, strengthens the institutional sustainability aspect of the project.

As to the mechanisms to help sustain project activities, the MIRDC maintains very close relations with the private industry sector such as the Philippine Die and Mold Association (PDMA) and the Metalworking Industry Association of the Philippines (MIAP) and the Philippine Metalcasting Association, Inc. In addition, MIRDC maintains a working partnership with the TESDA (Technical Education Skills Development Authority, a government agency attached to the Department of Labor and Employment): (i) trainers of TESDA are continually trained by MIRDC staff, (ii) MIRDC staff assists TESDA in prioritizing and formulation of the occupational trade skills and competency assessments, and (iii) in evaluating the curricula of different vocational schools applying for accreditation. From time to time, MIRDC technical personnel are tapped by various vocational schools as jurors during skills competitions. These institutional linkages and cooperation also help enhance organizational stability and sustainability of MIRDC.

3.1.3 Financial sustainability

The financial sustainability aspect of the project is likewise secured. MIRDC (i) gets a regular budget from the national government every year, (ii) earns revenues through its training and seminars and consultancy services, and (iii) gets “grant subsidies” from the DOST.

From the national government, MIRDC gets a yearly budget ranging from 92 million to 96 million pesos during the project cooperation period. This budget comes from the General Appropriations Act (GAA) legislated by the Philippine Congress every year. The release of the budget is directly made to MIRDC by the Department of Budget and Management (DBM). This yearly budgetary allocation from the national government is used by MIRDC to pay for the salaries of the MIRDC staff and its operations and maintenance of facilities and equipment. The budget allocation from the national government to MIRDC has been increased to more than 100 million pesos every year starting in 2002. But this gradually decreased due to the budget tightening measures adopted by the government in view of the huge budget deficit the national government is presently encountering (see Table 3). However, the decreasing budget, which is, by the way, still above the 92 to 96 million average per year when the project was still implemented, has not significantly influenced the achievement of the overall goal of the project. The decrease has indeed limited the MIRDC to purchase new and advanced equipment but since most of the donated equipment are still usable and applicable for technology transfer, the decline of budget allocation had not adversely affected the MIRDC operations.

In terms of revenues earned through training and consultancy services, MIRDC raises an average of 30 million pesos per year. These revenues however are remitted by MIRDC directly to the Bureau of Treasury (BoT) to sustain other government projects and for which MIRDC has no control over planned expenditures.

An average of 10 million pesos every year is received by MIRDC from DOST as “grant-in-aid” for the purchase of accessories, fabrication, repairs and maintenance of equipment.

Over the last 35 years, MIRDC has been consistently provided with the necessary budget from the national government and that this budgetary support can be expected to continue in the future.

Table 3: Budget and revenues of MIRDC

Year	Budget (from national government)	Revenues (from training & consultancy)
During project cooperation period	Ranging from 92.0 to 96.0 million a year	
2002	110.5 million	29 million
2003	104.8 million	29.891 million
2004	101.9 million	24.33 million
2005	101.9 million	No data
Source: MIRDC		

3.1.4 Sustainability of project effects

Based on the results of the final evaluation conducted in March 2002, it was reported that the Project Purpose of providing training and technical support related to Plastic

Molding Tool Technology has been successfully achieved. Even after the cessation of JICA assistance in 2002, the Center was able to sustain project effects by regularly offering short-term training courses on design, CNC milling and plastic injection molding, machine programming and operation, etc. aside from the technical consultancy services provided by the project counterparts to the tool and die industry. These training and technical support services have been evaluated positively by the industry including the participants to the Center's training programs based on the training evaluation reports and impact assessment conducted by the Industry Assistance Division of MIRDC.

In terms of applicability of skills transferred by the project particularly in the fields of mold design, mold processing and mold assembly and trial shot and maintenance, the survey revealed that former project counterparts are able to continuously apply the knowledge and skills they acquired from their training in Japan. This is shown by the fact that these former project counterparts now serve as resource persons in the various training programs of the Center. The counterpart staff have also continuously assisted quite a number of clients from the industry in the area of machine operation and trouble shooting, plastic mold design, machining and processing.

In terms of receiving further training after the project ended in 2002, the survey revealed that none of them were sent abroad for further training. However, the project counterpart personnel attend seminars conducted by JETRO experts, participate in conferences and symposia sponsored by the industry associations in cooperation with MIRDC, and actively participate in the Center's activities and programs.

It is apparent that the sustainability of project effects is ensured considering the fact that the Center is the only government agency serving the needs of metals and allied industries through its comprehensive training programs and consultancy services. With the launching of the Small Enterprises Technology Upgrading Program or SET-UP in 2003, the Center will be able to continuously provide the necessary technological interventions for the upgrading of facilities and technical competencies of SMEs in the tool and die industry including those of the plastic molding tool sector. The SET-UP was conceived by the DOST as a strategy to encourage and assist micro, small and medium-scale enterprises (MSME's) in adopting technological innovations to enhance operational efficiency and boost their productivity and competitiveness. The program aims to empower firms by addressing its technical problems through technology transfer and technological interventions.

3.2 Impact

3.2.1 Impact attained at the Overall Goal level

The impact of the technical cooperation on the individual counterpart staff of MIRDC was highly significant, such that, compared to the time when the technical cooperation was not yet implemented, they can now be considered highly competent in delivering lectures during trainings and in providing technical consultancy or advisory services to small and medium enterprises of the industry.

The results of the survey at the micro, small and medium companies whose technicians received training and consultancy services from MIRDC revealed that the basic knowledge and skills on plastic molding were useful. However, there is need for more

advanced technologies using modern equipment in order to effectively compete with others in the industry and to appropriately respond to market demands. As such, acquisition by MIRDC of such technologies and technology demonstration equipment including the development of related curricula becomes more relevant and demanding.

If viewed from the angle of the original statement of the project's overall goal (...upgrading the technical level of engineers and technicians in the tool and die industry...), the impact of the technical cooperation in the whole tool and die industry may be considered small because the die and tool industry comprises many varied fields, to which plastic molding is only a small part. However, if the overall goal of the project is interpreted as "improvement of the Philippines' technical capability in the field of mold for plastic", then, the positive contribution of the technical cooperation in the plastic molding sector of the tool and die industry is highly significant. All of the respondents to interviews, focus group discussions and survey questionnaires expressed that the trainings received from the project were useful to their respective work and noted that their levels of skills on plastic molding have been upgraded after having received advice or training from the project. The President and officers of the Philippine Die and Mold Association, when interviewed, expressed that, compared to 10 years ago (when the project was not yet implemented), the products of small companies in the field of plastic molding are of better quality. They attributed this improvement to the continuing MIRDC training and consultancy services, which were made possible through the project.

Box 1: Statement on the impact of technology transfer

“The company I am working with is small. But after applying the techniques on plastic molding I learned from MIRDC trainings, the number of our clients and buyers started to increase, appreciating the good quality of our products sold at cheaper price.”

Statement of an engineer of an SME who received training from MIRDC, January 2006.

3.2.2 Impact not anticipated at project completion

The impact generated by the project which was not formally anticipated at project completion is the increase in MIRDC revenues derived from training and consultancy fees (see Table 3). This manifests that the number of MIRDC clients have increased to which the MIRDC's information campaign about its technical services had been effective. The MIRDC's sustained relationship with TESDA and the industry associations has contributed to the effective promotion of MIRDC services.

Table 4: Number of training and total participants

Year	Title of training	Total participants
2002 (July-December 2002)	CNC Milling	65
	Application of CAD/CAM	42
	Basic Mold Design for Injection Molds	13
	Plastic Injection Molding, Machine Programming and Operation	76
	CNC Milling with A/C on CNC EDM Sinking and Wire Cutting	13
	CNC EDM Programming and Operation	<u>39</u>
		248

2003	Plastic Injection Molding, Machine Programming and Operation	49
	Basic Mold Design for Injection Molds	6
	CNC Milling	78
	Application of CAD/CAM	<u>26</u>
		159
2004	Basic Mold Design for Injection Molds	23
	CNC Milling	148
	Basic CMM Operation	8
	Technical Drawing with Introductory CAD/CAM and Rapid	3
	Prototyping	11
	CNC VMC	15
	CNC EDM Programming and Operation	<u>27</u>
	Application of CAD/CAM	235
2005	CNC Milling	135
	CNC EDM Sinking, Programming and Operation	6
	Basic Plastic Injection Mold Design	5
	Plastic Injection Molding, Machine Programming and Operation	184
	CNC EDM (Wire-Cutting & Die Sinking)	7
	CNC VMC	10
	Application of CAD/CAM	<u>53</u>
	400	
Source: MIRDC		

The Center was not only able to provide training and technical advisory services to technicians and engineers working for the tool and die industry but MIRDC also increased the level of awareness of the faculty staff and students of a number of vocational schools in the country. These vocational schools are potential sources of skilled employees for the tool and die industry. The MIRDC conducts regular Appreciation Courses to students of private and state colleges and universities utilizing the equipment and machineries installed at the Center.

Three years after the project cooperation ended in 2002, various new and advanced

technologies were introduced on plastic molding by the large companies of the plastic molding industry. In view of this and in order to keep the role and technical services of MIRDC more relevant to the industry, MIRDC has to continuously upgrade its knowledge and skills through participation in trainings, symposiums, fora and additional exposures to new products.

3.3 Analysis of factors affecting Impact and Sustainability

3.3.1 Factors promoting Impact and Sustainability

(1) Factors promoting Impact

Commitment and support of industry associations. One factor that promotes the impact of the project is the continued support of the members of industry associations such as the Metalworking Industry Association of the Philippines (MIAP) and the Philippine Die and Mold Association (PDMA). These two associations have been instrumental in drumming up support and creating awareness of the project to industry members such that personnel from different industries as well as from other training and academic institutions have continuously availed of the training programs of the Center. There are also private companies who avail of consultancy services offered by MIRDC to improve product quality, production process, increase productivity, etc. The recipient enterprises, particularly those small and medium scale enterprises (SME's), have greatly benefited from these consultancy services in terms of enhanced productivity and increased production efficiency. As a result, MIRDC has proven to be a reliable partner of the industry in aggressively pursuing the goal of improving the technical capability of engineers and technicians in the industry thereby increasing

productivity and enhancing competitiveness.

Through the sustained partnership of the PDMA and MIRDC, they were able to successfully host the first international exhibition cum conference in 2003 which brought together industry players of die and mold and other related industries in the country and the Asian region to promote their products and services as well as expand business networks.

(2) Factors promoting Sustainability

Priority given by government to increasing productivity and enhancing global competitiveness of the industrial sector. The current Medium-Term Philippine Development Plan gives priority to the development of human resources to achieve the goal of increasing productivity and enhancing global competitiveness of the local manufacturing sector. In pursuing this policy, MIRDC will play a key role in developing highly-skilled and globally competitive manpower through its training and technical support services to the tool and die industry.

Former project counterparts remain working at MIRDC. Of the 56 former project counterparts, 46 remain employed at MIRDC. The low turn-over of staff in MIRDC gives an indication that most of these counterparts will continue working with MIRDC in the coming years thereby ensuring the continuity of technology transfer activities as envisioned by the project.

MIRDC is the sole government agency mandated to provide training and technical advisory services to the metalworking industry. Since there is no other agency that is

capable of providing professional training and technical advice to the metalworking industry, small and medium enterprises will continue to avail of the training and consultancy services being provided by MIRDC in the coming years.

3.3.2 Factors hindering Impact and Sustainability

(1) Factors hindering Impact

Need to continuously upgrade technology by MIRDC. Although the project was able to transfer basic skills on plastic molding tool technology to project counterparts, there is a need to continuously upgrade the skills of MIRDC staff in order to keep pace with rapid technological developments in the tool and die industry. Moreover, the continuous technological change within the industry will render the equipment provided by the project obsolete such that upgrading of equipment will become necessary in the future. Currently, the limited budget of MIRDC is a hindering factor in realizing plans for upgrading of equipment and skills of staff.

(2) Factors hindering Sustainability

Lack of mechanism to ensure continuous employment of trained staff. One of the factors that hinder the sustainability of the project is the lack of mechanism or motivating factors that would make trained technicians and engineers stay with the company which hired them. Based on the interview with the President of PDMA, the manufacturing companies have no way of keeping their trained employees. To address the issue of fast turn-over or "piracy" of MIRDC trained employees, they simply have to train more employees so that when one leaves the company for a more lucrative job offer, they have a fall back. In the case of MIRDC, when an employee resigns or avails

of early retirement, government bureaucracy makes it difficult to hire a replacement. There are cases in which the item vacated by an employee who retires will no longer be allowed to be filled up.

3.4 Issues and problems

Insufficient funds for the operation and maintenance of equipment. Over the last three years, MIRDC has received budgetary allocations that are insufficient to cover the cost of maintaining, operating and upgrading the equipment installed at the Center. While MIRDC receives an annual budgetary allocation of around P100 million, 75% of this goes to salaries of employees and personnel while the remaining 25% is used for maintenance and other operating expenses which includes cost of maintaining the installed equipment at the Center. Income derived from training and consultancy services go directly to the country's coffers which are used to sustain other government projects. There is no budget for the upgrading or replacement of obsolete equipment at the Center. Likewise, the Center has not received any assistance for continuing project activities from other donor agencies.

On-going rationalization and re-organization plans of MIRDC. With the strengthening of the research and development thrust of the Department of Science and Technology, there is a possibility that the Center will focus more on promoting Research & Development (R&D) activities and the project activities will be given a low priority.

3.5 Conclusion

The project has significantly contributed in the upgrading of the technical skills of engineers and technicians in the field of mold for plastic through the various training and technical consultancy services provided by the MIRDC staff to the plastic molding companies particularly those operating under small and medium enterprise (SME) category. The technology on plastic molding learned through the project is expected to continuously spread to engineering students and vocational technicians because of the institutional linkages and working relationships the MIRDC was able to establish with TESDA and other learning institutions. The improved capability in the field of mold for plastic is considered to be the contribution of the project cooperation towards the achievement of upgrading the technical level of engineers and technicians in the whole tool and die industry in the Philippines.

Sustainability of the project is secured through the continued support of both the government and the private sector for the development of highly skilled and globally competitive manpower in the tool and die industry.

4. Recommendations and Lessons learned

4.1 Recommendations

4.1.1 For the implementing agency

- (a) To ensure the sustainability of project activities, there is need for MIRDC to study possibilities of setting-up a mechanism whereby income derived from training and technical consultancy services can be readily accessed by MIRDC for the

operations and maintenance of its facilities and equipment. At present, the MIRDC's revenues from training and consultancy services are directly remitted to the Philippines' Bureau of Treasury (BoT), which automatically form part of the national fund, to which MIRDC has no control over its utilization. Other similar centers operating under the DOST formed or were converted into Foundations, such as the Construction Management Development Foundation (CMDf). CMDf generates its own revenues through training and use the same for the operations and maintenance of its facilities and equipment. The appropriateness of a "Foundation" system to MIRDC's situation however cannot be ascertained at this time, thus the need for MIRDC to study such approach and other possible options.

- (b) To make the project outcomes more beneficial to the industry, there is need for MIRDC to advance its basic technologies on plastic molding and upgrade its obsolete equipment. But because of the huge budget deficit the Philippine government is presently encountering, MIRDC will not be provided by the national government with the necessary budget for technology advancement and equipment upgrading. In view of this, MIRDC shall study the possibility of exploring other possible sources of funding assistance for such purpose.

4.1.2 For JICA

In order to strengthen the positive gains produced by the project, JICA may wish to study the possibility of providing a follow-up support for the upgrading of equipment and enhancing the skills of technical staff of MIRDC in view of the rapidly advancing

technological innovations in the plastic molding sector of the tool and die industry.

4.2 Lessons learned

- (a) Strong partnership between the government and the private sector particularly the stakeholders and other beneficiaries of the project is vital for the sustainability of project effects. This partnership, together with the commitment and support of the private sector, will redound to the achievement of purpose and the goal of the project

- (b) Establishing the direct logical links between and among project objectives during the project designing stage helps facilitate effective project implementation and evaluation. In this project, the original statement of Overall Goal (... technical level of engineers and technicians in the Philippines' Tool and Die industry will be upgraded...) seems too high from the statement of the Project Purpose (... MIRDC will be able to provide training and technical support related to plastic molding tool technology...), considering that the whole Tool and Die industry is comprised of varied fields, to which plastic molding is only a small part. The more realistic objective statement for the overall goal of this project could have been, "to improve the Philippines' technical capability in the field of the mold for plastic", to which the Project Purpose could establish direct contributions. Then, the original statement of the Overall Goal (...upgrading of the technical level of engineers and technicians in the tool and die industry...) would have become the objective statement for the "super goal".

Project Design Matrix for Evaluation (PDMe)**PTTC on the UPGRADING PROJECT FOR PLASTIC MOLDING TOOL TECHNOLOGY**

Project Duration: September 1, 1997-August 1, 2002

Target Country: Republic of the Philippines

Implementing Agency: Metals Industry Research and Development Center

Target Group: MIRDC staff & technicians and engineers of the tool and die industry

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p>Overall Goal</p> <p>Technical level of engineers and technicians in the Philippine tool and die industry will be upgraded.</p>	<p>1. Improvement of capability of technical staff of tool and die industry</p> <p>2. Number of adopters of new tool and die technology disseminated by MIRDC.</p> <p>3. Number of clients utilizing MIRDC tool and die facilities.</p>	<p>1-2 MIRDC report on tool and die industry</p> <p>3. MIRDC marketing report</p>	<p>a. The present government policy on industrial development will be sustained.</p> <p>b. Brain drain rate will be at the moderate level. Availability of appropriate raw materials will remain stable.</p>
<p>Project Purpose</p> <p>MIRDC will be able to provide training and technical support related to plastic molding tool technology.</p>	<p>1. Level of satisfaction of individual beneficiaries</p> <p>2. Level of satisfaction of tool and die industry</p> <p>3. Number and type of new/improved technical services</p>	<p>1. Industrial Training Section report</p> <p>2. Technical and business Advisory Section Report</p> <p>3. MIRDC Marketing Report</p>	<p>a. Tool and die industry will upgrade their facilities.</p> <p>b. Course graduates will be utilized in the right place in tool and die industry.</p>
<p>Outputs</p> <p>(0) The project management system and operation of the project will be enhanced.</p> <p>(1) The machinery and equipment will be provided, installed, operated and maintained properly.</p> <p>(2) The technical level of counterpart personnel will be upgraded.</p> <p>(3) Curricula, manuals and materials for training courses for tool and die will be developed.</p> <p>(4) Training courses for tool and die industry will be developed.</p> <p>(5) MIRDC's technical support services to tool and die industry will be implemented systematically.</p>	<p>0-1 Number of staff, budget</p> <p>0-2 Number of Joint Coordinating Committee meeting</p> <p>0-3 Number of plans formulated and reviewed</p> <p>0-4 Number of project management meeting</p> <p>0-5 Number of promotional activities</p> <p>1-1 No. of machinery and equipment introduced</p> <p>1-2 Operating condition of machinery and equipment</p> <p>1-3 Number of maintenance manuals</p> <p>1-4 Number of tool holders/tooling</p> <p>2-1 Assessment by the project team</p> <p>2-2 Number of in-house seminar seminars</p> <p>3-1 Number of curricula.</p> <p>3-2 Number of manuals</p> <p>3-3 Number of materials</p> <p>4-1 Number of training courses</p> <p>4-2 Number of course participants</p> <p>4-3 Performance of participants</p> <p>4-4 Assessment by participants</p> <p>5-1 Number of technical for fora/clinic</p> <p>5-2 Number of clients</p> <p>5-3 Number of inquiries received</p>	<p>0-1 Organizational chart, accounting report</p> <p>0-2 Minutes of meeting</p> <p>0-3 Plan of operations</p> <p>0-4 Minutes of meeting</p> <p>0-5 Leaflets, press releases</p> <p>1-1 MIRDC annual inventory record</p> <p>1-2 Equipment management record</p> <p>1-3 List of maintenance manuals</p> <p>1-4 MIRDC annual inventory record.</p> <p>2-1 Evaluation sheet of technology transfer</p> <p>2-2 List of in-house seminars</p> <p>3-1 List of curricula</p> <p>3-2 List of manuals</p> <p>3-3 List of materials</p> <p>4-1 Industrial Training Section report</p> <p>5-1 Technical and Business Advisory Section report</p> <p>5-2,3 MIRDC marketing report</p>	<p>a. Trained C/P will continue to cooperate even after resigning/retiring from MIRDC</p>

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p>Activities</p> <p>0-1 Allocate necessary personnel</p> <p>0-2 Formulate plan of operations</p> <p>0-3 Make budget plan and implement properly</p> <p>0-4 Establish and operate management system</p> <p>1-1 Make facility refurbishment plan and implement as planned</p> <p>1-2 Provide, install and commission machinery and equipment</p> <p>1-3 Prepare preventive/corrective maintenance programs of machinery and equipment</p> <p>1-4 Operate and maintain facility. Machinery and equipment</p> <p>2-1 Assess technical level of C/P through lectures and on-the-job training (OJT)</p> <p>2-3 Implement technology transfer to C/P</p> <p>2-4 Evaluate result of implementation of technology transfer.</p> <p>3-1 Assess technology and training needs of tool and die industry</p> <p>3-2 Develop curricula for training courses</p> <p>3-3 Prepare manuals and materials for training courses</p> <p>3-4 Review and improve curricula, manuals and materials.</p> <p>4-1 Select main/back-up trainers from C/P</p> <p>4-2 Make training course plans</p> <p>4-3 Conduct training courses</p> <p>4-4 Evaluate trainers and training courses</p> <p>5-1 Identify necessary technical support services for tool and die industry</p> <p>5-2 Implement technical support services</p> <p>5-3 Disseminate technical information through technology fora/clinic, and publications.</p>	<p style="text-align: center;">Inputs</p> <p>(Japanese side)</p> <ol style="list-style-type: none"> 1. Dispatch of Japanese experts <ol style="list-style-type: none"> 1) Long-term experts <ol style="list-style-type: none"> a. Chief Adviser b. Admin. Coordinator c. Mold design d. Mold processing e. Mold assembly and Trial shot 2) Short term experts <p>Appropriate number of short term experts will be dispatched as necessity arises</p> 2. Philippine C/P training in Japan (a certain number of C/P per year) 3. Provision of machinery and equipment <p>4. Supporting local cost</p> <p>(Philippine side)</p> <ol style="list-style-type: none"> 1. Provision and maintenance of buildings and facilities 2. Allocation of C/P and administrative personnel <ol style="list-style-type: none"> 1) Management C/P 2) Technical C/P <ol style="list-style-type: none"> (1) Mold design (2) Mold processing (3) Mold assembly (4) Maintenance and trial shot (5) Computer maintenance 3) Supporting C/P 4) Administrative staff 3. Provision of machinery and equipment 4. Local cost <p>Necessary budget for the implementation of the Project.</p> 		<p>[Pre-condition]</p> <p>Commitment of private sectors</p>

**SUMMARY OF RESULTS OF SURVEY QUESTIONNAIRE
FOR MIRDC COUNTERPART PERSONNEL
(No. of Respondents = 9)**

ITEM	RESPONSE(S)
Degree of Involvement	Full-Time Ad-Hoc/On-call basis (1)
Task or Responsibility during project implementation	<ol style="list-style-type: none"> 1. Mold assembly. Maintenance and trial shot 2. Assist in the design of mold. 3. Monitor production. 4. Supervise technicians. 5. Assembly of molds, 6. Conventional machining 7. Study drawing. 8. Technical assistance on Injection machine operation. 9. Designing of plastic injection mold using I-CAD and Auto-CAD software. 10. Conduct of training programs and consultancy services in plastic injection mold designing and manufacturing.
Skills or ability acquired or enhanced during involvement in the Project	<ol style="list-style-type: none"> 1. Ability to identify different parts of mold and functions 2. Ability to identify and use of different kinds of plastics 3. Learned how to operate injection machine 4. Learned how to polish mold 5. Learned the proper mold assembly and disassembly 6. Value of teamwork 7. Programming using Mastercom Wire. 8. Design of plastic injection mold. 9. processing of plastic injection mold 10. Assembly of plastic injection mold. 11. Study drawing; understand the blue print drawing of mold. 12. Conventional machining. 13. Fitting of mold parts 14. Mold weld. 15. Polishing. 16. Parameter setting on Injection Machine 17. Trouble shooting of defects. 18. Machining of core and cavity of mold 19. Programming simple mold parts for machining manually. 20. Operation of CNC Milling machine. 21. Programming operation using CAD/CAM. 22. Ability to know and how to use different kinds of injection parameters. 23. Plastic Injection and mold designing. 24. Use of software such as I-CAD and Mastercam.

<p>Opportunity to apply skills after the project ended in 2002</p>	<ol style="list-style-type: none"> 1. Yes, by acting as resource person during the conduct of seminars on plastic injection molding machine, operation and programming and accepting jobs on mold fabrication. 2. By machining and processing some plastic injection molds. 3. Served as resource person in CNC Milling course. 4. Serving as resource person in plastic injection and designing and manufacturing.
<p>Training/seminar attended in Japan</p>	<ol style="list-style-type: none"> 1. Mold Assembly (IK Tool, Nagano Prefecture; July 4, 2000-Dec. 22, 2000) 2. Programming for Mold Processing (Fujitsu Fruntech, Niigata (June 4-August 3, 2002) 3. Tool and Die (IK Tool, Nagano Prefecture; Nov. 17, 1997-March 28, 1998) 4. Mold Assembly Trial Shot (Japan, June –August 2001) 5. Mold Assembly and Trial Shot (IK Tool, Nagano Prefecture; September-November 14, 1998) 6. Mold Assembly and Trial Shot (IK Tool, Nagano Prefecture; July – October 1999)
<p>Additional Skills acquired from the seminar in Japan</p>	<p>Mold Polishing Mold Assembly Injection Machine Operation Programming using Powercam software Basic Design of Plastic Injection Mold. Polishing Technique CNC Milling Welding of Mold Proper care of mold parts Correct procedure for mold assembly Plastic defects and solutions CNC EDM Operation Application of CAD/CAM Knowledge in different kinds of molds.</p>
<p>Opportunity to apply skills in line of work</p>	<p>Yes, by actual application particularly when accepting jobs requiring the skills learned in Japan. No, because we don't have Powercam software. Yes, because we have the machine/equipment to operate on at the Center.</p>
<p>Able to share skills learned to co-workers</p>	<p>Yes, by conducting in-house seminar (echo seminar) Yes, through technology transfer. Yes, by cross-training and echo seminar.</p>

<p>Major impacts of the project on MIRDC, other institutions and the plastic molding tool industry</p>	<ol style="list-style-type: none"> 1. Upgrading of skills and knowledge of personnel involved in the project such that the Center is able to conduct training programs on plastic injection 2. By being aware that there is a project on plastic molding tool technology, government and private institutions send participants to the training programs offered by the Center. 3. The computers, machineries and equipment at MIRDC were upgraded. 4. The Center is now capable of conducting seminars on plastic molding. 5. Industry stakeholders can make use of the Center's equipment at a reasonable cost. 6. MIRDC counterpart personnel are able to produce parts, design mold, fabricate molds according to the requirements of clients. 7. MIRDC counterpart personnel now have the ability to offer consulting services in machine operation and trouble shooting, designing plastic injection molds 8. MIRDC clients started to increase and there were job orders. 9. The project generated significant impact on SME's but not that much for big companies because they have more advanced equipment and machines. 10. The project was also able to upgrade the skills of technicians and engineers working in the industry especially on plastic injection mold designing and manufacturing. They are also able to apply software such as Mastercam and Solidworks.
<p>Degree level of skills improvement after the Project ended in 2002 and why</p>	<ol style="list-style-type: none"> 1. Improved to some extent because I am able to apply the skills learned through the conduct of trainings and mold fabrication for MIRDC clients. 2. Same level as in 2002. 3. Improved to some extent because I can now prepare machining program on CNC milling using CAM software. 4. Improved to some extent because I learned a lot of techniques. 5. Improved to some extent because some of the experts were not so good in their area of expertise. 6. Improved to some extent but after the project ended in 2002, CPs did not undergo continuing education program. 7. Greatly improved because of the skills I learned during the seminar I attended in Japan. 8. Improved to some extent because I have already taken training on plastic injection m old designing in

	FRIM, Malaysia thus the training from JICA is just additional input to knowledge in plastic molding.
Trainings/Seminars attended from September 2002 up to the present	<ol style="list-style-type: none"> 1. Internal Quality Audit (MIRDC, May 13-17, 2004) 2. Development of Assessment Tools (TESDA, May 4-6, 2004) 3. First Aid (MIRDC, December 5-9, 2004) 4. J-Front Skills Certification System (Don Bosco Mandaluyong, December 2004) 5. MASTERCAM-CAD/CAM (MIRDC, Feb. 3-25, 2003) 6. Mold Design (MIRDC, March 3-May 15, 2003) 7. Mold Assembly and Trial Shot and Design (MIRDC, August 23, 2004) 8. Manufacturing and Machining Technique (MIRDC, August 24-25, 2004)
Mode of acquiring new skills other than training	<ol style="list-style-type: none"> 1. Actively participate in the implementation of agency programs and projects 2. Learn from colleagues 3. Literature review, books. 4. Take graduate studies.
Ability of MIRDC to fulfill its role or mandate in the tool and die sector, particularly plastic molding	<ol style="list-style-type: none"> 1. MIRDC was not able to fulfill its role because some trained personnel have left the country for new jobs, others resigned and are now working for private companies. 2. MIRDC is able to fulfill its role because of the training programs that the Center offers to members of the tool and die industry 3. MIRDC is able to fulfill its role because the Center was able to assist companies to produce molds, or repair their damaged molds. 4. MIRDC is able to fulfill its role or mandate in the tool and die sector particularly plastic molding because the Center is committed to transfer technology through seminars.
Major challenges faced by MIRDC	<ol style="list-style-type: none"> 1. Recent developments in technology, processing, programming in Mastercam, 3D machining. 2. Machine wear and tear; lack of tools 3. Counterpart Personnel leaving MIRDC. 4. Lack of good designer. 5. High cost of labor and materials. 6. Technological innovations on Plastic injection mold designing manufacturing especially complicated and hot runner molds. 7. Lack of mold kits for its presentation of technology to private institutions.

<p>How these challenges should be addressed by MIRDC</p>	<ol style="list-style-type: none">1. Consult with the private sector.2. The Agency should address the needs of CPs.3. Hire a very good designer so that MIRDC can be capable of designing more complicated molds.4. Request more funds from the national government.5. The agency is presently analyzing to set up in-house training to gain more knowledge on plastic injection mold designing and manufacturing6. Placing CPs for on-the-job training at some companies or private institutions utilizing plastic injection mold designing and manufacturing.
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