

THE PHILIPPINE **TOOL AND DIE INDUSTRY** **A 2006 STUDY**



Department of Science and Technology
METALS INDUSTRY RESEARCH & DEVELOPMENT CENTER

FOREWORD

The Metals Industry Research and Development Center (MIRDC) conducted the 2006 Philippine Tool and Die Industry Study as an update of the previous study published in 1996. The study aimed at providing a profile and assessment of the tool and die industry's production, technical capabilities as well as issues and concerns that surround it.

The study highlights the performance of the tool and die sector for the period 2003-2005.

The publication of this study is yet another evidence of the Center's commitment to providing both the government and private sectors in the metals and engineering industry with relevant and timely information related to technologies, products, and processes.

It is the earnest hope of MIRDC that this study will serve as a guide for policy makers, planners, policy implementers, and the members of the industry in establishing policy reforms and recommendations in terms of high-end facility upgrading, human resource development, and encouraging investment incentives to fully improve the tool and die industry in the Philippines.

The collaborative effort on data collection and analysis was made possible through the hardwork of the following MIRDC staff:

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And most importantly, the major editing and objective comments provided by Dr. Danilo N. Pilar and Engr. Rey L. Rifareal as well as the unwavering support and assistance lent by MIRDC Extension Officers: Engr. Wilbert H. Balingit, PME; Engr. Richard R. Banzuela; and Engr. Benjamin V.D. Estrellado, PME.

This study is a collective undertaking of the Center—from the technical to the administrative staff whose solid support and commitment saw the delivery and completion of this publication.

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INTRODUCTION

The tool, die and mold making sector is one of the seven sub-sectors of the Metalworking Sector that has been identified and pushed to be strongly developed to accelerate the modernization of the country's metals and engineering industry. One of the factors considered is the computerization of tool and die operations and facilities of the industry. High on the list of priorities to be undertaken is the upgrading of skills as well as manpower development which will increase the competitiveness and benefit the major consuming industries such as the automotive and job shop sectors, among others.

Objectives of the Study

1. To provide an assessment of the Tool and Die Making Industry in the Philippines in view of its need for facilities upgrading, workforce skills development, and investment incentives;
2. To identify technical capability as well as issues and concerns of local tool and die shops that should be addressed by the government; and
3. To come up with an updated and consolidated information on tool and die industry that can be used as planning and programming tool to effect the development of the industry.

The National Statistical Coordination Board (NSCB), a government office headed by Dr. Romulo A. Virola, Secretary General, approved the MIRDC's 2006 Survey of the Metalworking Industry-Tool and Die Sector last 15 September 2006 with Approval No. MIRDC-0614-01 and expiration date on 31 December 2006.

Methodology

The primary data in this study were gathered through a survey made to the 170 tool and die shops identified in 2005 by MIRDC. Data were obtained through fielded questionnaires, personal interviews, and actual plant visits. Questionnaires were distributed to various regions designed to elicit responses that, on the aggregate, reflect the present performance of the industry, its structure and scope of operation, and the problems encountered in their operations.

Additional information required to assess the status of the industry were processed from various statistical sources and related industry studies generated by other government institutions.

Scope and Limitations of the Study

As with previous study, one of the persisting major problems encountered in the conduct of the survey was the difficulty in gathering data from the respondents because of their failure to keep systematic and organized records of their production and equipment acquisition. Some of the shops were also quite apprehensive about the intention of the data gatherer and subsequently declined to give the necessary information.

INDUSTRY PROFILE

Tool and die and mold making is a process that is being employed to convert raw material into a required shape using general or specialized metal machine tools. The material converted includes the following: metals, aluminum, and polymers (plastics). [1]

Tool and die making shops are basically machine shops whose operations are concentrated in the manufacture of tools, dies, molds, jigs, and fixtures. They support other metal processing shops performing pressworking, stamping, forging, die casting, and rolling operations, as well as companies engaged in plastic, glassware making, and rubber molding. A number of the larger metalworking companies have acquired in-plant tool and die and mold shops to serve their own requirements. [2]

There are 170 tool and die shops identified by the Center and 121 of them favorably responded to the survey. The primary data for the 2006 survey were generated from the 121 (71 percent) retrieved filled out questionnaires.

To support the study, secondary data were also gathered from various statistical sources and related industry studies.

The list of the respondent-shops can be found in Appendix A.

Geographical Distribution

Figure 1 on page 2 shows the geographical distribution of tool and die shops covered by the

survey. Almost half of the tool and die shops are concentrated in NCR. Region IV claims the second spot with 44 shops or 36 percent of the total surveyed shops. Region VII has 13 percent, Region III, six percent, while Region XI has the least number of respondents, two shops.

Year of Establishment

Table 1 reveals that most of the tool and die shops were established between 1986-2005. On the average, there were four shops established

Table 1. Year of Establishment

Year	No. of Shops
1951-1955	1
1956-1960	1
1961-1965	2
1966-1970	5
1971-1975	7
1976-1980	6
1981-1985	7
1986-1990	13
1991-1995	33
1996-2000	25
2001-2005	13
2007 (Existing)	8
Total	121

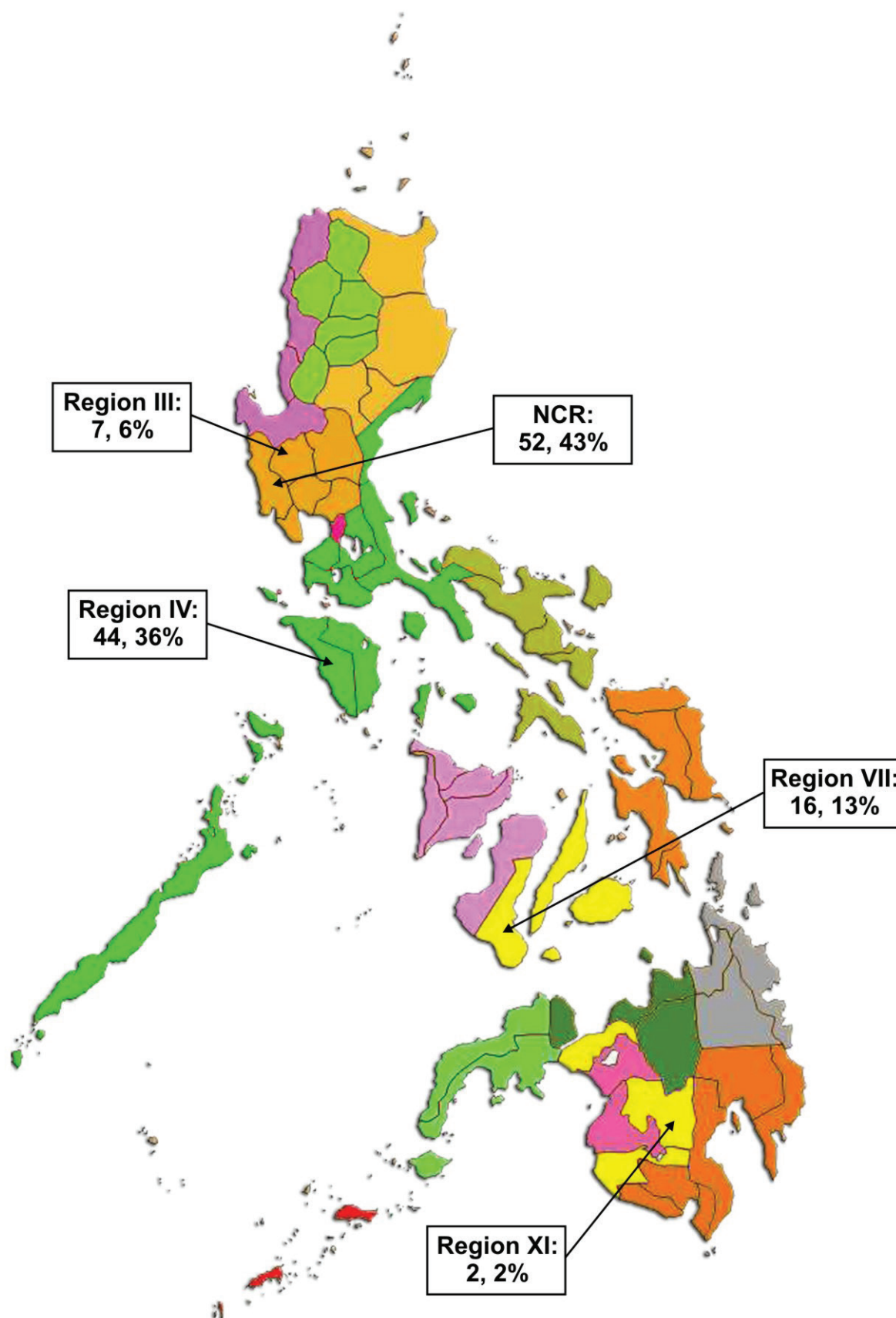


Figure 1. Geographical Distribution of Tool and Die Shops

per year during the said period while from 1951 to 1985, only one shop was being established per year.

Form of Business Organization

Shown in Table 2 are the tool and die shops classified according to form of business organization. Ninety shops or 74 percent of the total respondents are corporate in nature, of which about 44 percent were established between 1991 to 2000.

Table 2. Form of Business Organization

Category	No. of Shops	% Share
Single Proprietorship	22	18
Partnership	6	5
Corporation	90	74
Cooperative	1	1
Government	2	2
Total	121	100

Nationality of Owners

Table 3 shows the nationality of the owners of the country's tool and die shops. Filipinos own majority (77 percent) of the shops and approximately 16 percent are Japanese-owned.

Table 3. Nationality of Owners

Nationality	No. of Shops	% Share
Filipino	93	77
American	3	2
Japanese	18	16
Filipino-Japanese	3	2
Filipino-Chinese	3	2
Filipino-Taiwanese	1	1
Total	121	100

Type of Business Activity

Table 4 shows that 80 percent of the tool and die shops are independent and the remaining 20 percent are in-house. In-house shops are facilities owned by large manufacturing companies to exclusively serve their requirements for molds and dies, while independent shops are those that offer tool and die making services to other manufacturing companies.

Table 4. Type of Business Activity

Business Activity	No. of Shops	% Share
Captive (Subsidiary of a larger company)	24	20
Independent (the company itself)	97	80
Total	121	100

Business Operation

Table 5 shows that manufacturing is the most common operation that the tool and die shops are engaged with 47 percent share of the total shops. Companies that offer both activities, manufacturing and jobbing, account for 31 shops (26 percent).

Table 5. Type of Business Operation

Business Operation	No. of Shops	% Share
Manufacturing	57	47
Jobbing	18	15
Both	31	26
No Data	15	12
Total	121	100

Capitalization

The distribution of the tool and die shops according to company size based on their total assets following the DTI's classification range of company size is shown in Figure 2. Around 34 percent of the tool and die shops have assets of less than PhP 1,000,001 to PhP 10,000,000. Companies with capitalization of more than PhP 40 million, are located, as expected, in NCR, Region III and IV and account for only 12 percent of the total number of tool and die shops.

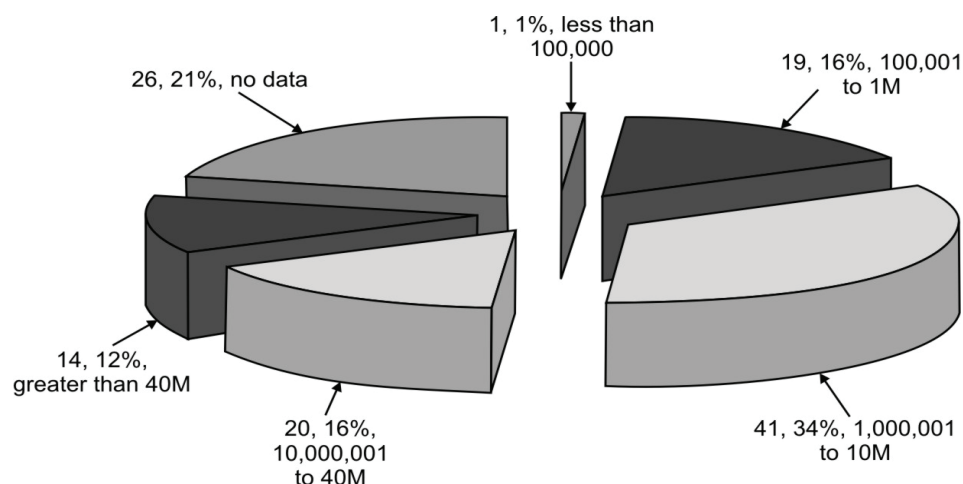


Figure 2. Capitalization

Initial Paid-up Capital

Table 6 shows that more than half or 59 percent of the respondents did not reveal their initial paid-up capital. Twenty-nine shops or 24 percent have an initial paid-up capital of PhP 100,001 to PhP 2,000,000 while 13 percent have initial paid-up capital of more than PhP 2,000,000.

Table 6. Initial Paid-Up Capital

Ranges	No. of Shops	% Share
Less than PhP 100,000	5	4
PhP 100,001 to 2,000,000	29	24
PhP 2,000,000 above	16	13
No data	71	59
Total	121	100

Additional Annual Investment

Out of the 121 tool and die shops, only 29 shops or 24 percent disclosed their additional annual investment. Seventeen shops have PhP 30,000 to PhP 1,000,000 additional annual investment. On the average, PhP 318,930 additional annual investment per shop were made in 2005. For PhP 1.1 million to PhP 18 million additional annual investment, there were 12 shops, and the average additional annual investment per shop was PhP 7,234,296.

Employment

The surveyed tool and die shops employ a total of 5,862 personnel, administrative and production personnel. Table 7 shows that 32 percent are administrative staff that include executive managers and office staff. On the other hand, Table 8 shows that around 3,969 or 68 percent are classified as production personnel. They are the technical/production workers comprised of engineers, designers/draftsman, quality control/inspection technicians, tool crib staff, laborers, research & development staff, and others such as machinist, operators, welders, fabricators, and plant maintenance. Majority of them have formal training due to the rigorous and exacting nature of the job. It also shows that there are more female employees with formal training than male employees.

Table 7. Distribution of Non-Production Personnel According to Gender

Distribution of Non-Production Personnel	Male	Female	Total
Executives/Managers	328	155	483
Other Administrative Employees	642	768	1,410
TOTAL	970	923	1,893

Table 8. Distribution of Production Personnel (Tool and Die Shop Only)

Distribution of Production Personnel (Tool & Die Shop Only)	W/ Formal Training		W/O Formal Training (i.e., skills acquired through on-the-job training and experience only)		Total	
	Male	Female	Male	Female	Male	Female
1. Engineer	132	56	87	5	219	61
2. Designer/Draftsman	99	10	51	7	150	17
3. Assembly/Die Maintenance	182	1,200	190	4	372	1,204
4. Inspector/Quality Control Technician	65	257	68	22	133	279
5. Tool Crib Staff	85	10	44	7	129	17
6. Laborers/Helpers	228	34	443	19	671	53
7. Research and Development Staff	33	5	29	5	62	10
8. Others	102	414	75	1	177	415
Sub-total	926	1,986	987	70	1,913	2,056
Total	3,969					

Table 9 details the number of tool and die employees by salary/income bracket based on their designation. Some shops did not divulge the salary/income received by their employees. A total of 2,942 employees or 74 percent of the total production personnel were classified according to their salary. About 55 percent of the profiled staff belong to the salary bracket of PhP 10,001 to PhP 15,000 and 31 percent fall within the salary bracket of PhP 10,000 and below. Only three engineers receive PhP 30,001 to PhP 35,000 income.

Based on the survey, it could be inferred that categorized engineers (66) as well as the

inspector/quality control technicians (161) receive a remuneration between PhP 15,001 to PhP 20,000. The assembly/die maintenance (1,223), research and development staff (22) receive PhP 10,001 to PhP 15,000. The designer/draftsman (48), tool crib staff (53) and laborers/helpers (494) and other production personnel (68) are paid PhP 10,000 and below.

Table 10 shows that 47 percent of the shops have one to ten non-production staff. A slight percentage (six percent) of shops employ more than 50 and these shops are owned by multinationals.

Table 9. Number of Tool & Die Employees by Salary/Income Bracket Designation

Designation	Salary/Income Bracket (PhP)							TOTAL
	10,000 and below	10,001 to 15,000	15,001 to 20,000	20,001 to 25,000	25,001 to 30,000	30,001 to 35,000	35,001 and above	
1. Engineer	18	54	66	6	11	3	6	164
2. Designer/Draftsman	48	25	28	9	5	-	3	118
3. Assembly/Die Maintenance	137	1,223	59	2	-	-	-	1,421
4. Inspector/Quality Control Technician	77	54	161	3	-	-	-	295
5. Tool Crib Staff	53	44	4	-	-	-	-	101
6. Laborers/Helpers	494	153	1	-	-	-	-	648
7. Research and Development Staff	15	22	9	2	-	-	-	48
8. Others	68	45	23	11	-	-	-	147
Total	910	1,620	351	33	16	3	9	2,942

Table 10. Number of Administrative/Non-Production Personnel

No. of Personnel	No. of Shops	% Share
1-10	57	47
11-20	20	17
21-50	10	8
More than 50	7	6
No data	27	22
Total	121	100

Table 11 reveals that 37 percent of tool and die shops employ one to ten staff and 25 percent with 11 to 20 production personnel. Only nine percent of the respondent-shops have

more than 50 production personnel and these shops are operated by multinationals.

Table 11. Number of Production Personnel in Tool and Die Shop

No. of Personnel	No. of Shops	% Share
1-10	45	37
11-20	30	25
21-50	18	15
More than 50	11	9
No data	17	14
Total	121	100

Membership to Metal Industry Organization

Out of 121 tool and die shops, there are 39 shops or 32 percent that are active members of recognized metal industry organization, local and abroad, namely:

- Philippine Die and Mold Association, Inc. (PDMA);
- Motor Vehicles Part Manufacturers Association of the Philippines (MVPMA);
- Metalworking Industries Association of the Philippines (MIAP);
- Original Equipment Manufacturers Association of the Philippines (OEMAP);
- Philippine Metalcasting Association, Inc. (PMAI);
- Japan External Trade Organization (JETRO);
- Society of Manufacturing Engineers (SME);
- Federation of Die and Mold Association (FDMA);
- Federation of Philippine Industries (FPI); and
- Cebu Center for Light Engineering and Manufacturing (CCLEM)

Some of the tool and die shops have multiple memberships on the above-mentioned organizations.

Table 12. Membership to Metal Industry Organization

Response	No. of Shops	% Share
Yes	39	32
No	82	68
Total	121	100

Research and Development (R&D)

There are only 19 tool and die shops or 16 percent that are involved in research and development; majority (59 percent) are not involved in such activity.

Standards and Support System

Fourteen shop owners or 12 percent disclosed the standards and support systems they use. They are the following:

- AS 9003 Quality System;
 - JIS;
 - CAD/CAM Automatic Production System (Hydraulics);
 - VIS for tolerance and clearance (Measurement); and
 - Production Support System (Marketing/Sales, Inventory).
- ISO 9001:2000;
 - ISO/TS 16949:2004;

Table 13. Number of Tool and Die Firms Involved in R&D

Response	No. of Shops	% Share
Yes	19	16
No	71	59
No Data	31	25
Total	121	100

MARKET PROFILE

Product Lines/Services

As mentioned in the industry profile, 97 shops are classified as independent shops that produce molds, dies, jigs and fixtures for product manufacturers. They also provide die repair services, and most of them are heavily engaged in general machining services for industrial parts. Table 14 provides the breakdown of products and services provided by both independent and in-house shops.

Twenty-four identified in-house shops produce various end products from the dies and molds they fabricate. Accordingly, eight of these firms go on to produce forgings for motorcycles, automotive, and other industrial parts. Seven firms produce plastic products, two are engaged in pressworking and stamping while another firm manufacture metal die-cast.

Local Production

Of the 121 respondent-shops, only 58 shops (48 percent) provided suitable production data for analysis. This is either due to lack of production records or because of their apprehension to reveal information for some business reasons.

As there is no fixed correlation between molds and die assembly weight and its price, this study uses "sales" as the more reliable market indicator. The production value of the 58 respondent-shops amounted to about PhP 1.45 billion. This estimate consists of local production for both the local and export market.

Of the sales volume generated in 2005, PhP 1.20 billion were manufactured by the independent shops (reported by 48 shops) accounting for 83 percent, while PhP 244.50 million

Table 14 . Product Lines/Services Offered

Product Lines/Services	No. of Shops
Simple Dies	90
Compound Dies	41
Progressive Dies	33
Jigs and Fixtures	59
Molds	31
End Products other than Tool and Die (e.g., machine spareparts, forgings, plastic components, die casts, rubber products)	43
Repair and Other Services	23

Note: Multiple answers

were produced by the in-house shops (reported by ten shops) representing about 17 percent.

Exports

Philippine exports of mold and die products in 2005 posted a 56.19 percent increase over 2003 level. In 2005, exports reached US\$ 3.13 million, up by US\$ 553 thousand over 2003 level of US\$ 2.58 million (Table 15). The increasing trend in exports earnings indicates a growing demand for such products in the foreign market.

The bulk of these die and mold products exported in 2005 were molds for rubber and plastics, which garnered 59 percent share while molds for minerals comprise 17 percent share.

Meanwhile, Table 16 reveals that Japan remains the country's top export market with total purchases amounting to US\$ 979 thousand. Exports to Japan, however, dropped to seven percent from a previous record of US\$ 1.043 million in 2004. Thailand came in second with US\$ 680 thousand, up by 89 percent from US\$ 360 thousand in 2004. China, ranked third behind Japan and Thailand, bought US\$ 295

**Table 15. Philippine Exports of Dies and Molds, By Product Type
FOB Value in US\$, 2003-2005**

	2005		2004		2003	
	Value	% Share	Value	% Share	Value	% Share
Total Exports	3,131,096	100	2,620,368	100	2,578,140	100
Dies	159,582	5.09	162,350	6.20	136,193	5.28
Molds for Metals	418,136	13.35	195,213	7.45	422,421	16.38
Molds for Glass	184,306	5.89	250,579	9.56	15,760	0.61
Molds for Minerals	526,763	16.82	273,497	10.44	119,986	4.65
Molds for Rubber and Plastics	1,842,309	58.84	1,738,729	66.35	1,883,780	73.07

Source: Foreign Trade Statistics of the Philippines, NSO

**Table 16. Philippine Export Markets of Dies and Molds
FOB Value in US\$, 2003-2005**

	2005		2004		2003	
	Value	% Share	Value	% Share	Value	% Share
Total	3,131,006	100	2,620,368	100	2,578,140	100
Top10	2,969,680	94.85	2,130,754	81.30	1,880,140	72.93
Others	161,326	5.15	489,614	18.68	698,000	27.07
Japan	979,184	31.27	1,043,657	39.83	1,198,266	46.47
Thailand	680,184	21.72	360,073	13.74	41,252	1.60
China	294,634	9.41	123,753	21.17	62,625	2.43
Myanmar	367,011	11.72	-	-	12,953	0.50
Malaysia	231,400	7.39	212,917	8.13	147,528	5.72
Israel	186,880	5.97	-	-	-	-
France	91,604	2.93	-	-	1,000	0.04
Taiwan	52,775	1.69	229,514	8.76	274,130	10.63
Hong Kong	48,835	1.56	105,773	4.04	132,331	5.13
India	37,173	1.19	55,067	2.10	10,055	0.40

Source: Foreign Trade Statistics of the Philippines, NSO

thousand worth of locally made dies and molds, up by 138 percent from US\$ 124 thousand in 2004.

Other top export markets for the Philippines are Myanmar (US\$ 367 thousand), Malaysia (US\$ 231 thousand), Israel (US\$ 187 thousand), France (US\$ 91 thousand), Taiwan (US\$ 53 thousand), Hong Kong (US\$ 49 thousand), and India (US\$ 37 thousand).

Imports

In 2005, imports of dies and molds (see Table 17) amounted to US\$ 44.38 million, an increase of nine percent from US\$ 40.71 million in 2004. Between 2003 and 2006, imports of die and molds registered an average growth rate of 5.13 percent.

Table 17. Philippine Imports of Dies and Molds, By Product Type
CIF Value in US\$, 2003-2005

	2005		2004		2003	
	Value	% Share	Value	% Share	Value	% Share
Total Imports	44,383,320	100	40,711,378	100	40,214,300	100
Dies	720,598	1.62	458,239	1.13	177,856	0.44
Molds for Metals	8,134,925	18.33	8,084,909	19.86	4,824,512	12.00
Molds for Glass	3,128,168	7.05	1,729,210	4.25	1,943,885	4.83
Molds for Minerals	2,400,142	5.42	2,523,927	6.20	1,867,999	4.65
Molds for Rubber and Plastics	29,982,487	67.58	27,915,093	68.57	31,400,052	78.06

Source: Foreign Trade Statistics of the Philippines, NSO

Table 18. Major Suppliers of Philippine Dies and Molds
CIF Value in US\$, 2003-2005

	2005		2004		2003	
	Value	% Share	Value	% Share	Value	% Share
Total	44,383,320	100	40,711,370	100	40,214,300	100
Top 10	41,563,481	93.65	37,889,609	93.07	37,103,431	92.26
Others	2,819,839	6.35	2,821,769	6.93	3,110,869	7.74
Japan	13,052,391	29.41	10,317,631	25.34	2,499,546	31.00
Korea	9,205,939	20.74	6,588,589	16.18	6,062,104	15.12
Taiwan	4,213,387	9.49	4,860,998	11.94	4,475,790	11.13
Malaysia	3,625,585	8.17	3,854,599	9.47	1,827,838	4.55
Singapore	3,317,695	7.48	4,816,021	11.83	5,863,133	14.58
USA	2,509,697	5.65	751,391	1.85	510,078	1.27
Hong Kong	2,422,185	5.46	1,775,638	4.36	2,088,200	5.19
China	2,364,355	5.33	4,405,131	10.82	2,834,902	7.05
Belgium	443,801	0.99	153,601	0.38	337,944	0.84
Thailand	408,446	0.92	366,010	0.89	603,896	2.00

Source: Foreign Trade and Statistics of the Philippines, NSO

Rubber and plastics molds constituted the largest demand for imports in 2005, taking a hefty 68 percent of total imports. Molds for metals accounted for 18 percent, while molds for glass registered seven percent, molds for mineral, five percent and dies for extruding metals accounted for two percent.

Table 18 on page 11 reveals that Japan remained the dominant supplier of imported dies and molds, accounting for 29 percent of total imports in 2005 followed by Korea, 21 percent and Taiwan, nine percent. All these countries were also dominant supplier of molds for rubber and plastics. Japan is the primary source of dies and molds for metals and metal carbides while glass molds are sourced in China and France.

Myanmar (Burma) is the main supplier of molds for minerals.

From the import data, it can be inferred that the country's manufacturing industry has been continuously dependent on imported molds and dies. The export-import ratio for 2005 alone was 1:14 (refer to Figure 3). This indicates that a substantial portion of the growing local market for die and mold products has not been supplied by the local industry. This also implies that the local manufacturers of molds and dies can expand substantially in order to support the other sectors of the country. In other words, there are ample import substitution opportunities for locally made molds and dies. [3]

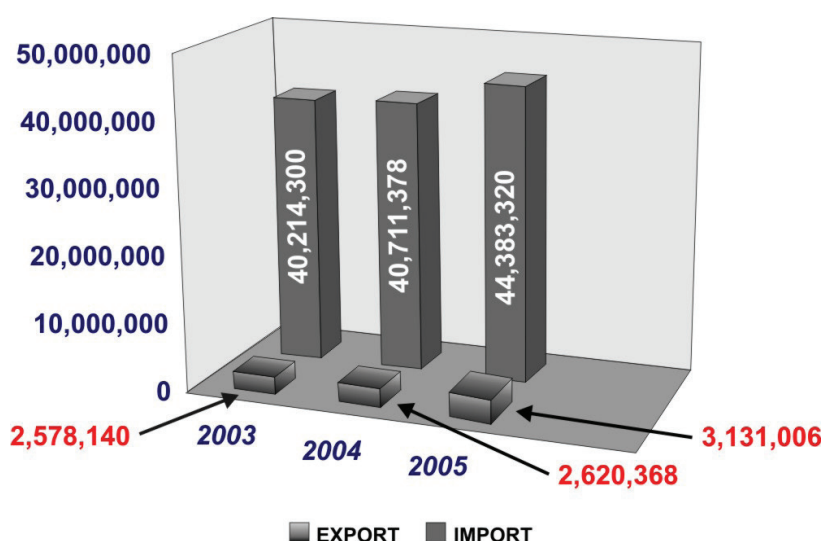


Figure 3. Tool and Die Exports & Imports, 2003-2005

Source: Foreign Trade and Statistics of the Philippines, NSO

Total Estimated Demand

In 2005, as indicated in Table 19, the total estimated demand for molds and dies was PhP 3.89 billion (US\$ 70.66M at PhP 55.085 to the dollar exchange rate). However, the local companies operating in the sector can only supply 37 percent of this huge demand. The rest of the required products come from importation. This translates into lost opportunities for the local mold and die manufactures, and in turn sets back the development of other manufacturing enterprises, which the sector supports.

Table 19. Total Estimated Demand for Molds and Dies, 2005

	PhP, Million	% Share
Production		37
Local Market	1,275.29 (A)	(33)
Export Market (US\$ 3.13M)	172.42 (B)	(4)
Importation (US\$ 44.38M)	2,444.67 (C)	63
Estimated Total Local Demand (A + C)	3,719.96	(96)
Estimated Total Demand (A + B + C)	3,892.38	

End-User Industries of Local Molds and Dies

Major end-user industries of local molds and dies are plastic manufacturing, pressworking/stamping, automotive, electronics, and appliance manufacturing. Table 20 shows the percentage distribution of end-user industries.

Table 20. Breakdown of Major End-User Industries of Local Molds and Dies

Sector/Industries	% Share
Plastic	39
Pressworking/Stamping	31
Automotive	21
Electronics	18
Appliance	10
Rubber	8
Die Casting	6
Glass Making	1
Forging	3
Others	5

Production Cost Data

The survey elicited only 32 respondents for production cost data for 2005. For presentation purposes, Table 21 shows the average breakdown of the cost components of tool and die making as reported by said respondents. Direct raw materials which consists mainly of steel for mold and die assembly account for about 34 percent of production cost, while direct labor (i.e., tool and die makers, general machinists, technicians, and engineers) represents about 23 percent. The remainder (43 percent) is categorized as overhead expenses broken into: indirect labor (administrative and supervision); power and other utilities; and other factory supplies.

Table 21. Average Breakdown of Production Cost for Tool and Die Making

Item	% Share
Direct Raw Materials	34
Direct Labor	23
Factory Overhead	43
Total	100

TECHNICAL PROFILE

The Technical Profile of this study tackles the following sub-topics:

- technical processes
- other metalworking processes employed
- die and mold assembly equipment
- other-related tool and die equipment
- metal finishing
- quality control/assurance facilities
- equipment details
 - condition
 - machine utilization
 - as purchased condition
 - age
- raw materials consumption/sourcing
- standardization

Tool and die making involves equipment-intensive operations requiring specialized machine tools, metal finishing, and quality control equipment, the product of which are molds, tools and dies, and jigs and fixtures. These products are precision metal components installed in a forming machine as a pattern to form the shape of a variety of end products which can be made of metal, glass, rubber, ceramics, or any form of the newly-developed composite materials. The equipment can be categorized into general metal machining and specialized metal machining, as shown in Table 24 on page 16.

Tool and die are generally part and parcel of other metal processing shops performing pressworking, stamping, forging, die casting,

and rolling operations as well as companies engaged in plastic, glassware making, and rubber molding.

The field of tool and die design is one of the most diversified areas in tool and die making, it comprises the following: analysis, planning, design, construction and application of tools and dies, methods, and procedures necessary to increase productivity. [4] Although majority of the business operation of the tool and die industry fall under manufacturing, the field of tool and die design is not given an emphasis as evidenced by the limited trained designers that the industry is currently producing. Table 8 shows that there are 109 tool designers, which only represents three percent of the total workforce.

After design considerations were already done, tool and die fabrication is then undertaken. After the basic process of machining of tool and die parts, they are heat treated, if necessary. The parts may also undergo metal finishing or plating to further extend its service life and improve its appearance. The parts are then subjected to quality control measurement of dimensions and hardness testing. Meeting the requirements, the parts are then assembled and measured again, tried and adjusted and then fitted into forming equipment. [5]

Technical Process

The processes that can be employed in tool and die making are either machining and/or casting. Machining is the method of removing the desired portion of metal to produce the required shapes, sizes, or surface finishes while casting shapes the molten metal through the use of molds. As to the process employed in the production of tool and die products, Table 22 shows that 103 or 85 percent of the total respondents are using machining while seven shops or six percent are employing casting.

Other metalworking processes employed by the shops are pressworking 38 percent (46 shops), heat treatment 31 percent (37 shops),

metal finishing/plating is 24 percent (29 shops) and forging seven percent (eight shops) as reflected in Table 23. Pressworking or pressing is the shaping of metals from pieces of thin sheets to form a desired shape and size through the application of a pressure to close a die. The processes include cutting, bending, and drawing operations at room or elevated temperature below the annealing temperature of the metal. Heat treatment, metal finishing/plating are processes that are applied after the tool and die process while forging is the plastic deformation of metals by an impact pressure exerted by a hammer press of an upsetting machine on anvils, in open dies or in closed dies. [6]

Table 22. Processes Employed in Production of Tool and Die Products

Process	No. of Shops	Percentage
Machining	103	85
Casting	7	6
No Answer	13	11

Note: Multiple Response

Table 23. Other Metalworking Processes Employed

Other Processes	No. of Shops	Percentage
Pressworking	46	38
Heat Treatment	37	31
Metal Finishing/Plating	29	24
Forging	8	7
No Answer	41	34

Note: Multiple Response

Die Assembly

Among the major components of the die assembly are:

1. Die set
2. Die shoe
3. Die holder
4. Die block
5. Guide posts
6. Punch holder
7. Punch
8. Pilot
9. Stripper Plate
10. Back gage
11. Front spacer
12. Finger stops
13. Automatic stop [7]

Mold Assembly

Classification of molds according to types of cavity designs:

1. Flash type
2. Positive type
3. Semi-positive type
4. Landed Plunger type
5. Sub-cavity type [8]

Equipment

Table 24 on next page shows the total number of machines used by the tool and die respondent-firms. Tool and die shops have production equipment which are categorized into general metal machines and specialized metal equipment. Under the general metal machining category, the processes employed include turning, milling, boring, grinding, and drilling. The respondents reported a total of 1,947 units, (69 percent) of the total machine tools composed of general metal machines while only 31 percent are specialized metal machines. The ratio of general metal machines to specialized metal machine tools is about 5:2. As to shop distribution of these machines, on the other hand, all tool and die shops in the industry have general purpose machines.

As revealed, there are a total of 1,354 units general metal machines composed of:

Table 24. Number of Tool and Die Equipment

Equipment	No. of Units	Sub-total	% Sub-Share	Total % Share	No. of Respondents
A. General Metal Machining					
• Lathe	251*	442	33	12	70
• Bench	102				36
• Turret	70				28
• Vertical	19				8
• Milling Machine	77*	385	28	11	24
• Universal	93				39
• Horizontal	55				18
• Vertical	160				53
• Boring Machine	8*	44	3	1	7
• Cylindrical	12				10
• Vertical/Horizontal	24				15
• Grinding Machine	41*	483	36	13	16
• Surface Grinder	339				85
• Bench Grinder	103				54
Sub-total	1,354				
B. Specialized Metal Machining					
• Copying Lathe	11	98	16	16	7
• NC/CNC Lathe	87				34
• Copy Milling	11	154	26		7
• NC/CNC Milling	143				55
• Jig Boring	9	10	2		8
• Line Boring	1				1
• Jig Grinding	8	120	20		7
• Centerless Grinding	13				8
• Profile Grinding	29				11
• Internal Grinding	14				8
• Tool and Cutter Grinder	56				35
• Electric Discharge Machining (EDM)	160	165	28		68
• Machining Centers	5				3
• Multi-Spindle Drill	15	24	4		7
• EDM Drill	1				1
• Drill Press/Drilling Machine	8				4
• Molding Machine	5	22	4		1
• Planer	4				3
• Shaper	10				7
• Pincut Facer	1				1
• Die Cast	2				1
Sub-total	593		100		
Total	1,947				
C. Other Tool and Die-Related Equipment					
• Band saw	6	50	12	1	3
• Hacksaw					1
• Shearing Machine					1
• Engraver Machine					1
• Welding Machine	10		20		8
• Heat Treatment	9		18		4
• Pressworking	25		50		4
D. Quality Control Facilities					
• Hardness Tester	60	60	4	45	56
• Atomic Absorption Spectrometer	1	1	0		
• Measuring Instruments		1,566	96		56
• a. Caliper	489				92
• b. Micrometer	795				79
• c. Height Gauge/Master	197				22
• d. CMM	31				24
• e. Toolmakers' Microscope	29				14
• f. Other Vision Measuring Machines					
• • Diprofiler	25				
• • Profile Projector					
Sub-total	1,627		100		
Total	3,624				

* No. of units are in general classification of machines

various lathe machines (33 percent) such as bench, turret, and vertical; milling machines (28 percent) such as universal, horizontal, and vertical, boring machines (three percent) classified as cylindrical and vertical/horizontal; and various types of grinding machines (36 percent) identified as surface grinders and bench grinders.

There are 593 units specialized metal machines reported by the respondents. They are categorized as such since they can perform operations as much as three times faster than the general purpose machines and they have high precision tolerances and capable of producing highly-intricate shapes. There are about 160 units (28 percent) of EDMs; 98 units (16 percent) of lathe machines (copy and NC/CNC); 154 units (26 percent) milling machines; ten units (two percent) boring machine tools (jig and line); 120 units (20 percent) grinding machines (such as jig, center-less, profile, internal and tool and cutter grinders); and 24 units (four percent) of drilling machines or drills such as multi-spindle drills, drill press/drilling machine, and EDM drill.

Among the 121 respondents, 68 shops or 56 percent are using EDM, and 11 percent are using wire-cut—showing the same percentage as that of the 1996 Tool and Die Industry Study. Several respondents disclosed that they are using advanced equipment such as Vertical Machining Centers (VMC), CNC Machining Centers, CNC EDMs, CNC EDM Wirecut, and CNC EDM Sinker. Five units of VMC, and one unit each of CNC Machining Center, CNC Wirecut Sinker, and EDM Sinker.

Machine Utilization

As shown in Appendix C, majority of the equipment are utilized between 80-100 percent. The next utilization rate is 41-60 percent.

Condition of Equipment

Of the 121 respondents, most machine tools are in good condition (96 percent or 1,342 units) while only four percent or 63 units are not operational. Refer to Appendix D.

Age of Equipment

Majority of the machines were found to be aged between 5-10 years while 112 units or 15 percent have been in operation for more than 20 years. Refer to Appendix B.

Source of Purchased Equipment

Of the total equipment reported, 51 percent or 519 units are local and 49 percent or 500 units are imported. The ratio is almost 1:1. Refer to Appendix E.

Metal Finishing

Among the 121 respondent-shops, about 31 percent or 37 shops have established their heat treatment facilities and 24 percent or 29 shops have metal finishing or plating facilities.

Quality Control/Assurance

Quality assurance and control include inspection of process and product, plus raw material inspection per international standards, ensuring on-time delivery and lower cost. Survey results show that ten percent of the workforce accounted for the QC/QA technicians. The main measuring instruments used are hardness testers, spectrometer, and other-measuring instruments such as calipers, 489 units (30 percent) and micrometers, 795 units (49 percent). Other measuring instruments are height gauge/master (12 percent), coordinate measuring machine (four percent), profiler or optical comparator (two percent).

Standardization

The standardization of tool, dies and mold components has proven to effectively reduce manufacturing costs, increase production rate, shorten delivery dates and maintain quality of required precision.

There are standards available for tool and die making (such as standards for jigs, press dies, die for die casting, molds for plastics, etc.) which can be sourced out at the Bureau of Product Standards.

Other references or source of standards used by tool and die makers are punch plastic molding special orders: standard components; design standards from JICA training; Futaba standards (for assembly guide, angular pin, ejector pin, etc.); and standard components for plastic mold and die cast from Misumi (for design of ejector pins, sprue, bushings, etc.)

Raw Materials Consumption/Utilization

The raw materials used in the tool and die industry as revealed by the survey are as follows: alloy steel; mild steel; carbides; and other metals such as stainless steel and plastic molding materials.

Only 20 percent or 24 respondents out of the surveyed shops, provided the information on prices of their raw materials, but since it varies

from one material to another, this is not sufficient to make conclusions regarding pricing.

Sixty-two percent or 75 shops procure their raw materials either from local distributors (64 percent or 48 shops) or by direct importation (36 percent or 27 respondent-shops).

PROBLEMS

The major factors that directly affect the production of the local tool and die making industry are the following: technical capability; workforce; equipment; financial; raw materials; marketing; utilities; and various government regulations. Despite the above-mentioned problems, 121 shop owners or 71 percent still managed to subsist and grow in terms of their given assets and resources.

As shown in Table 25, lack of training facilities (27 percent) and lack of support facilities (25 percent) are the major technical problems that deter the growth of the industry. Lack of design engineering facilities (20 percent) and an equal share of 14 percent for lack of technical consultancy and lack of testing facilities are the problems that trail behind. With these problems, respondents are unable to keep abreast with the latest technologies that will enable them to comply with the present quality standards of other countries.

Table 25. Technical Support

Problem Area	No. of Shops	% Share
Lack of training facilities	41	27
Lack of support facilities	38	25
Lack of design engineering	32	20
Lack of technical consultancy	22	14
Lack of testing facilities	21	14

Note: Multiple Response

Table 26. Labor/Workforce

Problem Area	No. of Shops	% Share
Lack of trained workforce	47	40
Absenteeism/tardiness	27	22
High employee turnover	20	17
Inconsistent work quality	18	15
Unreasonable unionism	7	6

Note: Multiple Response

Table 26 revealed that the shortage of trained workforce (40 percent) and absenteeism and tardiness (22 percent) were rated as the prevailing problems in the sector that greatly affect the tool and die making industry. Another human resource problem of the sector is the high employee turn over (17 percent) which tool and die shops find difficult to address due to better opportunities offered outside the industry. The study also revealed that piracy of skilled workers is one of the biggest problems of the sector. At the same time, the respondents complained about inconsistent work quality (15 percent) and unreasonable unionism (six percent).

With this present situation in the area workforce, there is an urgent

need for adequate measures to overcome the foregoing problems. Such measures, as suggested by the respondents, include the conduct of foreign and local training programs in order to improve and develop the skills and attain the level of competency of the local tool and die making industry to be globally competitive.

Table 27 shows the factors that hinder the acquisition and procurement of new equipment. The company owners expressed their concern about the continuing high prices of equipment

(39 percent) as one of the pressing problems that stunted the growth of the industry. Although the ratio of local to imported equipment as purchased is almost one, as indicated in Appendix E, still they considered repairs and maintenance as the second most prevailing problem (34 percent). They are also bothered about the difficulty of sourcing the necessary equipment (14 percent), and continue to experience problems on import and export rules and regulations, constituting 11 percent and two percent, respectively.

Table 27. Equipment

Problem Area	No. of Shops	% Share
Prices	48	39
Repairs and maintenance	43	34
Sourcing	17	14
Import rules and regulations	13	11
Export rules and regulations	2	2

Note: Multiple Response

In Table 28, difficulty in obtaining raw materials that are now much more expensive are encountered by 45 percent of the respondents. This is followed by problem in sourcing (26 percent). Most of the raw materials used in the tool and die making are imported. One respondent revealed that the raw materials

it use come from China. The concern on poor quality of locally made materials (15 percent) was rated third. These cited problems have caused the unnecessary disruption of the production activities that resulted to low output of the surveyed companies.

Table 28. Raw Materials

Problem Areas	No. of Shops	% Share
Prices	59	45
Sourcing	34	26
Quality	19	15
Import rules and regulations	16	12
Export rules and regulations	2	2

Note: Multiple Response

Table 29 shows that respondents decry the high interest imposed to them by some of the lending institutions (31 percent). The cited problem is a big burden to the industry wherein several shop owners are unable to augment their working capital through borrowings leading to the difficulty in the procurement of imported

materials and acquisition of new machines. On the other hand, problems on working capital (30 percent), sourcing of capital (16 percent), collateral (14 percent), and lack of financing institutions (nine percent) are the problems that surfaced during the survey.

Table 29. Finance

Problems Area	No. of Shops	% Share
Interest rate	31	31
Limited working capital	30	30
Sourcing	16	16
Collateral	14	14
Lack of financing institutions	9	9

Note: Multiple Response

Most of the respondents claim to suffer from sluggish market because of the factors listed in Table 30. The major cited problem is the unreasonable price competition among the tool and die shops as reported by 58 respondents (43 percent). Twenty-three percent were bothered about foreign competition, as this situation is relatively true considering the influx of imported products made from China. While it was the

perception of the respondents that the industry at this stage has a limited market (20 percent), this can be attributed to delayed economic growth they experienced in the past. Likewise, the study also revealed that their product quality (10 percent) inhibits their marketability and other respondents were dissatisfied about the distribution channel (four percent).

Table 30. Marketing

Problem Area	No. of Shops	% Share
Price Competition	58	43
Foreign Competition	31	23
Limited Market	27	20
Product Quality	14	10
Distribution Channel	5	4

Note: Multiple Response

At present, power cost is extremely high and still getting higher. As shown in Table 31, the high cost of electricity is one of the major problems of the industry. If this trend will continue, this will result to the interruption of production activities as disclosed by some shop owners. Lack of transportation is the second utility problem followed by communication that prevents access to information regarding the latest technology, awareness on the government assistance in new technologies, and processes in the business industry.

The major issue raised with regard to government assistance is the taxes imposed (56 percent). Other areas of concern are: tariff and custom procedures (22 percent) followed by tariff importation (17 percent) and the distribution channel (five percent). If promptly addressed by the government, this will result to increased business gain and strong global competitiveness.

Table 31. Utilities

Problem Area	No. of Shops	% Share
Electricity	44	58
Transportation	16	21
Communication	12	16
Water	4	5

Note: Multiple Response

Table 32. Government Regulations

Problems Areas	No. of Shops	% Share
Taxes	44	56
Customs procedures	17	22
Tariff (importation)	14	17
Distribution channels	4	5

Note: Multiple Response

FORECAST/TRENDS/VISION

In spite of the problems encountered by the industry, majority of the shop owners (41 percent) remain optimistic about the future of the industry as shown in Table 33. The study noted that only six percent are pessimistic because of the current political situation, the present economic condition, and stability of the country.

However, 28 percent of the respondents were unable to provide adequate information on this matter due to unpredictable trends of the economy.

Table 33. Prospects of Tool and Die Shop

Response	No. of Shops	% Share
Optimistic	50	41
Don't Know	16	13
Depends	14	12
Pessimistic	7	6
No data	34	28
Total	121	100

Expansion Plans

Thirty-three percent of the respondents disclosed that they are definite about their plans to expand capacity within 2–5 years in terms of technical capability, upgrading of equipment, adopt new technology and upgrading of human resource. Fifteen percent are planning to employ

new production processes and eight percent plans to invest on new products.

On the other hand, the study also revealed that 42 percent of the shop owners are no longer engaged in the tool and die fabrication because some of the customers prefer utilizing imported products specifically the appliance industry.

Table 34. No. of Shops with Expansion Plans Within the Next 2 to 5 Years

Response	No. of Shops	% Share
YES		
- additional capacity	40	33
- new production process	18	15
- new product	9	8
NO	50	41
No Data	4	3
Total	121	100

Over-all Business Outlook

Several shop owners are optimistic about the current state of the industry as 32 percent perceived an "improving" business outlook for

the current semester (July–December 2006) against previous semester (January–June 2006), while a similar business outlook for the next semester (January–June 2007) as indicated in Tables 35 and 36.

**Table 35. Business Outlook – Current Semester (July–Dec. 2006)
Against Previous Semester (January–June 2006)**

Perception	No. of Shops	% Share
Improving	38	31
No Change	24	20
Deteriorating	13	11
No Data	46	38
Total	121	100

**Table 36. Business Outlook – Next Semester (Jan–June 2007)
Against Current Semester (July–December 2006)**

Perception	No. Shops	% Share
Improving	38	32
No change	16	13
Deteriorating	10	8
No Data	57	47
Total	121	100

OTHER ISSUES AND CONCERNS OF THE TOOL AND DIE MAKING INDUSTRY

Several respondents raised some issues and concerns about the sector. If the said issues and concerns will be given attention by the concerned parties, the industry's productivity will increase. As a result, the metal sector will confidently attain globally competitive status.

- The government needs to exert effort to promote and support the industrial business by creating policies that are supportive of the needs of the industry;
- The MIRDC should closely work together with technical/vocational institutions outside Metro Manila for faculty development in the area of Tool and Die Technology;
- The Department of Science and Technology (DOST)/MIRDC should provide necessary assistance in the field of skillstraining and development to fully support the needs of industrial and metal sector;
- Government should introduce new technologies wherein they could produce sources that could generate a continuous power supply at a reasonable rate;
- Semi-government facilities are not properly utilized;
- Graft and corruption have reached the private sector;
- High cost of raw materials. Most scraps are imported from China;
- Lack of local inventors;
- Manufacturing industries are outnumbered by the fast growing call centers in the Philippines;
- Importations of products from China should be controlled in order to boost the tool and die industry;
- Conduct of foreign and local training programs in order to improve and develop skills and attain the level of competency of the local tool and die industry; and
- Government should provide an exhibition area, at a reasonable price, so that the industry can afford to market their product.

GOVERNMENT ASSISTANCE

The government institutions that offer services and assistance to address the needs and concerns of the Metals Engineering Sector are as follows:

- I.** The Metals Industry Research and Development Center (MIRDC) is tasked to provide services and assistance such as: Industrial Training, Research and Development, Prototyping and Short Series Experimental Production Services, Technology Commercialization and Consultancy Services, Testing and Quality Control Services.

The Center also disseminates information on the latest technology products, processes and markets through library sciences, publications, and business directory, among others.

➤ In January 2000 MIRDC carried out the project titled "Support to the Establishment of Precision Tool and Die Center" in order to improve the training and technical support capability of MIRDC. MIRDC trainers were able to impart their technical know-how to industry personnel. 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 personnel but also to vocational schools and university students and out-of-school youths through its linkage program.

➤ To help sustain project activities, the MIRDC maintains very close relationships with the industry sector such as the Philippine Die and Mold Association (PDMA), the Metalworking Industries Association of the Philippines (MIAP) and the Philippine Metalcasting Association, Inc. (PMAI).

➤ MIRDC maintains a working partnership with the Technical Education and Skills Development Authority (TESDA), an attached agency of the Department of Labor and Employment (DOLE), 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.

- II.** Technical Education and Skills Development Authority (TESDA)

<http://www.tesda.gov.ph> is a facility for providing online technical vocational training (TVET) services to each various clientele.

e-TESDA System and Standards
e-TESDA Services
e-TESDA Information
e-TESDA Training

III. Likewise, the 2006 Investment Priorities Plan (IPP) embodies the development thrust of the government for sustained and equitable economic growth as espoused in the 10-point agenda of the Macapagal-Arroyo Administration. The IPP is prepared by the Board of Investments (BOI), as a lead agency in promoting investments, focused on the sectors identified in the Medium-Term Philippine Development Plan (MTPDP) 2004-2010. [9]

Equity Ownership

- As a general rule, there are no restrictions on the extent of foreign ownership of export-oriented enterprises.
- For purposes of registration, domestic-oriented foreign-owned enterprises shall be allowed, provided that:
 - the project is not engaged in an activity covered under the areas specified in the Foreign Investment Negative List (FINL)*; and
 - the paid-up capital is at least the Philippine Peso equivalent of US\$ 200,000 or with minimum paid-up capital of the Philippine Peso equivalent of US\$ 100,000 provided that it (1) will evolve advanced technology as determined by the Department of Science and Technology or (2) will employ at least fifty (50) direct employees.

*The FINL is updated every two (2) years by an Inter-Agency Working Group led by the National Economic and Development Authority (NEDA).

Equity Requirement

- In general, the minimum equity required to finance the project applied for registration with the BOI shall be equal to 25 percent of project cost.
- Equity could be in the form of paid-up capital or retained earnings that has been or will be converted into paid-up capital of the applicant firm.

Regional Dispersal of Industries

The dispersal of economic activities in the countryside is encouraged. Unless provided for in these guidelines, projects

locating in the National Capital Region (NCR) are provided limited incentives. Accordingly, projects locating in Less Developed Areas (LDAs) are granted additional incentives as follows:

- Six (6) year income tax holiday (ITH) regardless of status (pioneer or non-pioneer) or type of project (new or expansion).
- Additional deductions from taxable income equivalent to 100 percent of expenses incurred in the development of necessary and major infrastructure facilities.

Exemption from the Locational Restriction

- Projects that will locate in government industrial estates declared as such by national law or by presidential proclamation prior to 01 January 1989.
- Projects that will engage in service type activities.
- Export-oriented projects.
- Modernization projects.
- New and expansion projects in support to export-oriented jewelry enterprises engaged in electroplating, gemstone appraisal and certification, assaying and hallmarking.
- Projects under the R.E.D. Program located within the premises of the firm's existing operations or contiguous thereto.
- Projects of micro and small enterprises (MSEs).

Export Activities

This covers the production/manufacture of non-traditional export products and services in support of exporters as identified under the Medium-Term Philippine Development Plan, 2004-2010 (MTPDP) or the Philippine Export Development Plan, 2005-2007 (PEDP).

To qualify for incentives, industrial goods should have undergone manufacturing. Production of industrial goods and products from recycled materials involving simple processing covering any

or a combination of activities such as but not limited to cleaning, sorting, cutting, shredding, pulverizing, grinding, crushing, compacting, dissolving, and filtration are not qualified for registration.

Assistance to Micro, Small- and Medium-Sized Projects *(In addition to the incentives under E.O. 226)*

1. Assistance in the preparation of simplified project for BOI registration;
2. Availability of an exchange and assistance facility the identified MSME support companies of a registered enterprise, thereby encouraging intra-sector linkages;
3. Technical assistance through BOI's regular programs and other supporting industries promotion program;
4. Assistance in sourcing financial report;
5. Assistance to overseas workers who will engage in MSME activities; and,
6. Promotion of specific area of economic activities that will support export and priority programs of the government that encourage inter-sector linkages.

Policies on Project Type and Status

1. New Project
2. Expansion Projects
3. Modernization or Rehabilitation Projects
4. Existing Export Projects

Projects Critical to the Environment

1. New and expansion projects shall be required to secure an Environmental Compliance Certificate pursuant to P.D. No. 1586 (Philippine Environmental Impact Statement System).
 - All projects that will involve handling, transport, processing and/or storage of toxic, hazardous substances and/or nuclear wastes shall be subject to the provisions of R.A. No. 6969 (Toxic and Hazardous Substances and Nuclear Wastes Control Act of

1990) and such other laws and/or relevant Presidential issuances.

2. Projects involving the importation of wastes for final disposal and material of no economic value to the country cannot be registered.

Industry Clusters

Industry Clusters may cover the following activities:

1. Services comprising a portion of the manufacturing process
2. Sub-assembly/fabrication of parts/components of the final product
3. Product testing and inspection
 - Compliance to ISO-IEC requirements; and
 - Accredited with the Bureau of Product Standards within the first year of registration.
4. Repair, maintenance, and calibration of machinery and equipment used by export-oriented companies utilizing high-technology processes.

SPECIFIC GUIDELINES:

Preferred Activities:

1. Motor Vehicle Products

This covers the production and/or manufacture of motor vehicle parts and components, and the manufacture or assembly of motor vehicles provided that the activity includes a program for the development of motor vehicle parts and components. This also covers the establishment and operation of Centers of Excellence that support the development of the motor vehicle industry.

- A. Manufacture of parts and components of motor vehicles; Projects complying with any of the following may qualify for Pioneer status;
 - Manufacturing of transmission, engines and tool and die for chassis and engine manufacturing;
 - Cross-border investment merger between companies across border involving a strong component

company merging with a weak Philippine-based company; Provided that surviving company will make use of Philippine facilities for global sourcing;

- Common facilities for forging parts and components of motor vehicle in compliance with Article 17, E.O. 226;
- Supporting industries for the manufacture of transmission/engine/common service facilities for forging of motor vehicle parts and components; Provided, that the supporting industries will have supply and/or service contract/s with the manufacturers of transmission/engine/common service facilities for forging of motor vehicle parts and components in compliance with Article 17, E.O. 226.
- Design customized to Asian needs in autos, trucks, and buses.

B. Machinery and equipment, raw materials and intermediate inputs in support of the activities listed the IPP.

This covers the fabrication of machinery and equipment and the production/manufacture of raw materials and intermediate inputs in support of the activities listed in the IPP.

Production of intermediate inputs involving simple processing covering any or a combination of activities such as but not limited to cleaning, sorting, cutting, shredding, pulverizing, grinding, crushing, compacting, dissolving and filtration are excluded.

Industry cluster and modernization activities as well as the establishment and operation of Centers of Excellence are limited only to the fabrication of machinery and equipment.

Incentives shall be limited to the capacities supplied to the activities listed in the IPP.

2. Electronics

This covers all segments within the value-chain structure of the industry such as original design manufacturing (ODM), electronics manufacturing services (EMS), the manufacture of electronic products (except home appliances), IC design, the manufacture of parts and components of electronic products including the inputs for the manufacture of such components, and the manufacture of production supplies (e.g., molds and dies)

1. Manufacture and test of electronic products

Electronic products include sub-assemblies and finished products which may be classified but not limited to the following sub-sectors of the electronics industry.

- a) Semiconductors
- b) Electronic Data Processing
- c) Telecommunications
- d) Communications and Radar
- e) Office Equipment
- f) Control and Instrumentation
- g) Medical and Industrial
- h) Automotive Electronics

2. Manufacture of parts and components of electronic products including the inputs for the manufacture of such components.

This covers all inputs of electronic products including the materials for the production of such parts and components.

3. Manufacture of production supplies to be used exclusively by the electronics industry.

This covers items that are necessary for the production of electronic products and its parts and components such as but not limited to molds and dies, precision tools, anti-static suits, etc.

4. Research and Development (R&D)

This covers research and development activities relating to the electronics sector.

5. IC design and its related training requirement and other design engineering services.

6. Establishment and operation of Centers of Excellence, test and other service facilities catering to the electronics industry.

Other service facilities cover activities such as repair, maintenance and calibration of production equipment, repair of electronic devices and equipment for re-export.

7. Original Design Manufacturing (ODM).

GLOBAL SCANNING OF TOOL AND DIE INDUSTRY

Asia

Gardner Publications, Inc. Website <http://www.mmsonline.com/>. 19 April 2007. [10]

The metalworking durable-goods-producing plants continued to increase by more than 10 percent (to a figure near 60 billion dollar) their purchases of new facilities/equipment last year as reflected in Table 37.

Asian competitors increased their installations of new, and more productive factory equipment—in many cases at a rate faster than in America.

China, the world's leading consuming country for the last 5 years, saw a 20-percent boost in 2006 to \$12.9 billion. This means that the value of Chinese consumption is equal to more than 21 percent of the total output of all producing countries in the annual survey.

Japan saw only a 1-percent increase in purchases last year, measured in yen. Nevertheless, that gain still was enough for Japan to firmly hold on to the No. 2 position in consumption at a strong \$7.4 billion.

Other Asian countries increased installations at a faster pace. Factories in both South Korea and Taiwan increased their spending on

Table 37. Top Producers: Value of Machine Tools Shipped, in Millions of U.S. Dollars, 2006

	Country	Output	Change, %
1.	Japan	13,522.0	8
2.	Germany	10,276.6	4
3.	China, Peoples Rep.	7,000.0	37
4.	Italy	5,451.6	11
5.	Korea, Rep. of	4,144.0	18
6.	Taiwan	3,692.0	10
7.	United States	3,625.3	5
8.	Switzerland	2,839.8	6
9.	Spain	1,242.4	10
10.	France	1,150.5	20

machine tools by 14 percent. These countries rank fifth and seventh, respectively, in the consumption listing.

India, while not quite yet in the top ten consuming nations, is sure to get there after this year. Booming industrialization continues, and consumption for 2006 came to \$1.3 billion. That figure may be only one-tenth that of giant China, but India's pace is noteworthy. Installations, measured in rupees, grew an astounding 41 percent last year. That comes on top of a 65-percent increase from 2004, which, in turn, saw a

doubling of consumption from 2003. After many years of mediocre machine-tool consumption, India is clearly skyrocketing.

Of the 29 countries in this year's survey, all but three showed an increase in consumption. Consumption, in this case what economists call "apparent consumption," is a statistic derived from taking production from a country's machine tool factories, adding its imports and subtracting its exports. What's left is assumed to have been installed—consumed—internally. [11]

Table 38. Top Consumers: Value of Machine Tools Installed, in Millions of U.S. Dollars, 2006

	Country	Consumption	Change, %
1.	China, Peoples Rep.	12,940.0	20
2.	Japan	7,432.7	1
3.	United States	6,256.7	5
4.	Germany	5,175.9	-6
5.	Korea, Rep. of	5,044.0	14
6.	Italy	3,552.9	7
7.	Taiwan	2,539.6	14
8.	France	1,611.7	7
9.	Canada	1,608.5	4
10.	Brazil	1,420.0	13

Turning to the WMT&CS's other main measure, which is output, there are several notable changes from last year. Once again, the news seems to be concentrated in Asia.

Japan continues to lead the world in production of metal cutting and metalforming machine tools with \$13.5 billion in shipments in 2006, a yen-based increase of eight percent. But more remarkable is the growth of China as a producer. The People's Republic of China's domestic machine tool industry grew 37 percent last year, as Chinese factories sought to meet a voracious local appetite that had previously been fed by imports. With estimated shipments of \$7 billion, China ranks as the world's third largest producer, behind Germany and ahead of Italy.

Other Asian producers also made significant gains. South Korea had an 18-percent boost in output last year and moved into fifth place. Taiwan, sixth, saw a 10-percent gain in 2006 to \$3.7 billion, moving ahead of the United States, which saw a 5-percent increase in production to \$3.6 billion.

The other major Asian player, India, still has modest machine tool output by Japan/China/Korea/Taiwan standards. However, 18th-ranked India has a domestic industry that, like China, is striving to meet growing internal demand; last year, its shipments grew 47 percent, the largest percentage increase of any of the 29 countries in the survey. [12]

ISTMA-AMERICAS BUSINESS CONDITIONS REPORT

*For The 6-Month Period Ending
December 31st, 2006*

The ISTMA-America Business Conditions Survey Report is a biannual geographical snapshot of business trends and conditions in the special tooling and machining sector. This survey covering the six-month period ending December 31, 2006 was conducted in February 2007. Executive summaries from the participating countries follow.

Australia

Our reporting members are concerned about offshore sourcing and find orders are "patchy" and many new tooling project release dates are being delayed. It is very clear Australian Toolmakers are under significant pressure from low cost imported. Tooling from South East Asia (mainly China) and India which is impacting the industry to a major extent and threatening its future viability. Many companies are very negative about the future of the industry in their general comments expecting substantial contraction in their coming years.

America

American factories were part of that expansion as mentioned in the topic under "Asia", but America cooled a bit in their rate of expenditure increases last year. Consumption in 2006 amounted to \$6.3 billion. That represents a respectable five-percent increase from 2005's \$5.9 billion, but it's less than the 16-percent gain the previous year or the whopping 30-percent boost coming out of the 2002 slump.

The increase in American consumption undoubtedly will continue in 2007. Machine tool orders placed by U.S. factories continue to increase, and as these orders are fulfilled, this will be reflected in the next WMTO&CS. American orders, tracked by the two Washington-area trade groups—The Association for Manufacturing Technology (AMT) and the American Machine Tool Distributors' Association—show a 2006 order level that's ahead of 2005 by 27 percent.

So once again, the United States ranks third among industrialized countries in terms of installations (see Top Consumers table in the previous section "Asia".) This puts the United States ahead of Germany, which saw a decline in expenditures last year. [13]

Argentina

During 2005 and part of 2006 an important growth was registered in the sector, but at the end of 2006 a flattening occurred in the level of activity. Not only has the sector and the economy in general surpassed the crisis that it went through from 2000 to 2002, but it has also reached the levels of the 1990's.

Growth has been driven by the automotive industry, with the launch of new models, and the food industry. Both have contributed

important developments to the local market as well as to the export market. However, the increase in the price of raw materials, the prize of standard parts, the cost of labor force, and the pressure on payment conditions exerted by the customers, are impacting the profit margins of the manufacturers of moulds, dies, control fixture and jigs.

Today, it is impossible to find skilled workers and lead times are decreasing.

Canada

Website: <http://www.ctma.com>. 05 September 2007. [14]

Ontario has the largest number of tooling companies within Canada and predominantly its manufacturing focus has been automotive related. Our sector is contracting—we are seeing employee lay-offs, reduced profits and plant closures. Currency rates and offshore sourcing have played a major role in this downturn.

A total of 33 member companies (20 percent of CTMA membership) participated in the survey. Thirty percent of respondents reported business conditions as good, very good or excellent—down from 34 percent in June 2006.

Reporting members commented that they are experiencing increased competition, poor payment conditions continue to shrink cash flow throughout the auto sector, customers are pressed for time, and conditions are the worst they have seen in this business since inception over 50 years ago.

Report find tough times in tool, die industry

Website: <http://sanfrancisco.bizjournals.com>. 05 September 2007. [15]

A recent U.S. International Trade Commission report confirms that domestic tool and die makers are being adversely affected by low-cost foreign competition and the transfer of tooling technologies to offshore producers.

However, manufacturing officials contend it is unlikely that United States-based firms will get relief from those conditions any time soon. In addition, they say, while domestic companies scramble to adapt to the tougher global environment, new product innovation is lagging and national security could be threatened.

The ITC which issued its report last month after the House Ways and Means Committee requested an investigation into the competitive conditions facing domestic tool and die makers, found that marketplace trends have put U.S. toolmakers at a disadvantage.

Chief among those conditions is the growing trend of U.S. companies, especially makers of appliances, electronics and telecommunications products, contracting projects to cheaper overseas toolmakers, particularly in Asia, where plants often operate 24 hours a day, according to the ITC report.

U.S. tooling firms are at a disadvantage to their foreign competitors, especially those in China, Portugal, Hong Kong, Taiwan and Korea, when it comes to labor costs. For example, hourly wage rates for toolmakers and tool designers in China are one-twelfth of those in the United States, while those in Taiwan are one-third, the ITC found.

In addition, a strong U.S. dollar, relative to many foreign currencies, is hurting the competitiveness of domestic toolmakers in the global market, the ITC report contends.

Cliff Shannon, president of SMC Business Councils – a Churchill, Penn-based non-profit trade association that represents more than 5,000 service, manufacturing and commercial firms—said the current industry conditions are forcing domestic tool and die makers to concentrate more on cost cutting than innovation.

Also, the competition is squeezing out a number of U.S. firms, many of which are the only ones in the country that make certain tools, dies and industrial molds, he said. Having to depend on foreign companies for those products could compromise the nation's security in the future.

"It's not only that we won't have that capability at home," Shannon said, "Where's the next generation of innovation going to come from? If they don't do it, then where is it going to come from?" Shannon said domestic tool and die makers are not afraid to compete on a global stage.

Revitalizing the U.S. tool and die industry

Frank Martin and Gary Gathen, Stamping Journal, 10 May 2005. [16]

The U.S. tooling industry has received quite a bit of press in the past few years

documenting its demise. Many people believe the rise of lower-cost tooling industries in foreign countries is the main culprit.

Unfortunately, it is not that simple. The U.S. tooling industry's future is precarious, but before we place the blame on globalization, let's consider how the industry arrived at its current state.

Understanding Root Causes

If offshoring has not been the sole cause of the industry's troubles, what has been, and what realizations must be faced as we move forward? Part of the decline in demand has been because of productivity improvements.

Unfortunately, over the last 20 years, productivity improvements were slow in coming, because the industry did not view them as required. Later in the decade, this perception changed as Tier 1 customers demanded supplier consolidation and improvement as they merged.

Four major factors have affected demand in the tool and die industry:

- 1. Fewer or delayed product launches.** The automotive product cycle has changed significantly—changes are less frequent, and design platforms are consolidated;
- 2. Increased reliability and a reduction in redundant tooling.** As the automotive industry became more confident in the capability and reliability of its tooling, many OEMs reduced the quantity of their safety tools. In most cases, redundant tooling was completely eliminated;
- 3. Part consolidation.** Combining multiple parts into one resulted in a reduction in the number of tools needed. While these tools may have become larger and more complex, overall the sum of the parts resulted in less tooling. Also, the use of common parts on more than one vehicle or vehicle platform resulted in less tool building; and
- 4. End-user productivity improvements.** While the tooling industry was increasing productivity, so were its end users. By increasing throughput at their facilities, OEMs were able to provide the same output with fewer tools.

According to the data below and Figure 4, by compounding demand reductions over the last 14 years, in 2004 the industry needed only 52 percent of the tooling that was needed in 1990. If the industry once again decreases demand by two percent in 2004, the demand in 2005 will fall to 51 percent of what was needed in 1990.

Year	Yearly Productivity Improvement (%)		Yearly Need Reduction (%)		Combined Effect (%)
1990	1	100	1	100	100
1991	1	99	1	99	98
1992	1	98	1	98	96
1993	1	97	1	97	94
1994	1	96	1	96	92
1995	2	94	2	94	89
1996	3	91	3	91	83
1997	4	88	4	88	77
1998	5	83	5	83	69
1999	6	78	10	75	59
2000	7	73	15	64	46
2001	8	67	15	54	36
2002	9	61	2	53	32
2003	10	55	2	52	29
2004	10	49	2	51	25

The data above shows the year-to-year cumulative effect of annual tooling productivity improvements and tooling need reductions.

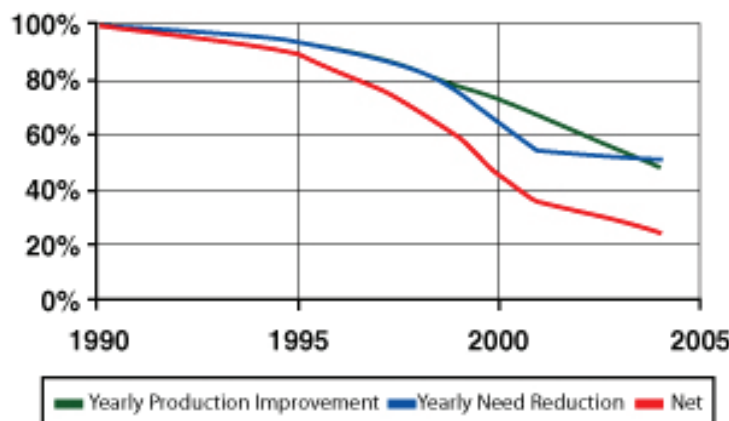


Figure 4. This graph summarizes in a graphic mode the cumulative effects of tool improvements and decline in tooling demands.

It's Time to Reorganize!

To minimize the risk of offshore sourcing of tooling, U.S. tool- and die-makers should consider taking these steps:

Recognize the Need to Add Value. Shops must identify specific products or services their customers will view as value-added. Once these

items are identified, the shop should evaluate realistically in-house capabilities. If there are value-added shortfalls, the shop must complete an analysis to determine whether it can obtain the required resources.

The difficult aspect of customer analysis is determining if customers understand the value of value-added services or products. When selling added value, shops should emphasize services such as product design, low-run production support, program management, and material development expertise.

Shorten Lead-Times. By significantly reducing lead-times, U.S. tool- and die-makers can create a competitive advantage that offshore competitors will find difficult to match. Offshore shops will be forced to expedite tooling, which increases their cost of doing business and raises their prices.

Identify Productivity Improvements. Any organization can make significant productivity improvements, which decrease costs. Many tool- and die-makers argue that concepts such as lean, one-piece flow, and cellular manufacturing are unworkable in the tooling industry. Not so.

How can a company reduce its lead-time by 50 percent without significant productivity improvements? For most companies within the industry, a 50 percent reduction in lead-time can be accomplished within three iterations of tooling. While the first tool may actually cost more, the savings realized by the second iteration reduces costs to become comparable with a normal delivery. By the third tool, costs are reduced, and the tool is delivered in half the time it took to create the first. Remember, time is money.

Scrutinize Wages and Benefits.

Although the tool and die industry has always been accustomed to ups and downs, when the demand was there, it knew it could count on good wages, regular overtime, and a good benefits package. Wages and benefits were good as companies competed to maintain a trained workforce. With so many shops to choose from, employees knew that if one company did not provide the overtime and wages desired, they could go down the street and get them from another company.

Now the labor force must come to the realization that their livelihood is at stake.

Significant changes are required to allow U.S. shops to compete on the world stage. Unfortunately, the labor force must share in these changes. New wage scales, new work rules, new benefits packages, skill enhancement, acceptance of change, and desire to compete will require all employees to modify the way they look at the industry.

Increase Demand. How can toolmakers increase demand when the business environment seemingly is doing everything it can to push the industry into the grave? Unfortunately, they can not. By changing and changing significantly, improving productivity, adding value, reducing lead-times, restructuring labor costs, and, yes, reducing prices will the industry be able to slow the escalating offshore sourcing trend.

U.S. tool- and die-makers must start thinking differently. Those who have the wherewithal to step up and are willing to offer added value to their customers will succeed. [16]

Africa

Website: <http://www.tasaweb.co.za>.
05 September 2007. [17]

The Toolmaking Association of Africa (TASA) was established in 2004 as a representative body for South African Tool Die and Mold (TDM) making industry. TASA is constituted as a national body with representation from all provinces that have significant tool, die and mould making activities. Representative is through TASA provincial structures.

TASA was a driving force in the mobilization of Natural Tooling Initiative (NTI) and will remain an important and strong stakeholder in the process of the full establishment of NTI which has a national objective the rehabilitation of South African Tool, Die and Mold Making Industry. Any company who is involved in tool, die or mould making, or supplies material to, or relies on this essential and core industry will benefit tremendously through participation in TASA structures.

Tooling is an equipment required to convert raw material into a required shaped. Tool and die and mold making is the process of equipment manufacture that aids in the conversion of a raw material into a required shaped. The material converted includes the following: metals, aluminum, and polymers (plastics).

Tooling is found in almost all manufacturing industries including aerospace, automotive, chemical, electronics, leisure, marine, medical, mining, military, packaging and sail. The manufacturing is dependent on the availability of good tool, die and mold making industry. This tools, dies, and moulds directly contributed to the following: manufacturing output capacity, quality standard, price competitiveness, and life cycle cost of a product.

Initiative

Tools, Dies, and Molds (TDM's) are core, key and critical to manufacturing competitiveness. It is essential and cross-cuts all manufacturing sectors and manufacturing technologies. These includes the following: automotive, aerospace, rail and marine, defense, mining, agro-processing, mineral beneficiation, leisure, and packaging (foodstuffs, consumer goods, and electronics).

The TDM industry is currently in distress due to the following:

1. Skills erosion and job losses;
2. Critical shortage of artisans, engineers and project managers;
3. Radical changes in competitive skills value chain;
4. Technology stagnation due to a lack of recapitalization;
5. Loss of capacity;
6. Loss of competitiveness;
7. Absence of transformation in TDM industry; and
8. Increasing imports-decreasing exports

Intervention now is critical for the short, medium- and long-term well-being of the South African manufacturing sector.

Mandated and Supported By The DTI (Africa)

The SATISI forum (South African Tooling Industry Support Initiative) jointly hosted by the CSIR and the AIDC engaged with the DTI as early as 2002 for support for the ailing South African Tool, Die and Mold making industry.

The DTI NEDLAC Fund for Research into Industrial Development Growth and Equity (FRIDGE) commissioned a research study

in 2004, to assess the status of the South African Tool, Die and Mold making industry and to recommend a Strategic Plan for the Development of an Internationally Competitive Tooling Industry in South Africa. Emphasis was also placed on job creation. The research was jointly sanctioned by the CSIR, the AIDC and TASA (representing industry), through the SATISI forum. The research was conducted by Blueprint International (Pty) Ltd. and the research report was completed in June 2005. The report is available under the TASA useful documents section. Quoting from the Executive Summary of this report:

The research has found that the South African TDM industry is not currently well positioned to take advantage of the growth opportunities available to it but that it has the possibility of adapting efficiently and effectively if an Industry Plan is adopted by all stakeholders and implemented thoroughly over the next ten years. The industry is strategically critical for South African manufacturing as an underpinning industry.

Every manufacturer in South and Southern Africa needs tools, dies or molds in order to manufacture. To the extent that this can be supplied competitively locally, this improves the competitive capability of all South African industry across the board. Equally, the industry is relatively labor intensive, and requires skills at all levels. Even if the industry did not grow, some action would be required to prevent job losses. Since many of the TDMs in South Africa are small enterprises, job creation potential is high and barriers to entry at the lower tech levels are relatively low. Finally, the TDM process is extremely high value added process. Even though the raw materials are largely imported, such substantial value is added that from a value add point of view, it is a desirable industry to support.

In April 2005, the DTI made RIZIM available to TASA, through it is ASA, through it is SSAS program (Sector Specific Assistance Scheme) in execution of the future master plan for the rehabilitation of the industry. This master plan has been completed, submitted to and accepted by the DTI.

The NTIP (Pty) Ltd. the agency created for management and execution of the SSAS program as well as for management and execution of the future master plan, is now engaged with the DTI in order to define and mobilize future support for the NTI.

Global Outlook for Mold Manufacturing

ISTMA (International Special Tooling & Machining Association) 2005

Board Meeting By Harry Moser

ISTMA BUSINESS CONDITIONS REPORT.

[18]

Tool and die/precision machining industry trends are amazingly uniform worldwide. Business is tough almost everywhere, but getting better.

The tool and die industry conditions in most of the developed and developing countries are surprisingly similar to those in the U.S. and Canada. At the ISTMA (International Special Tooling & Machining Association) 2005 Board Meeting, held in Melbourne, Australia this past June, each country reported the status of its market, focusing primarily on tool and die, and secondarily on precision machining.

The consistent message from almost all of the developed countries and many of the developing countries was:

- Manufacturing is not appreciated.
- A shortage of skilled workers.
- Volume had fallen off and has recovered the last one to two years.
- Profits are down.
- Competition from China.

(Separate reports from China also show some similarities, with skilled labor shortages, margin shrinkage and a need to increase prices to cover rising costs.)

As an example of the commonality of market conditions, see the report on Hungary. Except for the reference to Germany, the reported conditions are almost identical to what is being said in the U.S., even though wages in Hungary are approximately 35 percent of the U.S. level.

This pattern is positive. We know that our industry is essential and will survive and, in fact, continue to grow as the world economy grows. Almost all countries face similar problems. Since all will not collapse, there will be economic adjustments, such as in product pricing, currencies, etc., so that the industry will survive and prosper. Far better to know that we are all in the same boat than to find that the U.S. and Canada are in a uniquely difficult position.

Data

Specific reports from the represented countries in North and South America, Europe and Asia follow.

North America

United States of America

- Pretty busy
- Margin off
- Trend 2005 versus 2004:
 - Tool & Die, +8 percent
 - Molds, +8 percent
 - Special Machines, +15 percent
 - Precision Machining, +13 percent
 - Aerospace, +14 percent

Canada

- 80 percent located in southern Ontario
- Impacted by strong Canadian dollar and globalization
- Western provinces expanding with aerospace, oil, gas and mining
- Shortage of highly skilled people
- Ontario announced corporate tax credit of \$ 15,000 per apprentice over three years

South America

Argentina

- Busy

Europe

Germany

- Output, +60 percent in 10 years, versus +20 percent for overall industry
- Last two years a total 3 to 4 percent decline
- Dependent on the automotive industry
- 2004 exporting to:
 - 1st Switzerland

- 2nd United States of America
- 3rd Czech Republic
- 9th China
- 2004 production
 - Dies, 4.2 billion Euro
 - Injection molds, 1.6 billion Euro
 - Die cast dies, 0.2 billion Euro

Switzerland

- Similar to Germany
- Slowdown started 1st Quarter 2005
- Capacity utilization = 87.9 percent
- Turnover equals 459.6 million Euro
- Export ratio: 78.2 percent
- Exports to the U.S.: up 4.3 percent
- Number of companies: 510
- Margins down

Italy

- Business conditions generally rated good
- Losing business due to large companies shifting to Eastern Europe and Far East
- Keen price competition from China

Great Britain

- Output and orders slow
- Margins under pressure
- Domestic market for dies and molds equals 450 million, 52.9 million export
- Insufficient number of apprentice
- Fighting for better government support

Portugal

- Mold industry margins eroding
- 11 percent of production is consumed domestically
- Exported 335 million Euro, up slightly
- French market up, U.S. market down from 3rd to 5th
- Competitive in niche markets for highly complex molds

France

- Mold production = 1 billion Euro
- Employees 9,000
- 1/3 Exports, 1/3 Imports
- Business better the last six months

Spain

- OEMs moving to emerging countries
- Trading companies offering tools from emerging countries
- Exports: dies off, molds steady
- Imports: dies up 69 percent

Finland

- Year-to-date: +20 percent
- Backlog: two to three months
- Russia: market strong/becoming the major trading partner
- Hard to be profitable
- Mainly selling to domestic customers
- Skilled labor available but not in the needed locations

Czech Republic

- Dependent on automotive sector
- Generally reduced interest in technical jobs. Most recently moderate improvements due to ease of finding jobs and high average earnings

Slovenia

- Sales equals 121 million Euro
- Export = 72 million Euro

Hungary

- Lack of understanding of our industry. Concerned about: tax, regulations, energy costs, etc.
- Currently healthy, but expecting slow-down due to stagnation in Germany, especially in the auto industry
- Cost going up and increasingly tough competition from China

- Companies that are busy are typically specialists/experts in the field
- Severe reduction in the number of apprentices
- Loss of skilled workers due to retirement
- Need government incentives to invest and train

Estonia

- Going quite well
- All companies rating business conditions good or at least fair
- Average order backlog 11 weeks
- Sales up 10 percent versus '04

Asia**Japan**

- Production down over the last several years, but up 20 percent in the last year
- Auto and electrical, up
- Expect continued improvement

Korea

- Auto industry, up
- Electronics, off
- Profits, up

Taiwan

- 650 member companies
- #8 in the world by value
- Tool and mold production = 56 billion Taiwanese Dollars (approx. 1.8 billion US\$)

India

- Tooling strong
- Auto parts export booming
- Organization of the industry
- Captive toolrooms in larger companies: 600+
- Captive toolrooms in smaller companies: 6,500+

- Independent commercial toolrooms, well organized 770+
- Training/educational institutes: 50+
- Strategic partnerships with European and North American companies
- Increased aeronautical industry
- 2004/05 Production
- Category Billion of US \$
Dies: \$ 2.0
Molds: \$ 2.3
Die Cast Dies: \$ 1.0
Forging Dies: \$ 0.9

Australia

- Toolmaker shortage due to fewer apprenticeships. Recruiting overseas.

Summary/Forecast

There is confidence in an eventual adjustment of currencies because analysis shows that U.S. manufacturing is a lot more competitive versus low-wage countries than are many U.S. services and software. The advantages of low-wage countries are primarily in the area of labor cost. The cost of manufactured products (e.g., molds) includes significant material and capital (e.g., machine tool cost). Material and capital

costs are much more uniform around the world than are labor costs. Also, manufactured goods require duty, freight, inventory carrying costs and, often, rework costs.

In contrast, software and services are almost 100 percent labor intensive and require no costs similar to duty, freight, local rework, etc. As the impact on software and services becomes more severe than on manufacturing, the dollar will come down in value versus the low-wage countries. Our government, which is more responsive to the software and service sectors, will feel our pain more readily when it starts to feel the greater pain of these other economic sectors.

Four U.S. NTMA member companies and three Canadian CTMA member companies attended the ISTMA board meeting—some as board members; others as interested participants. U.S. and Canadian shops are encouraged to join NTMA or CTMA for both the local and technical benefits that these organizations provide and the international insight provided by ISTMA.

Source: ISTMA (International Special Tooling & Machining Association) 2005 Board Meeting By Harry Moser, ISTMA Business Conditions Report

Appendix A

List of Respondent-Shops

NCR – 52

Parañaque City – 11

Bromac Industrial Corporation
C.C. Barleta Machine Service Center, Inc.
HDM Technologies, Inc.
Integral Machine Tool, Inc.
Philippine Aluminum Wheels, Inc.
R. Cura Engineering
Ruarco Equipment Parts Corporation
Sanford Corporation
Solid Laguna Corporation
Toolmate Technology & Trading Corporation
Techno Molds, Inc./Polytechnique

Taguig City – 7

Far East Semiconductor and Industrial, Inc.
Gerbag Industrial Technologies, Inc.
KEBA Engineering
Metal Improvement, Inc.
Metals Industry Research and Development Center (MIRDC)
Richman Products Corporation
U-veex Corporation

Mandaluyong City – 6

Dienamiktool
ICON Metal Industries
Ner Industrial Services Corporation
Oriental Toolmaster Corporation
Richardsons Tools and Machine Shop, Inc.
Tool Exponent Services (Asia) Corp.

Caloocan City – 5

Alba Machinery and Metalcast Corporation
M.D. Juan Enterprises
Maximetal Industries
OEM Parts Manufacturing Corporation
Teknoware Engineering Co.

Valenzuela City - 5

Albert Metalcraft
Daichi Metal Products Corporation
Dies & Tips Industries of the Philippines, Inc.
Powerbilt Plastics Mfg. Corporation
Samsotite Plastic Co.

Muntinlupa City - 4

AC-10 Precision Tools, Inc.
Dash Engineering and Machine Shop
La Rota Tool and Die Services
VL Advanced Technology

Manila - 3

Metallurgical Fabricators
San Miguel Packaging Products – Manila Plastics
Three Kings Industrial Sales Corporation

Pasig City - 3

Daichi Electronics Mfg., Inc.
Evapia Precision Technology
Southbay Tooling Corporation

Quezon City – 3

Alsofi Engineering Works
C.P. Big Value Corporation
Nito Seiki Manufacturing Corporation

Malabon City - 2

Carding Metal System
First Phil. Scales, Inc.

Marikina City – 2

Abcor Industrial Corporation
Arms Corporation of the Philippines

Las Piñas City - 1

Pilfran Machine Shop, Inc.

Cavite - 20

Aries Technologies, Inc.
Creative Diecast Phil. Corp. (Makabe Alumi)
Enomoto Philippines Manufacturing, Inc.
Fatec Corporation
F.A. Industrial Services Co.
Global Moulding Technology, Inc.
HS Molding Technologies, Inc.
JF Moulds Services
K.E.A. Industrial Corporation
L. Angeles Machineries Corporation
Mitsuba Philippines Corporation
Okabe Nikon Industrial Corporation

Premier Creative Packaging, Inc.
Sankei Philippines, Inc.
Taiyo Plastic Corporation
Tri-Allied Industries
SMC Yamamura Fuso Molds Corporation
Supermolds Philippines, Inc.
RS Unitech Manufacturing and Trading Corporation
Works Bell Phils., Inc.

Laguna – 19

Ambrose Industries
Anvil Metalcasting Corporation
All Tech Industrial Machine Shop
Fujitsu Die Tech. Corp. of the Philippines
Grasco Industries, Inc.
JGA Precision Tools and Trading
ITO-Seisakusho Philippines Corporation
JM Precision Tools Corporation
Laguna Metts Corporation
Lee-Yan Fabrication & Trading Co.
Masuda Philippines, Inc.
Matex International, Inc.
Optitech Machine Tools
Plastmann Industrial Corporation
RCM Manufacturing, Inc.
Roberts Automotive & Industrial Parts Mfg. Corp.
Sagara Metro Plastics Industrial Corporation
Torres Technology Center Corporation
VL Advanced Corporation

Cebu - 16

Cebu Mold Design and Fabrication Center
Cebu Dai-ichi, Inc.
Center for Industrial Technology & Enterprise (CITE)
Filjap Trading
M&Q Plastic Products, Inc.
Machinesystems Corporation
Macropack Corporation
Mactan Parts Technology, Inc.
Micro-Toolmaster Services
Nakatomi Electric Appliance Services
Norkis Trading Company, Inc.
Philippine Kenko Corp. (Plastic Division)
Precision Machinist Corporation (Premacor)
Precision Forming Corporation
Suarez & Sons, Inc.
Suarez Bros. Metal Arts, Inc.

Bulacan – 3

Jocelyn Forge, Inc.
Dualtech Engineering
Ramcar Technology, Inc.

Pampanga – 3

Vulcan Resources, Inc.
Philippine Shin-ei, Inc.
Venzon Manufacturing Corporation

Rizal – 3

Adzer Engineering
MRM Tool and Die Master
P & R Parts and Machineries

Batangas – 2

NISSIN Precision Philippines Corporation
Sohbi Kohgi (Phils.), Inc.

Bataan – 1

Government Arsenal, DND

General Santos City – 1

Winch Construction & Engineering Services

Davao City - 1

Davao Beta Spring, Inc.

Appendix B

Number of Equipment by Age

Equipment	2001 Above	1996- 2000	1991- 1995	1986- 1990	1985 Below	Total
A. General Metal Machining						
➤ Lathe (Bench, Turret, Vertical)	40	49	26	19	42	176
➤ Milling Machine (Universal, Horizontal, Vertical)	47	40	27	16	19	149
➤ Boring Machine (Cylindrical, Vertical/ Horizontal)	8	9	2	0	1	20
➤ Grinding Machine (Surface, Bench)	51	37	37	13	33	171
Sub-total	146	135	92	48	95	516
B. Specialized Metal Machining						
➤ Lathe (Copying, NC/CNC)	17	2	11	0	0	30
➤ Milling (Copying, NC/CNC)	24	20	9	5	5	63
➤ Boring (Jig, Line)	0	2	0	0	4	6
➤ Grinding (Jig, Centerless, Profile, Internal, Tool & Cutter)	3	22	5	1	8	39
➤ Electric Discharge Machining (EDM)	31	31	5	1	0	68
➤ Multi-Spindle Drill	0	6	0	0	0	6
Sub total	75	83	30	7	17	212
Total	221	218	122	55	112	728
Percentage 37% (total no. of equipment = 1,947)						

Appendix C

Machine Utilization

Equipment	81-100%	61-80%	41-60%	21-40%	20% Below	Ave. Utilization
A. General Metal Machining						
➤ Lathe (Bench, Turret, Vertical)	67	26	59	9	13	65
➤ Milling Machine (Universal, Horizontal, Vertical)	88	23	21	27	6	70
➤ Boring Machine (Cylindrical, Vertical/Horizontal)	3	2	11	0	4	50
➤ Grinding Machine	83	31	31	32	15	64
Sub-total	241	82	122	68	38	551
B. Specialized Metal Machining						
➤ Lathe (Copying, NC/CNC)	17	17	7	0	0	75
➤ Milling (Copying, NC/CNC)	15	8	11	4	3	64
➤ Boring (Jig, Line)	1	0	3	1	1	47
➤ Grinding (Jig, Centerless, Profile, Internal, Tool & Cutter)	19	9	1	0	13	60
➤ Electric Discharge Machining (EDM)	23	9	15	6	1	68
Sub-total	75	43	37	11	18	184
Total						735
Percentage (total no. of equipment = 1,947)				38%		

Appendix D

Machine Tools by Functional Status

Equipment	Working	Nonworking	Total
A. General Metal Machining			
➤ Lathe (Bench, Turret, Vertical)	275	11	286
➤ Milling Machine (Universal, Horizontal, Vertical)	287	13	300
➤ Boring Machine (Cylindrical, Vertical/Horizontal)	32	0	32
➤ Grinding Machine (Surface, Bench)	334	10	344
Sub-total	928	34	962
B. Specialized Metal Machining			
➤ Lathe (Copying, NC/CNC)	53	4	57
➤ Milling (Copying, NC/CNC)	133	9	142
➤ Boring (Jig, Line)	8	0	8
➤ Grinding (Jig, Centerless, Profile, Internal, Tool & Cutter)	87	6	93
➤ Electric Discharge Machining (EDM)	119	10	129
➤ Multi-Spindle Drill	14	0	14
Sub-total	414	29	443
Total	1,342	63	1,405
Percentage (total no. of equipment = 1,947)		72%	

Appendix E

Number of Equipment According to Source

Equipment	Local	Imported	Total
A. General Metal Machining			
➤ Lathe (Bench, Turret, Vertical)	128	93	221
➤ Milling Machine	111	113	224
➤ Boring Machine (Cylindrical, Vertical/Horizontal)	10	17	27
➤ Grinding Machine (Surface, Bench)	176	94	270
Sub-total	425	317	742
B. Specialized Metal Machining			
➤ Lathe (Copying, NC/CNC)	16	37	53
➤ Milling (Copying, NC/CNC)	20	40	60
➤ Boring (Jig, Line)	7	1	8
➤ Grinding (Jig, Centerless, Profile, Internal, Tool & Cutter)	23	53	76
➤ Electric Discharge Machining (EDM)	28	49	77
➤ Multi-Spindle Drill	0	3	3
Sub-total	94	183	277
Total	519	500	1,019
Percentage (total no. of equipment=1,947)	52%		

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