Philippine Metal Stamping Sector Study 2013

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The Cover: Metal stamping production of CHORYO Toolings System, Inc. at Silang, Cavite.

FOREWORD

The Metals Industry Research and Development Center (MIRDC) conducted this study on the stamping sector in order that: (1) it gains recognition as an important player in the metalworking industry; (2) its issues and concerns be addressed by the government; and (3) its membership profile be established.

The study aims to provide a general profile and assessment of the metalworking sector, focusing particularly on the stamping process in terms of its production, technical capabilities as well as issues and concerns affecting the metal stamping sector.

The study highlights the performance of this specific component of the M&E industries for the period 2013.

The publication of this study is yet another proof of the MIRDC's commitment in providing all its stakeholders with relevant and timely information related to technologies, products and processes specifically for stamping.

This study shall serve as a guide for policy makers, planners and policy implementers, and the industry members in establishing policy reforms and recommendations in terms of high-end facility upgrading, human resource development and encouraging investment incentives to upgrade this sector of the metalworking industry.

The stamping sector study is an initiative of the Industry Research and Study Unit (IRSU) team compose of:

Engr. Eldina B. Pinca;
Ms. Rosalinda M. Cruz;
Mr. Jim Patrick S. Erispe; and
Ms. Concesa T. Cortez

with the leadership and guidance of Ms. Lina B. Afable, Chief of the Technology Information and Promotion Section, and in consultation with Dr. Agustin M. Fudolig, Deputy Executive Director for Technical Services.

Publication of this report would not have been complete if not for the major editing and comments provided by Dr. Danilo N. Pilar, Chief of the Technology Diffusion Division, and the unwavering support of Ms. Josephine R. Esguerra, Engr. Adonis T. Marquez and Ms. Zalda R. Gayahan, and assistance extended by Engr. Benjamin V. Estrellado, PME.

The team also tapped the assistance of the National Statistical Coordination Board (NSCB) and the National Statistics Office (NSO) for data relevant to this study.

This study, which covered several activities from regional field visits to report writing, is a collective undertaking of the Center – from the technical to administrative staff whose solid support and commitment substantially contributed to the completion of this publication.

The Center also extends its gratefulness to Engr. Romanico F. Salido who wholeheartedly contributed his knowledge in the design of the survey questionnaire used in this study and provided pieces of advise he provided for a deeper discussion of the stamping technology.

Robert O. Dizon
Assistant Secretary, DOST and
Officer-In-Charge, MIRDC

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EXECUTIVE SUMMARY

The purpose of this study is to provide the government with a clear and up-to-date profile of the metalworking industry focusing on the stamping sector: its industry profile, market profile, technical profile, forecast and trends and challenges. The primary objective of this study is thus to help identify and characterize the metal stamping industry and its main competitive advantages through a structured analysis of industry data from surveys which were carried out in 2013. This study also focuses on the technological advantages and competencies of different metal stamping companies in the Philippines while identifying the challenges at the same time to positively address the issues in this industry.

The survey was conducted to 70 out of 80 identified stamping companies. The consolidated data was obtained through fielded questionnaires from respondents. The National Statistical Coordination Board (NSCB), headed by Sec. General Jose Ramon G. Albert, approved the 2013 Survey of the Metalworking Industry – Stamping Sector last September 2, 2013 with Approval Number NSO-1234 and expiration date on August 31, 2014.

Industry profile. The incentives provided by the government to metal stamping shops that are located at industrial states and science parks have prompted majority of investors to have their shops established in Calabarzon, therefore making Region IV-A the area with most number of metal stamping operations across the nation. The largest number of stamping shops which were established between 1989 and 2004 however, can be favored by the creation and growth of businesses driven by innovation as explained by the time the Philippine government has invested on and installed science parks. The metal stamping industry is primarily organized as corporation wherein fifty percent of the metal stamping industry, which is mostly involved in manufacturing, employs 10-99 workers. Eighty-six percent of the industry is operating as independent shop and ninety-seven percent of the total workforce is comprised of direct workers. As to capitalization, though most of the respondents did not disclose their specific initial principal investment, these stamping shops were classified according to size of capital which was categorically arranged as cottage (less than Php 100,000); micro (Php100,001 – Php 1M); small (Php 1,000,001 - Php 10M); medium (Php 10,000,001 – Php 40M) and large (greater than Php 40M), wherein majority falls under the small scale category.

Market profile. Annual production trend from 2010-2012 constitute a visible upward shift which indicates that the metal stamping industry has been operating adequately towards advancement. With the caveat of the export market decline from 2008 to 2011, the metal stamping industry managed to avert it significantly as the Philippine exports of stamped products in 2012 posted an 80% increase over the 2011 level. The reason behind the improving trend should be looked into since it is currently linked to the metal stamping companies' plans for business expansion. The import figures illustrate a relatively increasing demand from 2008 to 2012. The market demand for stamped products has been steadily expanding having the automotive industry as the sector most catered by the metal stamping sector.

Technical Profile. The metal stamping industry is largely represented by companies that employ the piercing and blanking process. Based on the data gathered from the different metal stamping shops, the most common equipment used in stamping is the mechanical press. The use of such equipment can be attributed to its greater cost efficiency compared to the traditional equipments. The data collected also revealed that the respondent-companies buy both local and imported raw materials.

Forecast / Trends. The industry's prospects usually lead to the outlook of having additional product lines in general. The domestic expansion of technical capabilities of metal stamping companies may offer new opportunities for firms that have survived industry's ups and downs. The optimism shown by the respondents signifies a more promising future for the metal stamping industry in the country.

Problems. It is quite significant for the metal stamping industry to analyze the material flow to find out the links among raw materials as it becomes the topmost problem in the industry. Aside from reported material defects (e.g. corrosion and substandard quality), raw materials used in the metal stamping industry may not have been equally distributed in the Philippines which forces owners of stamping companies to source out the required materials from Manila. In addition to this, both the setback of delivery of quality products and processes through QA/QC and problem with human resource development also requires immediate attention.

With regards to global competitiveness, it appears that the metal stamping industry in the Philippines is not left behind. While the limitation of this study lies on the fact that even if respondents are generally cooperative, there are some who were not systematic and organized in revealing records of their production (i.e. some respondents fear that the Bureau of Internal Revenue would have access to this data and would go after their undisclosed taxable earnings therefore making them very hesitant to give the needed information), the data pertaining to the technological advantage of the metal stamping industry still evidently depicts a competitive industry.

INTRODUCTION

The metal stamping sector holds important growth potential for the metalworking industry. Metal stamping refers to the method of bending, clipping and molding metallic and alloy sheets into definite forms (Economy Watch, 2010) specifically involving the process of blanking, piercing, compounding dies, punching, progressive stamping, drawing, coining, forming, savaging, extruding and embossing. These procedures that are carried out in the metal stamping industry give definite form to the large metal and alloy sheets. Finer components of larger machinery, equipment and bigger metal structures are the major products of the metal stamping industry while smaller items are used as spare parts of the same machine. A stamping shop is usually part of bigger tool and die shop. Tool and die shops in various regions in the Philippines have already been established and previous studies were already conducted.

Stamping, according to Lim, Venugopal & Ulsoy (2014) is a long-established, widely used industrial process for economical high-volume production. It is used extensively in the automotive industry, as well as for production of white goods and many other products due to its low cost and high productivity. In one study conducted by Kern and Muth II (1995), particularly focusing on the multifactor productivity in the metal stampings sector, it has been identified that the aforementioned sector of the metalworking industry does not only contribute in increasing the efficiency of the production runs, but has also devoted a great deal of attention to the relationship between productivity and flexibility. For example, in place of manually bolting dies to the press bed, companies in the industry have used mechanical and hydraulic clamps to decrease time required to change dies. This procedure was done in order to make shorter production runs more feasible and as a result, firms have identified different advantages both for the mechanical and hydraulic clamps wherein the former are easier to retrofit the press for while the latter exerts force to a great extent. The mechanical clamp however, appears to be less costly than their hydraulic counterparts. Since the machinery used for pressing the metals into shapes in the metal stamping industry are said to be less expensive than those used in other similar procedures, there is possibility for metal stamping industry to outclass the traditional methods adopted to mold metals into definite shapes. If this development can be adapted locally, this study consequently considers possible advocacy programs that can be implemented by the government or other related non-government organizations to significantly strengthen the local stamping industry sector by having the same system in the Philippines.

The metal stamping sector of the metalworking industry was chosen to be the focus of the study because of significant demands in the metropolitan area. What is very special about this group is that they constantly require the application of fast-changing technologies in order to meet the demands of customers. It has to be noted that skilled personnel employed by the sector are responsible for producing component parts of final goods that are supplied to other manufacturers. Moreover, it is also useful to study an industry of mostly small-sized companies, rather than affiliates of large national corporations, wherein decision makers play an important role due to their direct involvement.

Any attempt to characterize the metal stamping industry necessarily involves some degree of generalization. The succeeding pages in this paper will discuss the metal stamping sector's industry profile, market profile, technical profile, forecast and trends and problems to further review the industry as a whole.

Organizational Structure

Table 1 shows the Regional Distribution of Stamping Shops.

As shown, majority (34 shops or 49%) of the stamping shops are located in Region IV-A, followed by NCR (20 shops or 29%). Other regions like Regions VII, III and XI constitute the remaining 22 percent of the total respondent-shops. Figure 1 reflects their geographical distribution.

Table 1. Regional Distribution of Stamping Shops

Area/Region	No. of Shops	Percent (%)
NCR	20	29
Region III	2	3
Region IV-A	34	49
Region VII	8	11
Region XI	6	8
Total	**70**	**100**

Figure 1. Geographical Distribution of Stamping Shops

The government provides incentives in terms of tax deduction[1] when stamping companies locate their shops at the industrial states/science parks. There are reasons that cause the investors to stay in the CALABARZON area namely: (1) presence of a large number of skilled people who are English speaking; (2) available support in educational and technological facilities; (3) proximity to Metro Manila which is the economic center of the country, and (4) accessibility to transportation infrastructures , among others.

Table 2 presents the Year of Establishment of Stamping Shops. As presented, the biggest number (20 shops or 29%) of shops were established between 1989 and 1996. Eighteen (18) shops, which comprise 26%, were formed between 1997 and 2004. There is only one (1) shop which was established more than 39 years ago. Other shops were established in other years as shown in Table 2. It was during the time when the government invested on and established science parks inviting industry players to stay in Philippine parks and economic zones that many stamping shops were established.

Table 2. Year of Establishment of Stamping Shops

Year Started	No. of Shops	Percent (%)
Before 1973	1	1.4
1973 - 1980	8	11.0
1981 - 1988	9	12.8
1989 - 1996	20	29.0
1997- 2004	18	26.0
2005 - 2012	9	12.8
Did Not Disclose Data	5	7.0
Total	**70**	**100**

Figure 2 illustrates the Distribution of Stamping Shops According to Form of Business. As illustrated, the stamping companies were organized predominantly as corporation (58 shops or 83%); 11 shops (16%) as single proprietorship; and 1 shop (1%) as partnership. Stamping firm owners prefer

[1] De Lima, L.B. (PEZA, 2008)

to put up a corporate type of business due to the intensive capital requirement.

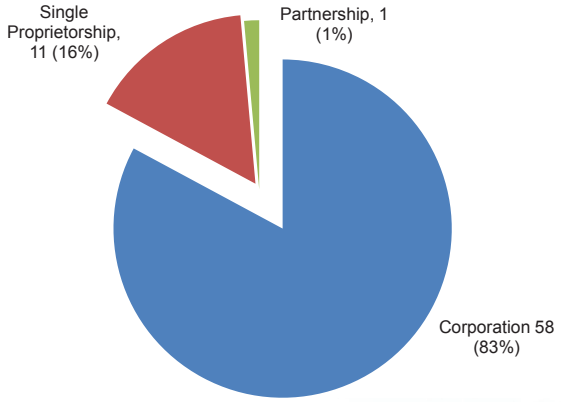

Figure 2. Distribution of Stamping Shops According to Form of Business

Figure 3 reveals the Number of Shops According to Type of Business Activity. As revealed, 60 shops (86%) of the respondent-shops are operating as independent shops; 7 shops (10%) are captive; and 3 shops (4%) did not disclose their business activity. Independent shops stand on their own and provide stamping-related services. Captive shops are shops that do not accept jobs from external customers - their services specifically cater to their own requirements. The captive shops usually maintain a high quality of service to meet the quality requirement of their company; to maintain a captive shop is costly, hence, only afforded by large companies. These are also called in-house shops.

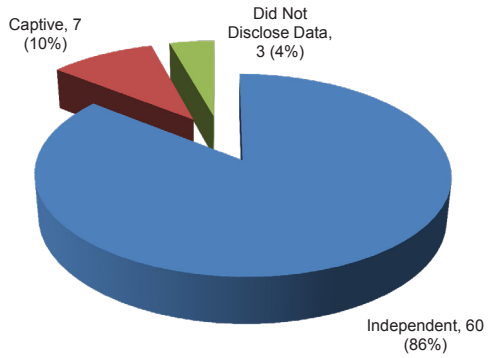

Figure 3. Number of Shops According to Type of Business Activity

Figure 4 reveals the Distribution of Shops According to Nature of Business Activity. As revealed, the stamping shops (48 shops or 69%) are largely engaged in manufacturing. This percentage indicates that there are a number of shops with certain product lines and have a regular market for their products. Of the 70 shops surveyed, 14 shops (20%) are engaged in both manufacturing and jobbing. Only a minimal number of shops are solely into jobbing activities.

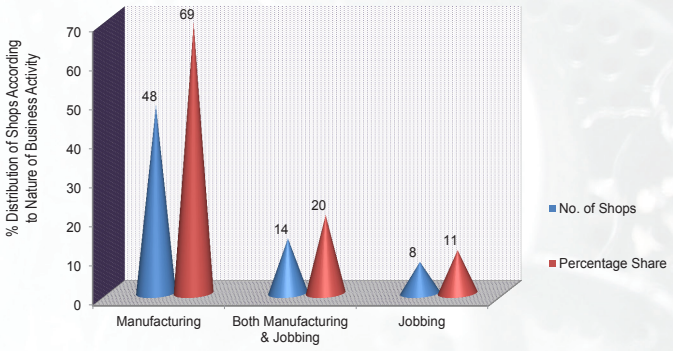

Figure 4. Distribution of Shops According to Nature of Business Activity

Capitalization

Table 3 shows the Initial Capitalization of Stamping Shops. As shown, most shops (21 shops or 30%) revealed that their initial capital is P 1,000,001 to 50 million. However, a high number of shops (47%) did not disclose their initial capital investment.

The data indicate that putting up a stamping business is indeed capital intensive. Many firms are able to shell out large amounts of investment. The same data explains why most companies are established as corporations.

Table 3. Initial Capitalization of Stamping Shops

Capitalization	No. of Shops	% Share
1 Million Pesos and Below	13	18.5
1,000,001 - 50 Million Pesos	21	30.0
50,000,001 – 100 Million Pesos	1	1.5
100,000,001 – 150 Million Pesos	1	1.5
150,000,001 – 200 Million	-	-
200,000,001 – 250 Million	1	1.5
Did Not Disclose Data	33	47
Total	70	100

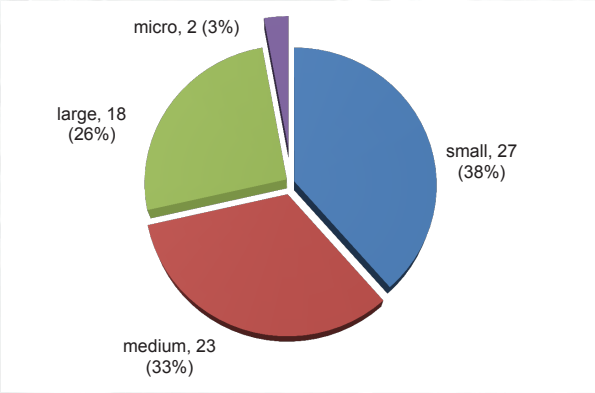

Figure 5. Classification of Shops Based on Size of Capital

Classification according to capital:

Cottage	–	less than P 100,000
Micro	–	P 100,001 – P 1M
Small	–	P 1,000,001 - P 10M
Medium	–	P 10,000,001 – P 40M
Large	–	Greater than P 40M

Figure 5 reveals the Classification of Shops Based on Size of Capital. As revealed, majority (27 shops or 38%) are classified as small-scale, followed by 23 shops (33%) medium scale and 18 shops (26%) large. Only 2 shops (3%) comprise the micro level.

Figure 6 presents the Classification of Shops According to Size of Employment. As presented, most of the shops (35 shops or 50%) belong to "small" category with only 10-99 employees. The "medium" category, with 100 - 199, is made up of 19 shops (27%). On the other hand, "large" category, those employing more than 200, make-up 13% of the respond ents and only three (3) shops or 4% make up the "micro" category or those employing only 1-9 employees. Four shops, however, did not disclose employment data.

Table 4 shows the Workforce Employed in Stamping Companies. As shown, direct workers constitute 97% of its total workforce. Direct workers are those who are engaged in production and non-production activities. Production workers are those directly performing stamping activities and other related jobs. This group also includes engineers who supervise and monitor those who are engaged in technical functions.

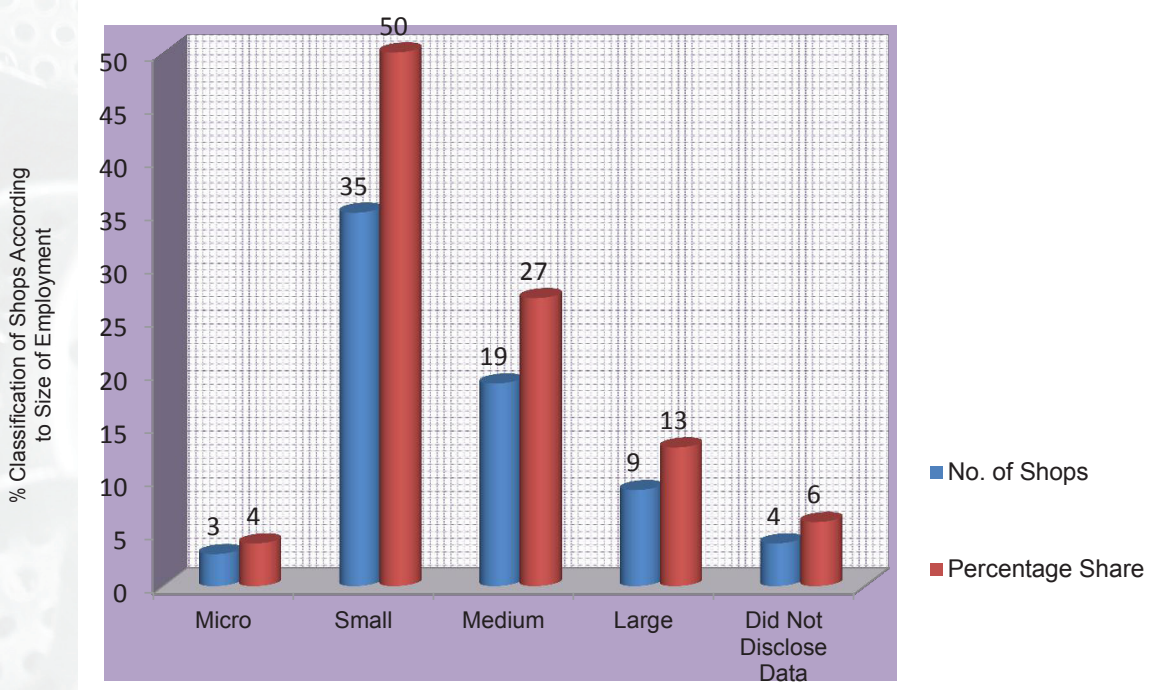

Figure 6. Classification of Shops According to Size of Employment

Figure 7 illustrates the Level of Proficiency of Workers. As illustrated, 26 shops or 37.1% gave their employees a Satisfactory rating; 20 shops (28.5%) gave a Very Satisfactory rating; 7 shops (10%) rated their employees as Excellent; and one shop (1.5%) gave a Fair rating. Sixteen (16) shops (22.9%) could not determine the performance of their workers. Most of the employees of the respondent-shops need training in quality control/quality assurance. This jives with the problem encountered by the sector in terms of product quality.

Table 4. Workforce Employed in Stamping Companies

Production	Non-Production	Contract Workers
4,125	1,574	2,048
5,699		

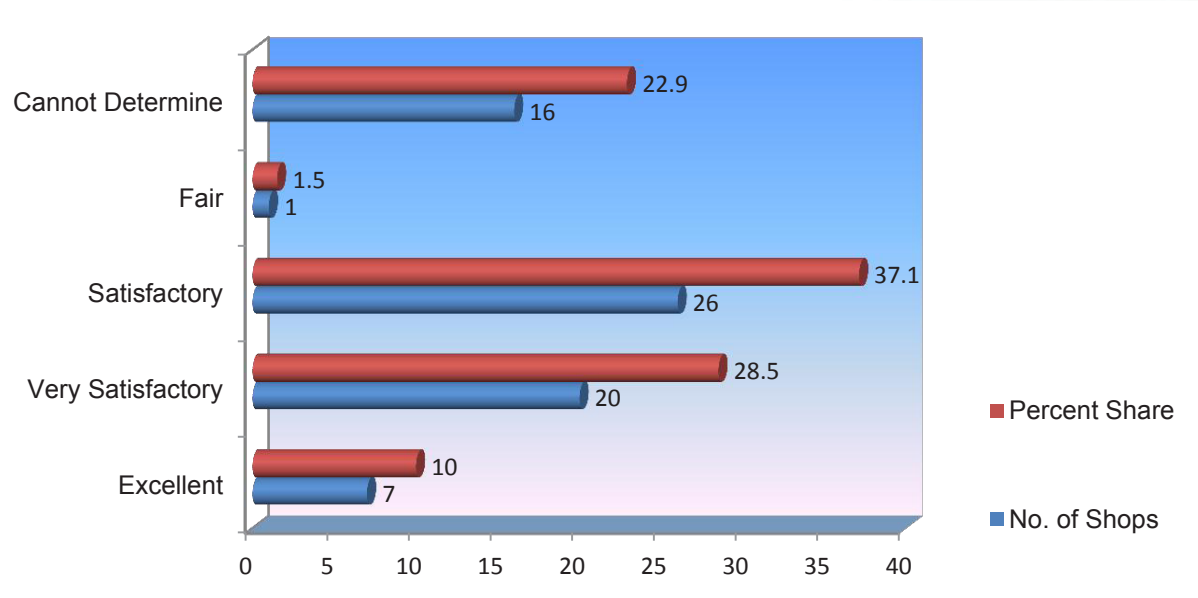

Figure 7. Level of Proficiency of Workers

Product Lines/Services Offered

Figure 8 shows the various product lines and services of the respondent stamping companies. As mentioned in the general profile, 60 companies or 86% are classified as independent shops. These independent shops produce molds, dies, jigs and fixtures for product manufacturers. Of this, 47 shops or 67% have tool and die, or machining and fabrication shops.

Local Production

Figure 9 presents the 2013 Average Total Annual Production of the Respondent-Companies. As presented, production of the surveyed stamping shops for the past three (3) years has been improving for most respondent-companies. Only 53% of the surveyed shops gave a response to the question on production data. However, only 31 or 44% were able to reveal their production and disclose data

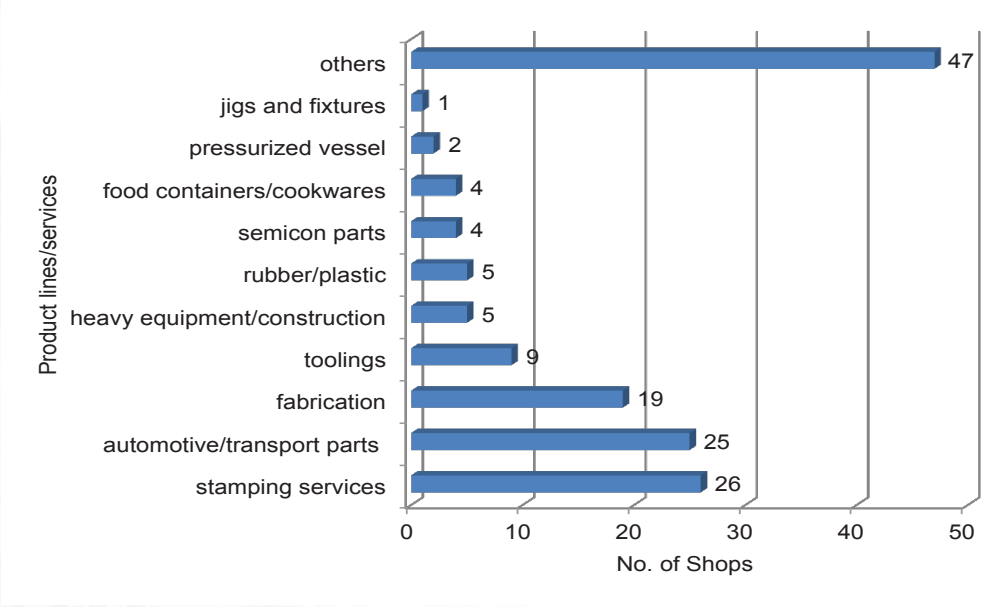

Figure 8. Product Lines/Services Offered

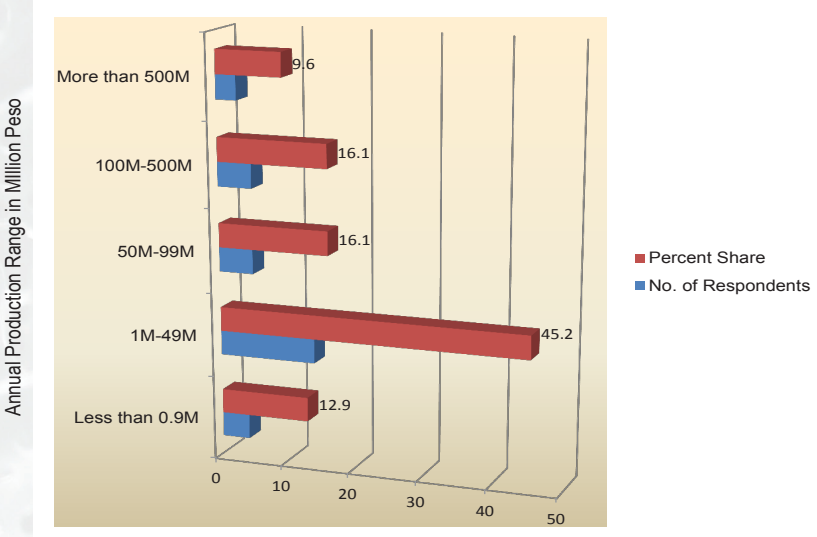

Figure 9. Distribution of Average Total Annual Production of Stamping Respondent-Companies, 2013

in peso and in dollar. Of the 31 respondent-companies, majority (45%) has a total annual production within the "P 1-49M" range, followed by annual production ranges of "P 50-99M" and "P 100-500M" with 16% each. One respondent disclosed that their annual production has reached 15.4 million pieces while others expressed their company's annual production in metric tons (e.g., 5.5, etc.).

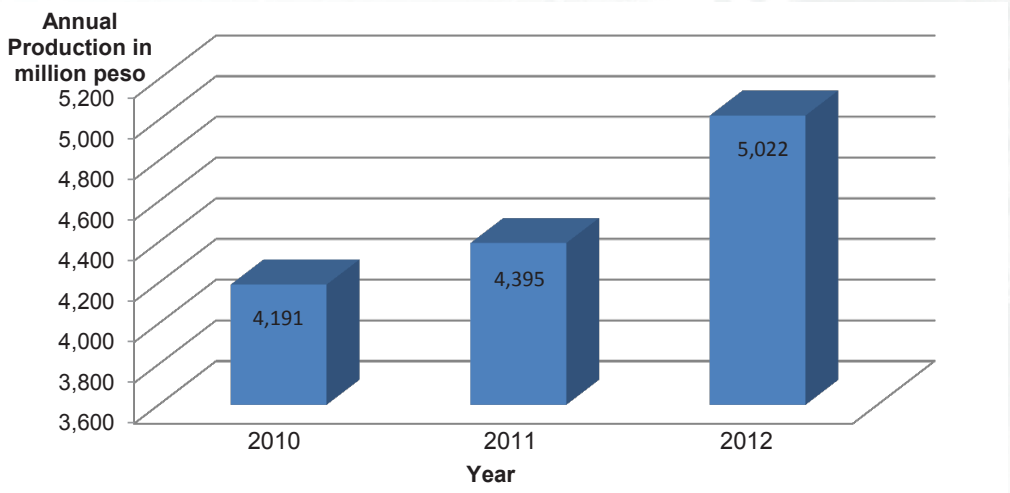

Figure 10. Annual Production Trend of the Respondent-Companies, 2010-2012

Production Statistics

Figure 10 shows the Annual Production Trend of the Respondent-Companies from 2010 to 2012. As shown, for the past three years, annual production has continously increased which indicates a lively business environment for the stamping sector.

The improving trend in terms of annual production provides a sound basis for the respondent-companies to push through with their plans to expand their business.

Export and import statistics are illustrated in Figures 11 and 12, respectively. Export market declined from 2008 to 2011, but rose significantly in 2012. The import figures illustrate a relatively increasing demand from 2008 to 2012. The market demand for stamped products has been steadily expanding.

Export

The Philippine exports of stamped products in 2012 posted an 80% increase over the 2011 level. In 2012, exports reached 12.2 million dollars which is a significant increase because exports slid down from 2008 to 2011 as shown in Figure 11. The NSO statistics show that the dominating export products from 2008 to 2010 is the "other interchangeable tools" averaging annually at 83%. Notable is the high value of 17.1 million dollars in 2008, while in 2011, the figure include products categorized "not electrically operated" and "others, electrically operated." However, in 2012, "tools for pressing, stamping and punching" and "dies for drawing or extruding metal" and "other presses for working metal or metal carbides" topped the list with a total of 84%.

Import

In 2012, imports of stamped products (refer to Figure 12) amounted to 45.89 million dollars, an increase of 69% over the 2011 level. The generally increasing import trend during this period supports the claim of some respondents that they relied on imported stamped products when local products were not available. Topping the list of the imported products are "other"; "other, electrically operated";

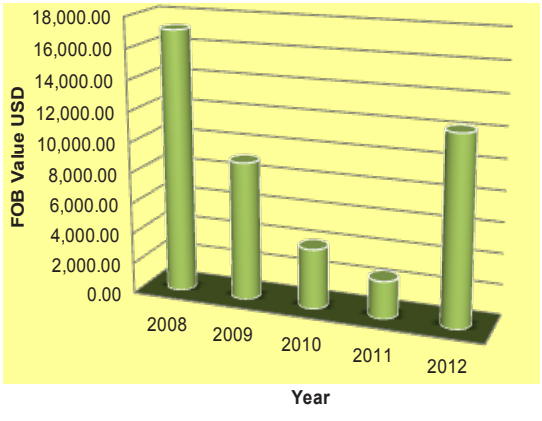

Figure 11. Export Statistics, 2008-2012

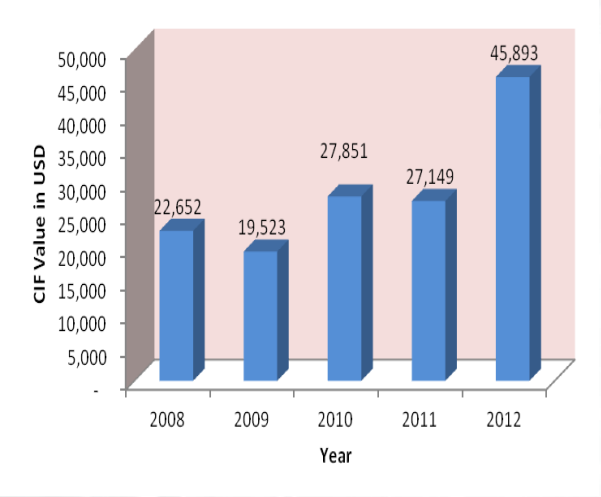

Figure 12. Import Statistics, 2008-2012

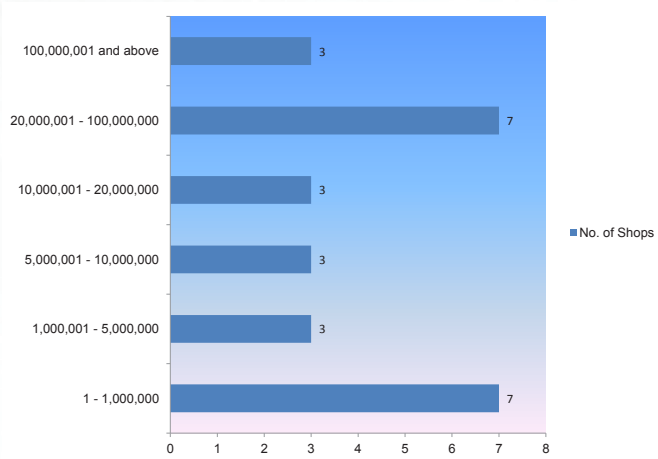

Figure 13. Cost of Production, 2013

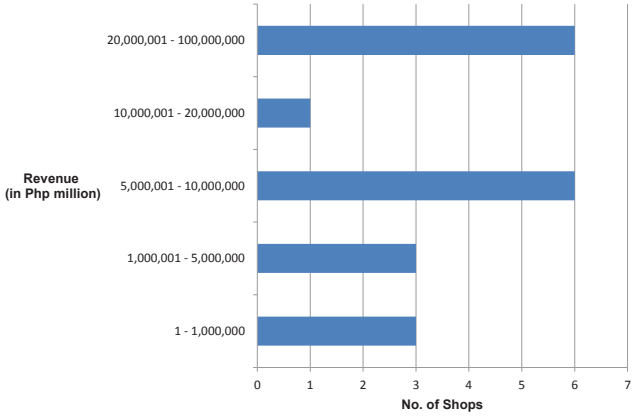

Figure 14. Revenue Generated, 2013

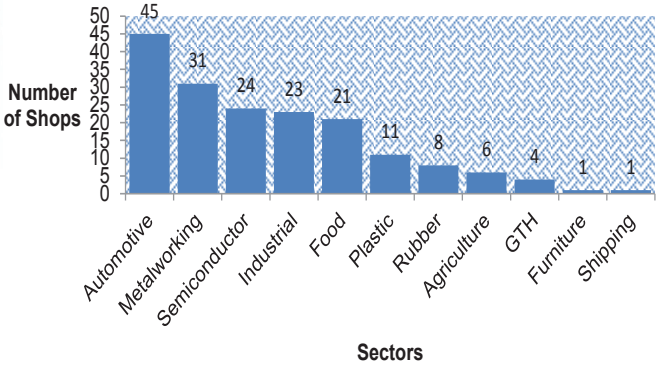

Figure 15. Sectors Served

"other interchangeable tools"; "electrically operated" and "machines for the manufacture of boxes, cans and similar containers of tin plate, electrically operated."

Cost of Production

Figure 13 reveals the Cost of Production in 2013, which varies on how big a shop's operation is. As revealed, seven (7) shops had an annual production cost of less than P 1M, while seven (7) shops had production costs in the range of P 20M to P 100M. Most respondents, however, have opted not to disclose data pertaining to production cost.

Revenue

Figure 14 presents Revenue Generated in 2013 by the respondent-companies, which represents income from their products or services. Revenue varies depending on how big a company is. From among the surveyed shops, six (6) shops revealed that their annual revenue is within the P 5,000,001-P 10M range, and another six (6) shops belonged to the P 20,000,001-100M category.

Sectors Served

Figure 15 shows the Sectors Served by the stamping shops. As shown, the automotive industry has the greatest demand (45%) for stamping process, followed by metalworking (31%), semiconductor (24%), industrial (23%), food (21%), and others.

*GTH- Gifts, Toys and Housewares

This section tackles the following sub-topics:

Stamping & Its Manufacturing Processes
Other Metalworking Processes Employed
Stamping Equipment
Quality Control/Assurance Facilities
Equipment Details
- Condition
- Machine Utilization
- As Purchased Condition
- Age

Raw Materials consumption/sourcing

Stamping & Its Manufacturing Processes

Stamping, also called pressing, is shaping of metals from pieces of thin sheets in closed dies. Stamping of metals includes cutting, bending or forming and drawing operations done at room or elevated temperature below the annealing temperature of metal. The process of manufacturing sheet metal products could be a single stage operation called compound die where every stroke of the press produces the desired form on the sheet metal part, or could occur through a series of stages (progressive die). Aside from the thin metal sheets, the materials that could be used also is polystyrene.

Stamped Products

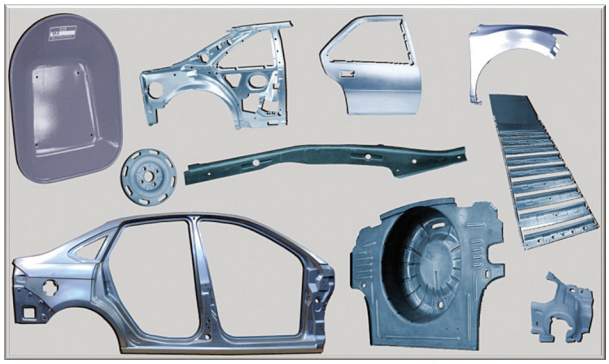

Figure 16a. Stamped Products

Cutting operations in stamping include shearing, blanking, punching or perforating, piercing, burring or extruding, trimming. Shearing involves the cutting of sheets or parts by long straight blades in metal shears by tin snips of scissors.

Forming operations involve bending, twisting, flanging, embossing, coining, beading, curling and drawing.

Figure 16b. Piercing/Embossing and Progressive dies

Piercing is the operation of cutting internal features (holes or slots) in sheet metal stock. **Piercing** is often combined with blanking.

Blanking and piercing are cutting processes in which sheet or plate is accurately cut out from flat stock to a definite outline in a press.

The process for parts manufactured simultaneously with both techniques is often termed 'pierce and blank'. An alternative name of piercing is punching.

In **drawing**, the material flows principally as a result of the application of a tensile stress. In this process, a blank of sheet metal is restrained at the edges, and the middle section is forced by a punch into a die to stretch the metal into a cup shaped drawn part. This drawn part can be circular, rectangular or just about any cross-section. A blank is first cut from flat stock and then a shell of cylindrical, conical and special shape is produced from this flat blank, by means of one or more drawing dies.

Figure 16c. Draw Formed Products

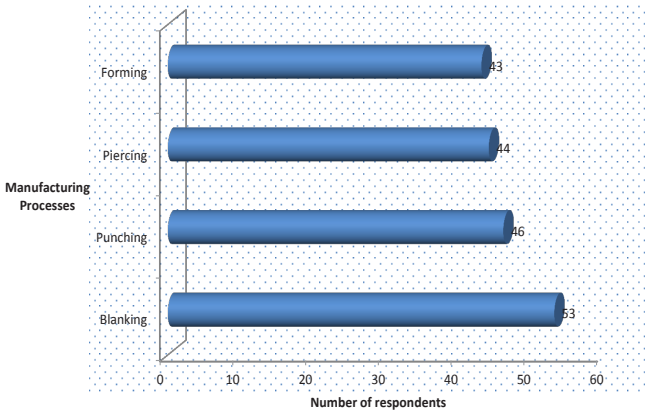

Figure 17. Distribution of Top Technical Processes Employed in the Production of Stamped Products, 2013

Draw forming is a metal stamping operation in which metal is pushed and stretched to form a closed elongation of the metal, such as a cup or closed tube.

Embossing is a mild cold-forming process of placing a flat part in between a male and female embossing die set. Once the part is pressed by the male and female dies, the image or characters are raised above the level part, similar to the numbers on a credit card. A die set which is relatively heavy and rigid for producing shallow or raised indentations with little or no change in metal thickness.

Compound Dies are dies in which two cutting operation are accomplished in one press stroke. The most common type of compound die, blanks and pierces a part.

Coining is a cold-working process in which a workpiece is subjected to a sufficiently high stress to induce plastic flow on the surface of the material. A beneficial feature is that in some metals, the plastic flow reduces surface grain size, and work hardens the surface, while the material deeper in the part retains its toughness and ductility. The term comes from the initial use of the process: manufacturing of coins.

Burring: After a pilot hole is pierced, a larger diameter punch is pushed through, causing the metal to expand and grow in length, level part, similar to the numbers on a credit card.

Extruding Die: A die in which a punch forces the metal to plastically flow through a die orifice so that the metal assumes the contour and cross sectional area of the orifice. In this type of die each slug is partly confined in a cavity and extremely high pres-

Table 5. Technical Processes Employed in the Production of Stamped Products

Product-Types of Dies Used (Process)	No. of Shops	% Share
Blanking	53	75.7
Punching	46	65.7
Piercing	44	62.9
Forming	43	61.4
Drawing	33	47
Embossing	30	43.0
Compound Dies	30	42.9
Coining	21	30
Extruding	10	14
Savaging	6	8.6
Total	316*	451.2*

*multiple responses

sure is applied by a punch to cause the material in the slug to extrude, much like tooth-paste is extruded when the tube is squeezed.

Table 5 shows the various Technical Processes Employed in the Production of Stamped Products. As shown, majority of the respondents (53 shops, 75.7%) are employing the blanking process. The punching and piercing process are next on the list with 65.7% and 62.9% of the respondents employing them, respectively.

Table 6 indicates the Metalworking Processes Employed by Stamping Companies. As indicated, majority have machining and tool and die processes (46 shops, 66%), followed by pressworking (32 shops, 46%). Sherman (1993) has identified machining and tool and die as two of the four major occupational groups in the metalworking industry.

Stamping Equipment

Table 7 and Figure 18 show the various categories of equipment utilized by the respondent-companies. As shown in Table 7, the most common stamping equipment utilized are mechanical presses, hydraulic presses, and hydro-pneumatic presses, and shearing machines. As shown in Figure 18, the most common equipment

Table 6. List of Metalworking Processes Employed By Stamping Companies

Processes	No. of Shops	% Share
Machining	46	66
Tool and die	46	66
Pressworking	32	46
Welding	8	11
Forging	8	11
Heat Treatment	6	9
Metalcasting	4	6
Electroplating	2	3
Others	3	4

Table 7. Distribution of Stamping & Stamping-Related Equipment in 2013

Type of Equipment	No. of Units	% Share
Stamping Equipment		
Mechanical Press	732	27.4
Hydraulic Press	255	9.6
Hydro-pneumatic Press	195	7.3
Sub-total	**1,182**	**44.3**
Tool and Die Facilities		
CAD-CAM	68	2.5
CNC Lathe	86	3.2
Other CNC Machines	78	2.9
EDM	64	2.4
3D-printer	3	0.1
Laser Machine	14	0.5
Shearing Machine	56	2.1
Sub-total	**369**	**13.7**
Quality Control Equipment		
CMM	31	1.2
Caliper, Micrometer, Height Gauge	911	34.1
Others	175	6.6
Sub-total	**1,117**	**41.9**
Total	**2,668**	**100**

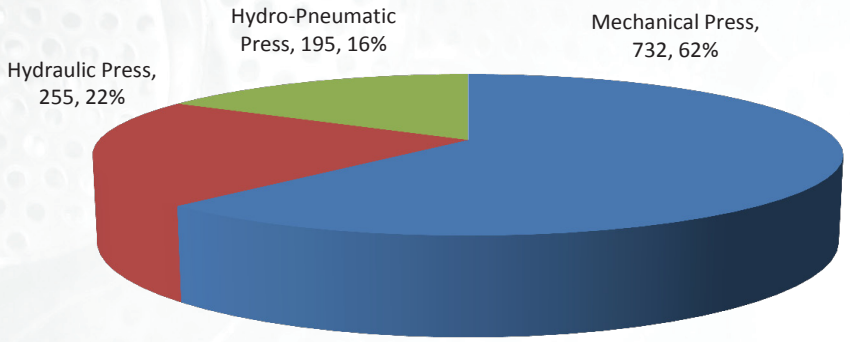

Figure 18. Distribution of Stamping Equipment

is the mechanical press (312 units, 71%) followed by hydro-pneumatic press equipment (50 units, 11%). Other stamping equipment includes hydraulic and shearing machines.

Table 8 presents data on the equipment based on purchase condition, type of acquisition and status. As presented, there are 407 brand new units as compared to 198 second hand units; 765 are imported units, while 19 are locally-purchased; 924 units are in working condition while only four(4) units are in non-working condition.

Table 8. Distribution of Equipment Based on as Purchase, Current Status and Type of Acquisition

Type of Equipment	As Purchase Condition		Current Status		Type of Acquisition	
	Brand New	Second Hand	Working	Non-working	Locally Purchased	Imported
Stamping Equipment						
Mechanical Press	237	133	568	3	14	464
Hydraulic Press	108	18	192	1	5	170
Hydro-pneumatic Press	62	47	164	0	0	131
Sub-total	**407**	**198**	**924**	**4**	**19**	**765**
Tool and Die Facilities						
CAD-CAM	13	1	62	0	35	26
CNC Lathe	30	6	71	0	20	44
Other CNC Machines	18	6	49	1	3	34
EDM	21	11	54	2	2	31
3-D Printer	2	0	2	0	0	2
Sub-total	**84**	**24**	**238**	**3**	**60**	**137**
Laser Machine	**7**	**0**	12	**0**	0	**8**
Shearing Machine	14	20	48	1	10	**27**
Quality Control Equipment						
CMM	13	5	25	2	0	23
Caliper, Micrometer, Height Gauge	509	16	766	0	31	713
Others	144	0	163	0	3	156
Sub-total	**666**	**21**	**954**	2	**34**	**892**

Based from the gathered data, the most common equipment used in stamping is the mechanical press. Figure 19 provides illustrations and descriptions of the stamping equipment:

Figure 19. Stamping Equipment

Mechanical Press

A machine-tool where an energy is added to a flywheel with an electric motor that accurately position a piece of metal so that the brake puts the bend in the correct place resulting to a shaped, formed or cut metal.

Hydraulic Press Machine

A press machine using a hydraulic cylinder to generate a compressive force. It uses the hydraulic equivalent of a mechanical lever. The hydraulic press depends on Pascal's principle: the pressure throughout a closed system is constant. One part of the system is a piston acting as a pump, with a modest mechanical force acting on a small cross-sectional area; the other part is a piston with a larger area which generates a correspondingly large mechanical force.

Hydro-Pneumatic Machine

The hydro pneumatic stamping machine is manufactured using quality basic material like iron, steel and alloy. The range of hydropneumatic press finds application in punching, embossing, straightening and stamping. These system is used for applications where the job is automatically fed into the die and only short travel is required for pressing.

Shearing Machine

Machines that accomplished shearing by the action of two blades, one fixed and one moving vertically, meeting progressively from one side of the material to the other much like ordinary hand shears. The angular alignment of the blades is called the rake. Also to be considered is the blade or knife clearance to each other. Both rake and clearance are a function of the type and thickness of the material to be cut.

Equipment Details

A. Age

The equipment utilized by respondent-shops are distributed by age in Appendix B. The data show that a large number of mechanical presses (299 units) were acquired between 2000 to 2013. The second most common equipment is the hydraulic press. Survey results reveal that most of the hydraulic press (157 units) were acquired in the 1980 to 1999. Most of the hydro-pneumatic press (48 units) were also bought during the 1980 to 1999.

B. Machine Utilization

The percentage utilization of machines is shown in Appendix C. Majority of the stamping equipment, 449 units (69 % of the total number of units) are "71-100%" utilized. The same percentage of utilization, 71-100%, also holds true for the rest of the advanced equipment and quality control instruments.

C. Condition

Appendix D tabulated the Distribution of Machines, by Operational Status. As shown, an average of 99.57% are in "working" condition while those in "non-working" condition constitutes only 0.43%.

D. Source of Equipment

Appendix E shows the Distribution of Equipment According to Source. Imported equipment are represented by 960 units (91.5%), while local equipment are comprised of only 89 units (8.5%). However for the Quality Control instrument, 892 units (96.3%) are imported while 34 units (3.7%) are purchased locally.

Raw Materials Consumption/Sourcing

Table 9 reveals the Distribution of Specific Raw Materials for Production Used by the Respondent Stamping Companies. As revealed, main raw materials used are tool steel (42 shops, 59%), followed by mild steel (36 shops, 51%) and non-ferrous (22 shops, 31%).

Table 10 presents where the respondent-companies source their specific raw materials. As presented, most of the companies (36 shops, 51.4%) buy both local and imported raw materials.

On the other hand, Table 11 presents the volume of raw materials consumed by respondent-shops. As presented, most respondent-companies consume 101-500 tons of raw materials per year.

Table 9. Specific Raw Materials for Production Used by Respondent - Stamping Companies

Specific Raw Materials	No. of Shops	% Share
Tool steel	42	59
Mild steel	36	51
Non-ferrous	22	31
Medium carbon steel	15	21
Iron	9	13
Plastics	-	-
Stainless Steel	2	3
Total	126*	178*

*Note: Multiple Response

Table 10. Summary of the Respondents' Sources of Raw Materials

Specific Raw Materials	No. of Shops	% Share
Local	26	37.1
Imported	5	7.1
Both	36	51.4
Did not disclose data	3	4.3
Total	70	100

Table 11. Usage of Raw Materials Per Year

Volume of Raw Materials	No. of Company-Respondents	% Share
1-10 Tons	4	14
11-20	1	3
21-100	3	10
101-500	8	28
501-1000	4	14
More than 1000	5	17
30-36 million pesos	2	7
No answer	2	7
Total	**29**	**100**

Shop owners cannot tell for sure what the future of the company will be. Markets emerge and easily rise, while in some unfortunate cases, markets disappear in a short period of time.

Figure 20 provides a glimpse of the respondent-companies' business options. The study reveals that even if business nowadays are experiencing ups and downs brought about by natural calamities/disasters (like typhoon, earthquake and volcanic eruption, among others), as well as by strong competition, majority (66.94%) of the respondents are confident that business will be in the uptrend hence, expansion plans are being considered.

Table 12 shows respondents in the stamping industry who have plans to expand their business. Some respondents are considering expansion in terms of company technical capacity and expansion in various ventures including: moulds fabrication, engineering plastics; and in welding shops and general construction. Some said that they plan to focus on equipment fabrication particularly those needed in agriculture and solid waste management, and on upgrading of other old equipment.

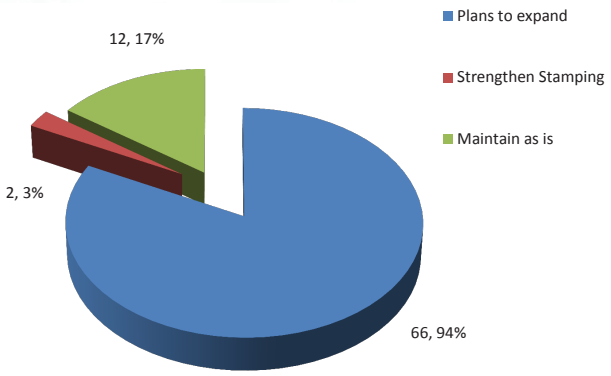

Figure 20 . Plans of the Respondent-Companies

Over-all Business Outlook

Table 13 presents the Business Outlook of Respondent-Shops for July - December 2013. As presented, most of the shop owners are optimistic about the state of the stamping industry as 47 shops (67%) perceived an "improving" business outlook for the period July – December 2013. It can be noted that 21 of the 70 respondent-shops say that "no change" in business outlook is seen.

Table 12. Plans of the Respondent-Companies

Plans of the Company	No. of Respondents	Percent Share
Additional product lines, expands company technical capability, and increasing production and personnel	68	97
Maintain the business as is	12	17
Total	**80***	**114***

*Note: Multiple Response

Table 13. Business Outlook of Respondent-Shops (July - December 2013)

Responses	No. of Respondents	Percent Share
Improving	47	67
No Change	21	30
Deteriorating	2	3
Total	**70**	**100**

Figure 21 shows the Business Outlook of the Respondent-Companies during the previous semester, January – June 2013. As shown, 40 shops (57%) perceived an "improving" business outlook. A slight difference of 10% in the survey responses for the two semesters of 2013 was observed. More metal stamping companies had an optimistic outlook in the second half of the year. This difference is attributed to the issues and problems that hinder the productivity of the business such as materials, quality of the product and human resource.

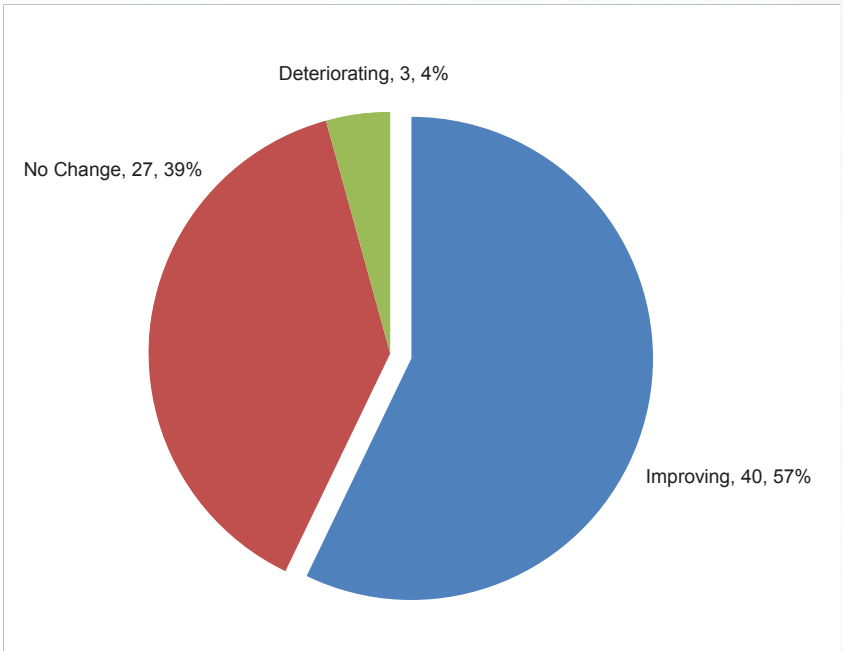

Figure 21. Business Outlook of the Respondent-Companies (January - June 2013)

PROBLEMS

Table 14 enumerate problems encountered by the local stamping industry. Figure 22 presents a graphical illustration of the problems. Materials-related issues is the topmost problem (36%) as revealed in the survey. The respondent-shops encounter different kinds of material-related issues such as: material defect (corrosion, sub-standard quality); and difficulty of sourcing out due to non-availability in the local market, among others. Some owners of stamping companies from the regions said that they have to travel from their place to Manila just to source out the required material of the customer. The respondents also shared that this situation is one reason why target deliveries lag behind.

QA/QC is the second problem, with a response rate of 21%. These problems should be addressed and essential solutions should be instituted to bridge the gap in the delivery of quality products and processes in the production line. Ultimately, it is the delivery of high quality products that suit the required specification of the customers that will truly matter because doing so will assure local stamping companies of a stable market.

Human Resource Development is the third problem that affects business operations.This was identified by 19% of the 70 respondents. The survey disclosed that lack of skills, personnel differences, and lack of commitment are some of the issues and concerns that need immediate attention. Fast turn-over of employees is also a problem.

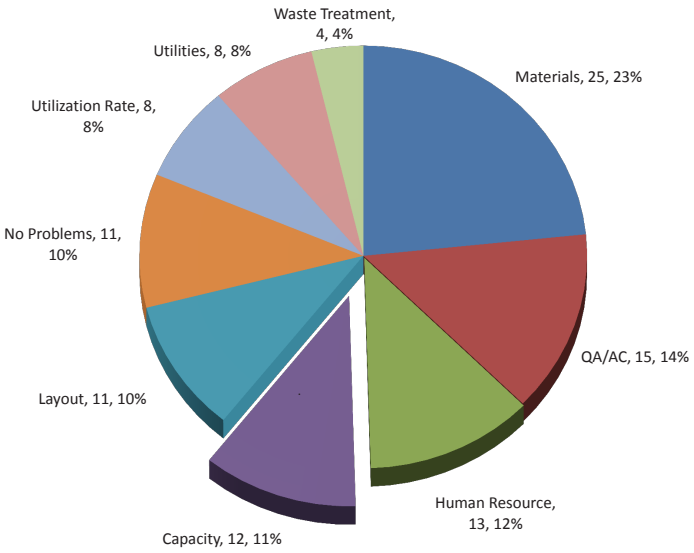

Figure 22. Problems Encountered by the Respondent-Companies

Table 14. Problems of the Respondent-Companies

Problems	No. of Responses	Percent Share
Layout	11	16
Capacity	12	17
QA/QC	15	21
Materials	25	36
Utilization Rate	8	11
Human Resource	13	19
Waste Treatment	4	6
Utilities	8	11
No Problem	11	16

Table 15 shows the Weaknesses of the Respondent-Companies. As shown, one of the weaknesses is stiff competition as gathered from 51% of the total of 70 surveyed respondents. It is evident that strong competition is one of the factors that should be addressed quickly to prevent the downturn of the business. Capability building and skills enhancement are some of the best strategies for the local stamping companies so that they may be able to overcome these weaknesses.

On the contrary, Table 16 presents the Strengths/Opportunities of the Respondent-Companies. Strengths are factors that determine how the company works well in the business arena. These are made up of a unique blend of common elements in operating the business. Knowing the business strengths of the company is essential, especially in the company's operations in terms of planning (manhour/machine hour, job scheduling/job loading) as well as in the preparation of marketing/business strategy plans. Opportunities are circumstances wherein the business has increased chances of flourishing. The introduction of new products, the improvement of existing ones and accuracy of machines are the first three factors that highly contribute to the creation of more opportunities in business operations and in the over-all performance of the company.

Opportunities may come in many forms: High volume of jobs from the customers; increasing demands; and better income opportunities. If the identified opportunity is to be exploited, the company can map out the business strategy and allocate the resources to attain one's goal. As presented in Table 16, the customer is one of the company's business strengths gaining the highest share of 60%. Shop owners must establish credibility with the customer with respect to delivering products on time. Accuracy of machines must always be maintained. Capability and capacity of the shops are also important to be able to serve the requirements of customers.

Table 15. Weaknesses of the Respondent-Companies

Weaknesses	No. of Responses	Percent Share
Stiff Competition (Competitiveness)	36	51
Lack of Customers	8	11
High Cost of Production	22	31
Difficulty in Sourcing of Raw Materials	23	33
Untrained Personnel	19	27
Government Regulation (Compliance)	15	21
Total	**123***	**174***

*Note: Multiple Response

Table 16. Strengths/Opportunities of the Respondent-Companies

Strengths/Opportunities	No. of Responses	Percent Share
Customer	42	60
Accuracy of Machines	30	43
Delivery Time	32	46
Durable Products	29	41
Craftsmanship	19	27
Human Resource	18	26

OTHER ISSUES AND CONCERNS OF THE STAMPING INDUSTRY

Issues and concerns about the stamping industry that were raised by the respondents should be given special and immediate attention by the concerned parties to help attain the global competitiveness of the sector.

Among the issues and concerns are:

- The availability and accessibility of material is one of the most important factors that will help improve the stamping sector.
- Monitoring of production activities is very vital in determining production expenses (e.g. man hour, machine hour, materials, and power), time of delivery and the present status of a certain job.
- Generally, companies in the M & E industries must possess some sort of a cultural understanding. They need to learn to complement each other in terms of related metalworking processes for better work relationship so as to improve the metalworking industry and be able to compete globally.

Training Programs

- A training program on Tool and Die Making and Stamping Seminar is needed to be continuously implemented and improved to update the skills and enhance the capability of the employees.
- The DOST-MIRDC should provide necessary assistance in the field of skills development to fully support the needs of industrial and metal sector (e.g. QA/QC, repair of machine particularly the hydraulic and pneumatic, CAD-CAM, Tool and Die, and fabrication of jigs and fixtures).

APPENDIX A
List of Stamping Companies

National Capital Region: 20
- Ambrose Industries, Inc.
- Dienamik Tool Services
- JSM Aluminum Corp.
- Maximetal Industries, Inc.
- OEM Parts Mfg. Corp.
- Fabricators Phils., Inc.
- Sobida Motors Corp.
- Primark Tooling Industries Corp.
- Rich Metal Products Corp.
- Southbay Tooling Corp.
- Nito Seiki Mfg. Corp.
- Dash Engineering & Machine Shop
- Blue Steel Industries, Inc.
- Autobus Industries, Inc.
- Haruka Machine Works Phils., Inc.
- Champion Fine Tooling Corp.
- Malasaga Trading Corp.
- First Phil. Scales, Inc.
- Remcor Industrial and Mfg.
- Icon Metal Industries Corp.

Region III : 2
- Koryo Subic, Inc.
- Nicera Phils., Inc.

Region VII: 7
- Atlas Metal Industries
- Machine Systems Corporation
- Mandaue Atlas Steel Fabrication Corp.
- PFE Industrial Services
- Precision Forming Corporation
- Suarez and Sons, Inc.
- Suki Trading Corp.

Region XI: 8
- Alvarando Machine Shop
- Davao Beta Springs, Inc.
- IVSA Machine Shop & Engineering Works
- JAS Machine Shop & Engineering Works
- Uniwide Rubber & Metal Industry
- H.D. Rubber Manufacturer & Machine Shop
- MFC Machine Shop
- Alvarando Machine Shop

Region IV-A: 34
- Aikawa Phils., Inc.
- Ant Steel Corp.
- Anvil Metal Shop Corp.
- A-5 Alliance Industrial Machines, Inc.
- Chorakawa Technologies, Inc.
- CLP Metal Industry & Precision Toolings
- Choryo Toolings System, Inc.
- ERML Trading & Engineering Services
- F. Tech Phils. Mfg., Inc.
- Fujitsu Die-Tech Corp. of the Phils.
- HS Technologies (Phils.), Inc.
- Harmo Technology Corp.
- Ito Seisakusho Phils. Corp.
- JFB Tech Phils., Inc.
- KEA Industrial Corp.
- Laguna Carparts Manufacturing., Inc.
- M2 Fabrication, Inc.
- Mitsuba Phils. Corp.
- Nissin Precision Phils. Co.
- Okabe Nikoh Corp.
- Optitech Machine Tools
- RJ Spring Rubber & Metal Parts Mfg. Corp.
- Richtech Industrial Supply Comp.
- Rollmaster Machinery & Industrial Services Corp.
- SMC Yamamura Fuso Molds Corp.
- Sankou Seiki Co., Ltd., Inc.
- Sohbi Kohgei (Phils.), Inc.
- Supersystem Toolings and Metalfab, Inc.
- Tri-R Allied Industries, Inc.
- Works Bell Phils., Inc.
- Utsuta Metal Stamping Phils., Inc.
- Valerie Products Mfg., Inc.
- Aries Technologies, Inc.
- CVC Precision Toolings, Inc.

APPENDIX B
Distribution of Equipment, By Age

Equipment	No. of Units			Total Responses	Response Rate
	1960 - 1979	1980 - 1999	2000 - 2013		
Mechanical Press	3	263	299	37	53
Hydraulic Press	0	157	70	20	29
Hydro-pneumatic Press	0	48	41	11	16
Sub-total	3	468	410		
CAD-CAM	0	8	34	14	20.6
CNC Lathe	6	8	20	13	18.6
Other CNC Machines	0	8	30	14	20.0
3D-Printer	0	0	1	1	1.4
EDM	0	8	20	12	18.8
Laser Machines	0	1	7	6	8.6
Shearing Machine	0	13	17	17	24.3
CMM	0	4	12	11	15.7
Caliper, Micrometer, HG	3	209	237	20	28.6
Others	0	145	13	5	7.1

APPENDIX C
Distribution of Machines, by Percentage Utilization

Equipment	Distribution of Number of Units in Percentage Utilization			Total Responses	Response Rate
	1-40 %	41-70 %	71-100 %		
Mechanical Press	40	91	248	28	40
Hydraulic Press	19	8	151	17	24.3
Hydro-pneumatic Press	16	26	50	11	15.7
Subtotal	**75**	**125**	**449**	56	80
CAD-CAM	-	2	26	4	5.6
CNC Lathe	3	1	16	9	12.7
Other CNC Machines	6	4	11	10	14.1
EDM	4	8	8	11	15.5
3D-Printer	1	-	-	1	1.4
Laser Machines	1	-	4	5	7.1
Shearing Machine	5	4	17	14	19.7
CMM	-	4	6	8	11.3
Caliper, Micrometer, HG	4	14	596	18	25.0
Others	-	1	1	1	1.4

APPENDIX D
Distribution of Machines, by Operational Status

Equipment	Working	Nonworking	Total Responses	Response Rate
Mechanical Press	568	3	55	77.5
Hydraulic Press	192	1	31	29.6
Hydro-pneumatic Press	164	0	20	28.2
CAD-CAM	62	0	18	25.4
CNC Lathe	71	0	24	33.8
Other CNC Machines	49	1	27	38.0
EDM	54	2	25	35.2
3-D Printer	2	0	2	2.9
Laser Machines	12	0	10	14.1
Shearing Machine	48	1	31	43.7
CMM	25	2	17	23.9
Caliper, Micrometer, HG	766	0	47	66.2
Others	163	0	10	14.1

APPENDIX E
Distribution of Equipment, According to Source

Equipment	Local	Imported	Total Responses	Response Rate
Mechanical Press	14	464	38	54
Hydraulic Press	5	170	13	18
Hydro-pneumatic Press	0	131	13	18
CAD-CAM	35	26	11	16
CNC Lathe	20	44	16	23
Other CNC Machines	3	34	14	20
EDM	2	31	10	14
3-D Printer	0	2	2	3
Laser Machines	0	8	7	10
Shearing Machine	10	27	18	25
CMM	0	23	14	20
Sub-total	89	960		
Total	1,049			
Caliper, Micrometer, Height Gauge	31	713	26	37
Others	3	156	5	7
Total	34	892		
	926			

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DEPARTMENT OF SCIENCE AND TECHNOLOGY

METALS INDUSTRY RESEARCH AND DEVELOPMENT CENTER

MIRDC Compound, Gen. Santos Avenue
Bicutan, Taguig City, 1631 Metro Manila
P.O. Box 2449 Makati, 1229 Metro Manila, Philippines
Telephone Nos.: (632) 837-0431 to 38 (connecting all departments)
Fax Nos.: (632) 837-0613 and 837-0479
Website: http://www.mirdc.dost.gov.ph
E-mail: mirdc@mirdc.dost.gov.ph