2018 State of the Die Casting Industry

Stephen P. Udvardy, President
North American Die Casting Association
Arlington Heights, Illinois

Introduction

There have been interesting turns of events in 2018. In late 2017, slight softening in the automotive market and housing market, the top two markets for die casting, was forecast for 2018. Consequently, overall die casting shipments for 2018 were not forecast to grow more than slightly, if at all. Counter to this forecast in late 2017, results from the NADCA quarterly business barometer for each of the first, second, and third quarter of 2018 indicated that shipments in 2018 would grow at least 2.9% and as much as 7.3% over the 2017 shipment level. According to the National Association of Manufacturers (NAM), manufacturing in the Unites States had the highest positive outlook in the 20-year history of the NAM quarterly survey. The top two challenges CEO’s identified in the third quarter of 2016, namely rising healthcare costs and unfavorable business climate, have been replaced in the third quarter of 2018 by attracting quality workers and increased raw material costs. Through a new trade agreement between the U.S., Mexico, and Canada, NAFTA has become the USMCA. Furthermore, tariffs have been placed on several imported goods in additional attempts to balance trade. With the many changes that have taken place and more to come, the automotive and housing markets are forecast to grow slightly in 2019. Indications are that die casting shipments in 2019 will be about the same as compared to 2018 and a slight amount of growth may be experienced.

Further details on U.S. manufacturing, workforce, trade, regulatory reform, macro-economics, end markets for die casting, and die casting shipments follow.

U.S. Manufacturing

In the third quarter of 2016, heading toward the 2016 election, CEOs of U.S manufacturing companies that responded the quarterly survey conducted by NAM, identified the challenges they faced. The top two were rising healthcare costs and an unfavorable business climate. Five quarters later, the fourth quarter report from 2017 showed that the two challenges facing the CEOs were attracting and retaining a quality workforce and rising healthcare cost. Two years later, the fourth quarter report from 2017 showed that the two challenges facing the CEOs were attracting and retaining a quality workforce and increased raw material costs. This represents a major shift in the challenges manufacturing faces today as compared to a few short years ago. Along with the shift in challenges, including the sharp decline in concern of unfavorable business climate, came a heightened positive outlook. The outlook showed that 92.5% of the respondents are positive about their own company’s outlook. (The second quarter report of 2018 posted the highest positive outlook in the 20-year history of the report with 95.1% of the respondents indicating they are positive about their own company’s outlook.) The 4-quarter rolling average for the third quarter of 2018 was at 93.9%, the highest in the 20-year history of the survey. Also indicated by the survey is growth over the next 12 months in sales (5.0%), full-time employment (2.4%), capital investment (3.4%), and production (4.9%). Also, growth rate of prices of products produced by manufacturing companies is expected to be 3.2%. On the negative side, raw material prices are expected to increase by 4.8%
and healthcare is expected to increase by 7.4% over the next 12 months. The respondents to the NAM survey are from small, medium, and large companies within various manufacturing sectors.

**Workforce**

Finding qualified workers is not only an issue for the die casting industry. Over 73% of U.S. manufacturers cite finding qualified workers as a major issue and threat to their business. Some have held off plans to expand and create new jobs and some have even turned down new business. The Government has been supportive of workforce development even prior to the current administration. In July of 2018, the Strengthening Career and Technical Education for the 21st Century Act, also known as CTE, was passed. This bill amends the Perkins Career and Technical Education bill by allowing states to establish certain goals for CTE programs without getting them cleared by the secretary of education first. The bill also allows funding support for education down to the 7th grade level. More recently, a White House Apprenticeship Task Force was formed. This task force is working to better integrate apprenticeships with higher education institutions and provide a pathway to high schools. It is also addressing competency versus time-based programs, focusing on creating training opportunities, and allowing non-registered programs. Guidance for an Industry Recognized Apprenticeship Program (IRAP) is in the early stages of development. IRAPs are intended to have a certifying entity and NADCA has submitted a letter to the Department of Labor expressing interest in becoming the certifier for the die casting industry when an IRAP for our industry is developed. Hopefully, the CTE bill and IRAP’s will assist reducing the shortage of qualified workers by developing more of them.

**Table 1 - NAM Manufacturers’ Outlook Survey, 3Q 2018.**

<table>
<thead>
<tr>
<th>Overall Facts About the Survey</th>
<th>Number of Responses: 718</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Field: August 17-31, 2018</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Respondents Positive About Their Own Company’s Outlook</th>
<th>Overall Manufacturing Outlook Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>92.5% (June: 95.1% - all time high)</td>
<td>61.9 (June: 63.6 - all time high, revised)</td>
</tr>
</tbody>
</table>

* all-time highs

- Expected Growth Rate for **SALES** Over the Next 12 Months: 4.9% (June: 5.7% - remained highest since 1997:4)
- Expected Growth Rate for **PRODUCTION** Over the Next 12 Months: 4.9% (June: 5.7% - highest since Q added 3 yrs ago)
- Expected Growth Rate for **EMPLOYMENT** Over the Next 12 Months: 2.5% (June: 3.1% - all time high)
- Expected Growth Rate for **WAGES** Over the Next 12 Months: 2.7% - still highest since 2001:1 (June: 2.7%)
- Expected Growth Rate for **CAPITAL INVESTMENTS** Over the Next 12 Months: 3.4% (June: 4.1% - all time high)
- Expected Growth Rate for **EXPORTS** Over the Next 12 Months: 0.8% (June: 1.1% - highest since 2014:2)
- Expected Growth Rate for **PRICES OF COMPANY’S PRODUCTS** Over the Next 12 Months: 3.2% - still highest since 2011:2 (June: 3.2%)
- Expected Growth Rate for **RAW MATERIAL PRICES AND OTHER INPUT COSTS** Over the Next 12 Months: 4.8% (June: 5.6%)
- Expected Growth Rate for **INVENTORIES** Over the Next 12 Months: 1.0% (June: 1.5%)
- Expected Growth Rate for **HEALTH INSURANCE COSTS** Over the Next 12 Months: 7.4% (June: 7.7%)

NAFTA has now become the U.S. Mexico Canada Agreement – USMCA. This agreement increases the North American (N.A.) content in passenger vehicles from 62.5% to 75%. The N.A. content for heavy duty truck content needs to be 70%. Aluminum, steel, and glass components in vehicles need to be a minimum of 70% N.A. content. In addition, 40% of passenger vehicle final assembly needs to be completed by workers averaging over $16/hour.

As a result of the 232 Investigation, which is related to national defense, tariffs have been placed on steel and aluminum imports – 25% for steel and 10% for aluminum. Finished steel dies are not subject to the tariff, however, die cast aluminum components are subject to the tariff. The intent of the 232 tariffs are to increase the U.S. steel production capacity from 73% to 80% and the aluminum production capacity from 48% to 80%. The 232 tariffs cover most of the world. Some exceptions, for instance, include Australia which is fully exempt, and South Korea, Argentina, and Brazil which have quotas. At present, there is no indication of this issue being resolved.

Trade Balance

NAFTA has now become the U.S. Mexico Canada Agreement – USMCA. This agreement increases the North American (N.A.) content in passenger vehicles from 62.5% to 75%. The N.A. content for heavy duty truck content needs to be 70%. Aluminum, steel, and glass components in vehicles need to be a minimum of 70% N.A. content. In addition, 40% of passenger vehicle final assembly needs to be completed by workers averaging over $16/hour.

As a result of the 232 Investigation, which is related to national defense, tariffs have been placed on steel and aluminum imports – 25% for steel and 10% for aluminum. Finished steel dies are not subject to the tariff, however, die cast aluminum components are subject to the tariff. The intent of the 232 tariffs are to increase the U.S. steel production capacity from 73% to 80% and the aluminum production capacity from 48% to 80%. The 232 tariffs cover most of the world. Some exceptions, for instance, include Australia which is fully exempt, and South Korea, Argentina, and Brazil which have quotas. At present, there is no indication of this issue being resolved.

Tariffs have been placed on Chinese goods under the 301 tariff. These tariffs were set in response to the estimated $60B of harm cause by China due to unfair practices. There are over 6,000 items covered on three lists of items subject to a tariff. The first two lists are subject to a 25% tariff. The first three lists are subject to a 25% tariff.
third list was initially subject to a 10% tax, but scheduled to go to 25% on January 1, 2019. Among the three lists are die casting machines, dies, and other equipment that are subject to tariffs. It is likely that a quota system may come into play with the 301 China tariff.

### Regulatory Reform

A year has passed and work is still in progress on replacing the Clean Power Plan with the new Affordable Clean Energy (ACE) plan. This new plan looks at control within the fence-line of the energy source and not upstream and downstream sources. There has not been much effort on reducing costs and finding/developing new sources of energy. However, the EPA has loosened rules requiring lengthy reviews of requests from utilities to improve their facility’s efficiency.

California Proposition 65 and the respective warning labels are being expanded to nickel and nickel compounds. Although it is the end product which the consumer obtains that California requires to be labeled, some upstream suppliers are being asked to provide information indicating that products are in compliance with Prop 65. During 2019, NADCA in collaboration with The Franklin Partnership will be developing a guidance document for those in the die casting industry who may be involved with Prop 65.

### Macro-Economics

The economy was sparked in 2018. In the third quarter of 2018, the U.S. GDP growth rate hit 3.5% to beat the 3.3% expectation. The quarter prior hit a rate of 4.2% which was the highest since the third quarter of 2014. With the first quarter of 2018 at a growth rate of 2.2%, it is estimated that the annual growth rate for 2018 will be about 3%. This is greater than the 2.5% growth rate seen in 2017 and 2.1% seen in 2016. Consumer sentiment has remained high and personal spending rose contributing to the GDP growth. With consumer sentiment and confidence high, individuals feel more comfortable making major purchases such as automobiles and homes which are favorable for the die casting industry. Further contributing to consumer spending and therefore GDP growth is the increased number of individuals that have been employed during 2018. The overall unemployment level hit an 18-year low level of 3.7%. Over the past year, an average of 191,000 new jobs were added per month and since the beginning of 2017, nearly 3 million people found jobs.

Manufacturing Capacity Use rose to 78.1% through the third quarter of 2018 from the 75.5% level in 2017 for all of manufacturing. With NAM’s third quarter 2018 survey report indicating that the growth rate for production over the next 12 months will hit 4.9%, Capacity Use should continue to rise and hit a more healthy and desirable 80% minimum in 2019. Also indicated by the same NAM report is an expected growth rate over the next 12 months in sales of 5.0%, full-time employment of 2.4%, capital investment of 3.4%, and prices of products produced by manufacturing companies of 3.2%. On the negative side, raw material prices are expected to increase by 4.8% and healthcare is expected to increase by 7.4% over the next 12 months. All considered, the Outlook Index has remained high for small, medium, and large companies throughout the first three quarters of 2018 with an average of approximately 62. The Outlook Index through the first three quarters of 2016 was an average of about 41.
End Market Analysis

Automotive is the largest market served by die casting with nearly 70% of the aluminum die casting shipments, about 26% of the zinc die casting shipments, and much of the magnesium die casting shipments related to the automotive market. One year ago, the forecast for light vehicle sales (cars, light trucks, and SUVs) was a bit of softening in 2018 as compared to 2017. It was thought that the with the slight softening in sales in 2017 compared to the stellar sales in 2015 and 2016 would continue and drop below the 17 million mark. Contrary to this forecast, vehicle sales are up and 2018 is forecast to come in at 17.12 million as compared to 17.00 million in 2017. Furthermore, Wards forecast for 2019 is 17.51 million units sold in the U.S. Statista forecasts U.S. sales to be 17.3 million units in 2019 and 17.6 in 2020. These forecasts are good news for die casting. The rate at which the all-electric vehicle is adopted by the U.S. consumer and the mix of die casting on all electric vehicles leaves an open question about the volume of die castings that will serve automotive in the future.

Figure 10 - Aluminum die casting markets.

Figure 11 - Zinc die casting markets.

Table 2 - Forecast for light vehicle sales – North America.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCTION</td>
<td>North America</td>
<td>17.73</td>
<td>16.99</td>
<td>17.12</td>
<td>17.51</td>
<td>0.7%</td>
</tr>
<tr>
<td></td>
<td>US</td>
<td>11.92</td>
<td>10.91</td>
<td>11.18</td>
<td>11.25</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>3.46</td>
<td>3.91</td>
<td>3.93</td>
<td>4.26</td>
<td>0.6%</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>2.36</td>
<td>2.18</td>
<td>2.01</td>
<td>1.99</td>
<td>-7.7%</td>
</tr>
<tr>
<td>AVAILABLE STRAIGHT-TIME PRODUCTION</td>
<td>North America</td>
<td>18.12</td>
<td>18.09</td>
<td>18.16</td>
<td>18.63</td>
<td>0.4%</td>
</tr>
<tr>
<td></td>
<td>US</td>
<td>12.12</td>
<td>11.57</td>
<td>11.55</td>
<td>11.66</td>
<td>-0.2%</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>3.71</td>
<td>4.32</td>
<td>4.46</td>
<td>4.81</td>
<td>3.2%</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>2.29</td>
<td>2.19</td>
<td>2.15</td>
<td>2.16</td>
<td>-2.0%</td>
</tr>
<tr>
<td>CAPACITY UTILIZATION</td>
<td>North America</td>
<td>100.6%</td>
<td>94.1%</td>
<td>93.6%</td>
<td>94.1%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>US</td>
<td>102.8%</td>
<td>93.3%</td>
<td>94.3%</td>
<td>94.5%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>99.8%</td>
<td>102.7%</td>
<td>99.0%</td>
<td>99.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>103.0%</td>
<td>99.2%</td>
<td>93.4%</td>
<td>92.4%</td>
<td>-</td>
</tr>
</tbody>
</table>

Figure 12 - The automotive industry is the number 1 market for die casting, so it compels us to closely follow the sales forecasts for this market.

Figure 13 - Market share by powertrain. Source: National Automobile Dealers Association (NADA).

Housing is the second largest market served by die casting with about 13% of aluminum and 47% of zinc die casting shipments related to housing. Similar to the automotive market scenario, estimates in late 2017 pegged new starts for single family home is 2018 at 1.1 million – slight softening compared to 1.2 million units built in 2017. Monthly housing starts proved to be greater in 2018 as compared to 2017, therefore, 2018 is now expected to come in 3%-6% higher than 2017 which is 1.24-1.27 million units. Similar
growing market continues to show steady growth. The forecast is for housing start gains of 6% in 2016, up 16% in 2017, and up 9% in 2018. Figure 16 - Appliances are tied to housing. The housing forecast for 2019 is 3-5%.

Overall Automotive Non-Auto Al Zn Mg
3rd Q’18 vs 2nd Q’18 3.24% -5.58% 6.42% 3.53% 0.31% 2.56%
2nd Q’18 vs 1st Q’18 -2.32% -4.75% 0.76% -3.02% 3.58% 12.36%
1st Q’18 vs 4th Q’17 4.17% 4.31% 4.00% 4.24% 3.65% 1.49%

Table 4 - 2018 vs 2017 shipments.

Two indicators of the direction shipments may be taking are quoting activity and die builds. Results from the third quarter 2018 business barometer indicated that quoting new jobs was up 6.9% as compared to the same time last year. Quoting for automotive was up 6.9% and quoting for non-automotive

was up 2.6%. Die builds for automotive were up 1.9% and die builds for non-automotive were up 0.8%.

As points of interest, the business barometer report indicated that the capacity use in die casting was an average of 60% in the third quarter of 2018 compared to the 59% for the third quarter of 2017 and compared to the aforementioned 79.1% for all of manufacturing. Average energy cost was $0.15 per pound shipped in the third quarter which was the same as for the second quarter and down from $0.19 per pound shipped for the first quarter of 2018. This is also down from the overall average for 2017 of $0.17 per pound.

Figure 18 - Based on the Association’s sample survey of U.S. aluminum foundries, shipments of aluminum castings for sale totaled 2,279 million pounds during the first half 2018, and shipments for own use totaled 236 million pounds.

Figure 19 - U.S. zinc die casting shipments.

**Conclusions**

The overall trend in manufacturing is an increase in positive outlook. The challenges of rising healthcare costs and unfavorable business climate have decreased and been overtaken by the current top challenges of finding qualified workers and increased raw material costs. Light automobile sales in 2018 will be slightly higher than for 2017 and mild growth is projected for 2019. New single-family housing starts in 2018 will have mild growth over 2017 and the mild growth should continue into 2019. Overall die casting shipments in 2018 are forecast to be up over 2017 by 2.9% on the conservative side and 7.3% on the more optimistic side. Aluminum die casting shipments are forecast to be up as much as 7.8% in 2018 over 2017. Zinc die casting shipments are forecast to be up 2.1% and magnesium shipments are forecast to be down 2.5% in 2018 compared to 2017. Based on market forecasts, shipments in 2019 should have mild growth over 2018.

Figure 20 - Overall, quoting of new jobs was up 3.7% in Q3 2018 as compared to Q3 2017.

Figure 21 - Overall, new die builds were up about 1.1% as compared to the same time last year.