What a year 2020 was! Indeed, a year many would like to forget, but unable to, due to much of its impact being indelibly etched in their memory. To say it was an unprecedented one is an understatement. It started with a strong economy, 50-year record low unemployment of 3.5%, an SAAR (Seasonally Adjusted Annual Rate) for light vehicle sales near 17.0M, and an SAAR for new privately-owned housing starts at a staggering 1.6M. Along comes the coronavirus (COVID-19) pandemic that hit the U.S. in mid-March after spreading through several countries and then continuing on to most of the world, turning much of our “normal” upside-down. COVID-19 cases and deaths rose causing state after state to launch shelter in place orders, hospitals to become over-stressed, and businesses to shut down. By the end of April, light vehicle sales and new housing starts crashed and the average operating level of die casting plants was an estimated 46% of normal operating level. As if the pandemic was not enough to deal with, devastating wild fires and hurricanes, as well as social and political unrest leading to demonstrations and looting added to the burden. By the end of the second quarter, the U.S. GDP Growth dropped like a rock to nearly -32%! Assisting its members during these troubling times, NADCA provided support that included a 50% dues reduction, free online education, and bi-weekly webinar updates from Washington.

But wait! What happened next? A recovery! Not a full recovery, but a significant one. COVID cases became somewhat controlled and state restrictions gradually decreased. Businesses began operating under a “new normal” and adopting COVID-19 related worker/customer safety procedures and a $2.2 trillion economic stimulus bill (CARES Act) was passed by the Federal Government. Light vehicle sales increased from an SAAR of less than 9.0M in April to an SAAR of 16.2M in October and new housing starts rose from an SAAR of 0.93M to about 1.5M over the same time period. In October, cases were again on the rise and in November some states started tightening up on restrictions. It may be a few weeks before it is known whether the cases, restrictions, and other factors may be negatively impacting the recovery rate. However, there are two major COVID-19 vaccines pending FDA approval at the time of this writing which provide a degree of optimism for 2021 that COVID-19 will no longer be a major factor and the recovery will continue.

The following presents information on progress in Washington D.C., macro-economics, overall manufacturing, and additional detail on die casting markets which leads to the estimated die casting shipments for 2020 and the die casting shipment forecast for 2021.

On the Washington D.C. Front

Adding to all of the events of 2020 was the presidential election on November 3, and an exciting one it was! Although the results were contested by the Trump Administration, Joe Biden was declared winner on November 7. The President-elect will be taking the oath of office on January 20, 2021 – Inauguration Day. Changes under the Biden Administration that are anticipated to have impact on the die casting industry include: more stringent regulations for manufacturers; a higher fuel economy standard for vehicles; lifting or lightening of tariffs on products from Canada, the EU, and Australia; and a higher level of additional economic stimulus funds. We are about to see how this all plays out. What we know for sure is that the Trump era has ended after a one 4-year term.

Let’s review some of the accomplishments of the Trump Administration. Individual and corporate tax cuts were made, there was rollback of some regulations favorable for our industry, tariffs were imposed in an attempt to balance trade, defense spending was increased, manufacturing had a more positive outlook, and unemployment hit a 50-year record low. Due to the coronavirus, much of manufacturing started to suffer and unemployment increased dramatically. The CARES Act was passed providing $2.2T to stimulate the economy. Some great support for manufacturing came in the form of the Payroll Protection Program and many of our member companies took advantage of this loan program and the loan forgiveness. In all, the stimulus package did assist the economy and as funds are running out, negotiations for the level of additional funding are in process on Capitol Hill.
From a trade balance perspective, we now have the USMCA, which is the new North American Free Trade Agreement, with the goal of increasing the North American content in vehicles. The targets include increasing the North American content in passenger vehicles from 62.5% to 75% and to 70% in heavy duty trucks. In addition, we have the 232 tariffs (25% tax on specific steel products and 10% tax on specific aluminum products imported into the U.S) and the 301 tariffs on over 7,000 items imported from China ranging from 7% tax (items on List 4) to 25% tax (items on Lists 1, 2, and 3). The trade deficit with China was $419B at the end of 2018 and $345B at the end of 2019. Through September of 2020 the trade deficit with China was $223B as compared to $261B through September of 2019. As COVID-19 is a contributing factor, it is unknown how much the tariffs have had on reducing the deficit in 2020. Although the 301 tariffs appear to be reducing the deficit with China, in general, all of the tariffs have assisted some companies while shifting harm to others.

The Strengthening Career and Technical Education for the 21st Century (CTE) Act was passed reauthorizing the Perkins Career and Technical Education Act. This Act provided for $1.2B of funds for states to apply toward education and training of individuals at various education levels. In addition, the Industry Recognized Apprenticeship Program (IRAP) in support of developing skilled workers for manufacturing was launched under the Department of Labor. There are currently 18 approved Standards Recognition Entities (SREs) for the Industry Recognized Apprenticeship Program, one of which is NIMS (the National Institute for Metalworking Skills). The SREs assist in qualifying/certifying industry apprenticeship programs. Both the CTE and IRAP have been implemented with a focus on strengthening U.S. manufacturing.

From a lack of accomplishments under the Trump Administration related to Trump’s 2016 campaign promises, there has been no substantive healthcare reform, no large bill for infrastructure spending, and no just or real immigration reform.

Macro Economics

The U.S. GDP growth rate for all of 2019 was 2.3%. The 4th quarter of 2019 was at 2.1% as we headed into the 1st quarter of 2020. The impact of the coronavirus was noticed as early as the quarter over quarter growth rate results for the 1st quarter were available, which was -5.0%. The 2nd quarter 2020 GDP growth rate plummeted to a record drop of -31.4%, to be followed by the largest expansion ever to 33.1%. The U.S. GDP growth rate for the 4th quarter of 2020 is expected to be 3.0% and the estimate for all of 2020 is a growth rate of a few percent below that of pre-pandemic levels. GDP growth rate estimates for 2021 and 2022 are currently 1.7% and 1.9%, respectively, based on Trading Economics’ econometric models.

Canada’s GDP growth rate for the 3rd quarter of 2020 was a record expansion of 8.9%, following a record drop to -11.3% in the 2nd quarter. GDP growth rate in Canada for the 4th quarter is expected to be 4.3%. Estimates for 2021 and 2022 are currently 2.7% and 1.7%, respectively, based on models. GDP growth rate in Mexico for the 3rd quarter of 2020 was 12.1%, following a drop to -17.0% in the 2nd quarter. GDP growth rate in Mexico for the 4th quarter is expected to be 0.9%. Models estimate the GDP growth rate in Mexico for 2021 and 2022 to be 1.1% and 0.8%, respectively.
Consumer sentiment remained high in early 2020 and was at an index of 101 in February. By the time April hit and in the midst of the pandemic, the sentiment index dropped sharply to 71.8. As less people were working and many were dealing with uncertainties, there was an anticipated sharp decrease in consumer spending. As the economic recovery started, the consumer sentiment index started to recover as well, and by October the sentiment index reached 81.8, but still low compared to 101. Consumer spending increased as the sentiment increased. Over the same period of time, the 50-year record low unemployment of 3.5% rose to 14.7% in April as about 22 million people became unemployed. As less than half of the unemployed were re-employed or found new jobs, the unemployment level dropped to 6.9% by October. Capacity utilization for all of U.S. manufacturing per the Federal Reserve System was 75.56% in February of 2020, fell to 60.30% in April, and rebounded to 72.32% in October. As you will find below, the capacity utilization for the overall die casting industry is lower than for all of U.S. manufacturing.

Additional information for all U.S. manufacturing is provided by the National Association of Manufacturers (NAM), which conducts quarterly surveys. One section of the survey asks CEOs of manufacturing companies to rate the challenges they face. Results from the most recent survey, the 3rd quarter 2020 survey, indicate that the top three challenges facing CEOs are: 1) a weaker domestic economy and sales for their products with 66.5% of the population indicating this is the #1 (top) challenge; 2) attracting and retaining a qualified workforce with 55.1% indicating this is the #2 challenge; and, 3) rising healthcare/insurance costs with 51.1% indicating this is the #3 challenge. For comparison, in all of 2019 and the 1st quarter of 2020, attracting and retaining a quality workforce was the top priority. From the 3rd quarter of 2016, heading into the 2016 presidential election, the top 3 challenges cited were: 1) rising healthcare/insurance costs with 73.9% indicating this as the #1 challenge; 2) unfavorable business climate (i.e. taxes, regulations) with 73.0% indicating this as the #2 challenge; and, 3) a weaker domestic economy and sales for their products with 61.2% indicating this as the #3 challenge. The biggest change from the 3rd quarter of 2016 to the 3rd quarter of 2020 is that an unfavorable business climate fell from the #2 challenge to the #7 challenge with only 16.7% indicating that unfavorable business climate is a challenge.
Figure 9 - Manufacturing CEOs' top challenges in the third quarter of 2020. Source: NAM manufacturers' outlook survey.

Another section of the survey is based on the CEOs' outlook for their own company. A CEO Outlook Index is generated as well as the percentage of CEOs who have a positive outlook. The CEO Outlook Index had grown appreciably and quickly from the 3rd quarter of 2016 with indexes ranging from the mid-30s to the low 40s to indexes above 60 by the 1st quarter of 2017. The indexes remained high from 2017 through early 2019 before starting to tail off a bit. Then the indexes dropped sharply in the 2nd quarter of 2020 to a range of 15-30 due to the pandemic and has recovered to the 40s in the 3rd quarter of 2020.

In late 2016, less than 60% of the CEO's had a positive outlook. By 2018, the positive outlook reached a 20-year all-time high of 92.4%. As trade uncertainties, the workforce shortage, and a softening global economy came into play, the positive outlook dipped to 67.6% in 2019 and rose to 75.6% in the 1st quarter of 2020, only to fall to 33.9% in the 2nd quarter and recover to 66.0% in the 3rd quarter of 2020.

In late 2016, less than 60% of the CEO's had a positive outlook. By 2018, the positive outlook reached a 20-year all-time high of 92.4%. As trade uncertainties, the workforce shortage, and a softening global economy came into play, the positive outlook dipped to 67.6% in 2019 and rose to 75.6% in the 1st quarter of 2020, only to fall to 33.9% in the 2nd quarter and recover to 66.0% in the 3rd quarter of 2020. Overall, the CEO outlook according to NAM had quickly increased at the beginning of the Trump era then started to decline slightly in the second half of the era before COVID-19 contributed to a quick decline and rapid recovery to late-2019 levels.

Markets Served by Die Casting

There are several markets served by die casting. For several years, end markets have included lawn and garden equipment, hand and power tools, telecommunication devices, computers and business equipment, plumbing, medical devices, sports and recreation equipment, aerospace, and others. More recently, opportunities to serve the robotics and the renewable energy industries have increased. However, for several years, the top 2 markets, comprising about 75% of all shipments, have remained the automotive market and the housing market. At approximately 68% of the shipments, automotive is the top market for aluminum die casting followed by housing at approximately 9% of shipments. At approximately 45% of shipments, housing is the top market for zinc die casting followed by automotive at about 26% of the shipments. With automotive and housing comprising the bulk of all diecasting shipments, the sales and sales forecast information below is focused on these two markets.

Figure 10 - Manufacturing outlook index from the first quarter of 2019 to the third quarter of 2020. The information shows the overall index and index for small, medium and large companies. Source: NAM third quarter 2020 manufacturers’ outlook survey.

In late 2019, the forecast for light vehicle sales in 2020 was 16.5 million units, slightly lower than the sales level of 16.8 million in 2019 and below the 17 million mark of the prior 4-5 years (17.2 million in 2018). The seasonally adjusted annual rate of sales (SAAR) in January and February of 2020 were in the mid-16 million units and right on target, pre-pandemic. By April, the SAAR dropped below 9 million and the amount of time it would take to recover was uncertain. Optimistic forecasts at that point in time were 12
million units for the year. However, the SAAR in May rose to 12.2 million and continued to climb to slightly above 16 million (near pre-pandemic levels) in September and October before tailing off to 15.8 million in November. In November, forecasts for the total light vehicle sales in 2020 were readjusted and ranged from 14.3-14.5 million - below the pre-pandemic forecast, but indicative of a reasonably good recovery. According to economists from the University of Michigan, signs point toward solid sales and production of vehicles in 2021 and 2022 and forecasting specialists indicate the outlook for 2021 is 16.3 million units.

There were 1.29 million new privately-owned housing starts in 2019 and in late 2019 the forecast for 2020 was about the same level - 1.28 million. The SAAR for new privately-owned new housing starts in January of 2020 was an astounding 1.62 million and 1.57 million in February. A strong market as many new homeowners are continuing to take advantage of extremely low mortgage interest rates. The same trend was seen in housing as March and April came along. The SAAR for new privately-owned housing starts dove to 0.93 million in April. The SAAR in May, June, and July monotonically increased to 1.49 million in July and was 1.53 million in October 2020, for a recovery to pre-pandemic levels. The forecast in October for all of 2020 remained at 1.28 million. New privately-owned housing starts in the U.S. is projected to trend around 1.17 million units in 2021 and 1.27 million units in 2022 according to econometric models. It should be noted that the appliances market and lawn and garden equipment market are impacted by the housing market as new appliances are purchased for new homes and many individuals buy new lawn and garden equipment when they move into a new home.

NADCA conducts a quarterly survey called the Business Barometer to determine the current level of die casting shipments and to obtain forecast information for shipments. In addition, information on die builds and quoting activity is collected and used as indicators of future business activity and shipments. Information on aluminum die casting shipments is also obtained from the Aluminum Association. Die castings in the U.S. are currently produced by 398 die casting plants. There are about 40 plants in Canada and an estimated 100+ plants in Mexico producing die castings. In 2019, the U.S. die casting plants shipped 2.87 billion pounds of aluminum die castings per the most current Aluminum Association data, which is down from 3.12 billion pounds in 2018, representing an about an 8% decline. Zinc die casting shipments in 2019 were approximately 383 million pounds, which is

Table 1 - Shipment comparison by quarter from the NADCA Q3 2020 Business Barometer.

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<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Automotive</th>
<th>Non-Auto</th>
<th>Al</th>
<th>Zn</th>
<th>Mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th Q’20 vs 3rd Q’20</td>
<td>10.66%</td>
<td>13.64%</td>
<td>10.06%</td>
<td>10.61%</td>
<td>11.71%</td>
<td>13.64%</td>
</tr>
<tr>
<td>3rd Q’20 vs 2nd Q’20</td>
<td>-47.23%</td>
<td>-55.37%</td>
<td>-43.71%</td>
<td>-48.53%</td>
<td>-37.56%</td>
<td>-19.08%</td>
</tr>
<tr>
<td>2nd Q’20 vs 1st Q’20</td>
<td>3.98%</td>
<td>-4.22%</td>
<td>7.98%</td>
<td>3.97%</td>
<td>3.94%</td>
<td>9.76%</td>
</tr>
<tr>
<td>1st Q’20 vs 4th Q’19</td>
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Table 2 - 2020 shipment forecast compared to 2019 shipments from the NADCA Q3 2020 Business Barometer.

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<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Automotive</th>
<th>Non-Auto</th>
<th>Al</th>
<th>Zn</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2020 Actual vs 2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2020 vs 2019 Forecast (Q3)</td>
<td>-5.95%</td>
<td>7.63%</td>
<td>-8.77%</td>
<td>-5.85%</td>
<td>-8.31%</td>
<td>-11.79%</td>
</tr>
<tr>
<td>2020 vs 2019 Forecast (Q2)</td>
<td>-11.80%</td>
<td>-10.79%</td>
<td>-12.00%</td>
<td>-11.34%</td>
<td>-15.54%</td>
<td>-12.00%</td>
</tr>
<tr>
<td>2020 vs 2019 Forecast (Q1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tbody>
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up slightly from 379 million pounds in 2018, representing about a 1% increase. The most recent results from the third quarter 2020 NADCA Business Barometer indicate that overall die casting shipments in the 3rd quarter were up 10.66% from the 2nd quarter of 2020, after declining an estimated 47.23% in the 2nd quarter compared to the 1st quarter of 2020. Automotive related shipments were up 13.46% in the 3rd quarter after declining an estimated 55.37% in the 2nd quarter compared to the 1st quarter. Non-automotive related shipments were up 10.06% in the 3rd quarter after declining an estimated 43.71% in the 2nd quarter compared to the 1st quarter. Segregated by alloy family, aluminum, zinc, and magnesium shipments in the 3rd quarter of 2020 were up 10.61%, 11.71%, and 13.64%, respectively from the previous quarter after declining 48.53%, 37.56%, and 19.08%, respectively in the 2nd quarter compared to the 1st quarter.

The forecast for overall 2020 shipments based on the third quarter barometer is down a minimum of 5.95% as compared to 2019 with automotive shipments forecast to be up 7.63% and non-automotive shipments down 8.77% in 2020 compared to 2019. Aluminum, zinc, and magnesium shipments are forecast to be down 5.85%, 8.31%, and 11.79%, respectively, in 2020 compared to 2019. Although overall shipments are forecast to be down as anticipated for 2020, the results from the third quarter barometer during the recovery period are more optimistic than the results from the second quarter barometer when the impact of COVID-19 was greatest.

Capacity utilization in the 3rd quarter of 2020 was 60% overall for die casting. Capacity utilization in automotive was 77% and capacity utilization in non-automotive was 53%. (The capacity utilization for all of manufacturing was 72.32% as mentioned above). In the 1st quarter of 2020, the overall capacity utilization for die casting was 59%, with automotive slightly above 58% and non-automotive slightly above 59%. The 2nd quarter of 2020 yielded low capacity utilization levels as some plants were shut down and others were throttled-back in production. Overall die casting capacity utilization for the second quarter was an estimated 44% with automotive related plants at 43% and non-automotive plants at 45%.

The year 2020 was a challenging and interesting one due to COVID-19. The effects of the virus started taking hold in March and had taken its worst toll in April. With stay at home orders, business shutdowns, and a decrease in production levels for various manufacturing sectors including diecasting, the overall economy was turned upside down and GDP growth plummeted to -31.4% in the U.S. As businesses found ways to navigate their way through the financial stress and issues caused by the pandemic, recovery started in the months that followed and was aided by the CARES Act leading to a third quarter GDP growth of a positive 33.1% percent.

During the Trump era progress was made in the areas including tax reform, trade balancing, and U.S. manufacturing. Some regulations for manufacturers were made more friendly and the overall climate for U.S. manufacturing was improved as evidenced by the NAM survey reports. However, little to no progress was made in the areas of healthcare reform, immigration, and infrastructure spending. Changes should be expected under the Biden Administration.

Die casting in 2020 started with strong shipment levels, dropped 47.23% in the 2nd quarter compared to the 1st quarter then rebounded 10.66% in the 3rd quarter over the 2nd quarter. The forecasted die casting shipment level for 2020 is down a minimum of 5.95% percent compared to 2019.

The 2020 forecast for light auto sales is 14.3-14.5 million units and it is currently anticipated that auto sales in 2021 will be 16.3 million units. The 2020 forecast for new privately-owned housing starts is 1.28 million units and it is currently anticipated that new housing starts in 2021 will decline slightly to 1.17 million units. Taking these changes into consideration, it is estimated that die casting shipments will be back up to very near 2019 levels in 2021.