# SFSA CASTEEL REPORTER

**Steel Founders' Society of America**

**a publication serving SFSA steel casting industry members**

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# *June — 2021*

## Casteel Commentary

Workforce Recruitment and retention will be a critical task for success for the next decade, even more than the traditional dependence on a skilled team. This month's Casteel Commentary explores the problem and proposes directions to tackle the need we have for engaged people for our industry.

## Research Review

Please make your plans to participate in the annual SFSA Research Review Aug 3-6. This year's meeting will be hybrid: Aug 3-4 will be held in-person at Four Points Sheraton, Chicago O'hare and Aug 5-6 will be virtual. The Review covers the latest in both Carbon & Low Alloy and High Alloy steel casting research and is your opportunity to interact with the researchers and provide industry steering. The event vets our research portfolio to select the R&D projects to be featured at the National T&O. Registration is required and must be completed by Thursday, July 29: https://sfsa.site-ym.com/event/rr2021. For questions, contact Diana David ddavid@sfsa.org.

## Member Interns: Peaslee & Schumo Scholarships – Due July 6th

Recruiting students to join our industry and grow into leadership positions remains a critical need in the steel casting industry and a strategic initiative of the Society. The Steel Founders' Society Foundation aims to attract the next generation workforce by providing scholarships to student interns. To compete for the scholarships, interns are required to work at a member foundry and carry out a specific task or investigation. Selected works are presented at the annual T&O conference. If you currently have or plan to have an intern work at your foundry in 2021, be sure to have them complete this online registration form by **July 6**. Find out more about the scholarships at https://www.sfsa.org/scholarships.php.

## Research Highlight: Fatigue Performance of Steel Castings

Steel castings are often subjected to cyclic structural loading, which can lead to uncertainty in quality-driven performance. Uncertainty of this nature often manifests as over-conservatism in design and quality requirements. To reduce this uncertainty and provide engineering tools for improved fatigue design capability, four small fatigue studies have been started. Using the case study of the M&T railroad knuckle, fatigue samples have been extracted from various parts of the knuckle to see what effects the manufacturing process (solidification and quench effect) has on fatigue performance to better inform fatigue predictions. SFSA is also collaborating with the SAE Fatigue Design & Evaluation (FD&E) committee to provide a better material fatigue performance estimation more quickly and affordably than current methods. Successful Failure Consulting Corp (SFCC) is working to develop a relationship between monotonic properties predicted from the University of Iowa's (UI) solidification modeling and the cyclic properties used to estimate fatigue performance. The University of Northern Iowa, University of Iowa, and SFSA are casting a geometry that has been extensively studied by the SAE FD&E committee as a years-long weld fatigue project. This project is scoped for a direct comparison of the performance advantages of cast geometry when compared to weld/fabrication geometry, even in the presence of porosity. Rigging and specimen design are being finalized (Iowa); specimens will be cast with printed molds at UNI and then fatigue tested.

Each of these projects is a piece of the puzzle leading to a better assessment of steel casting fatigue performance. More accurate and earlier fatigue estimations will likely help steel casting designers move away from over-conservatism in their quality requirements due to a lack of confidence in the designing-for-fatigue process.

## 75th T&O - Art Contest

*Foundry Painting by David Knapp*

A 75th anniversary, a diamond jubilee, marks a significant milestone. The society is hosting a children's art contest to commemorate our 75th T&O Conference. The submission deadline is June 30th. Children or grandchildren (nieces and nephews too) of SFSA members are eligible to submit their artwork for a chance to win Amazon gift card prizes. All employees at your foundry are welcome to participate.

Entries

1. All art must be the original work of the child.
    a. Artwork may be any form – painting, drawing, sculpture, photo, computer graphics, etc.
    b. Artwork should illustrate artisans manufacturing steel castings or the processes of a steel foundry
2. Email entry to adrowski@sfsa.org including:
    a. Child's name and age; and member name, company, and relationship to the child
    b. Digital image (300 dpi or greater JPG file) of the artwork (title or description optional)
3. Submission limited to 2/child and must be received by June 30th

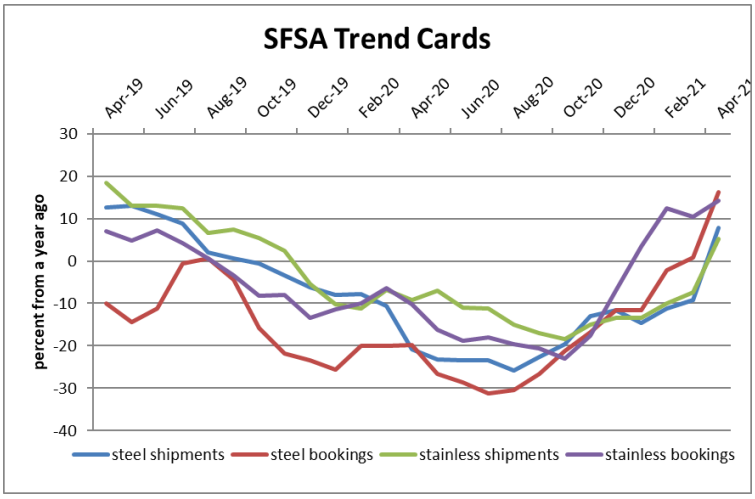
This year's conference will be an in-person meeting on December 8-11 in Chicago at the Loews Hotel.

## Fall Leadership Meeting

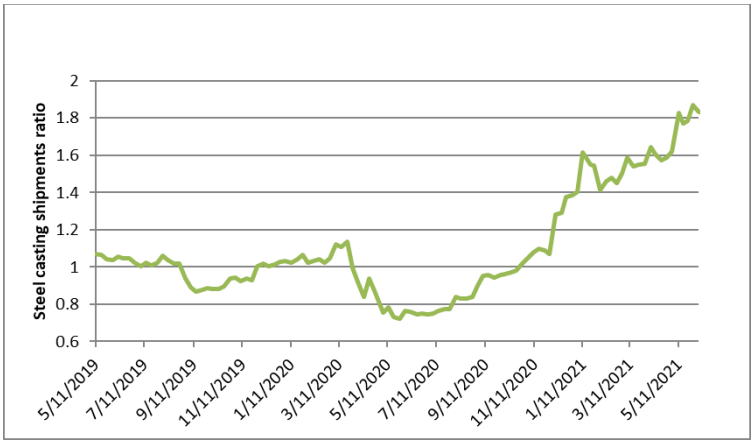
The 2021 Fall Leadership Meeting will be held at the Omni Grove Park Inn Resort in Asheville, NC on September 12-14. The meeting will follow the traditional schedule with the Executive Committee and Board Meetings on the weekends and the business sessions on Monday and Tuesday morning. The staff is working to finalize the program and activities. Registration will be online starting in July.

## Market News

The full monthly business report is at the end of the newsletter. The trend cards show a continued improvement in market conditions with steel casting bookings positive and stainless bookings growing. Shipments are just above year-ago levels which was down, but this is likely the result of the inability to ramp up production with a limited workforce. The challenge of attracting adequate employees is the largest and most systemic problem we currently face as an industry. This lack of employees can be seen in the growing backlog in the stainless-steel casting backlog median of over 10 weeks.

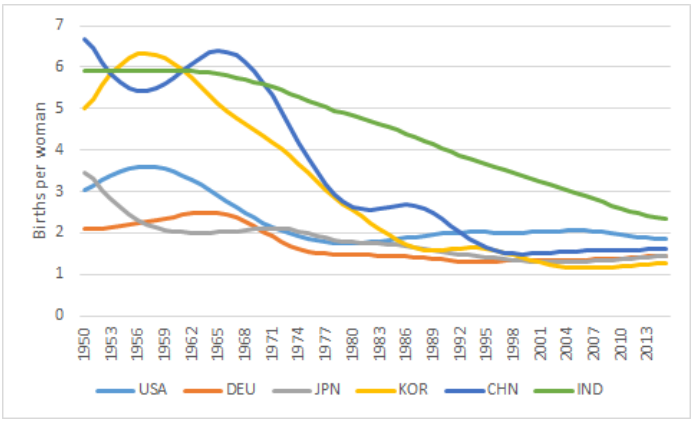


The weekly reports show continued increases in the production and price of commercial steel products. Non-defense capital equipment new orders and shipments have been increasing since last June and now exceed the levels pre-pandemic. The price of oil and copper is high enough to support additional investment in mining and oil production and indicate improving industrial activity. The steel casting shipment ratio is based on a correlation of the factors of steel price, production, scrap price and oil price monthly with the SFSA steel casting shipment trends. This is evaluated as a ratio of the current level with the level one year ago. We have not seen the sharp uptick yet in demand, but we are likely to see accelerating demand and be limit by our capability to produce.

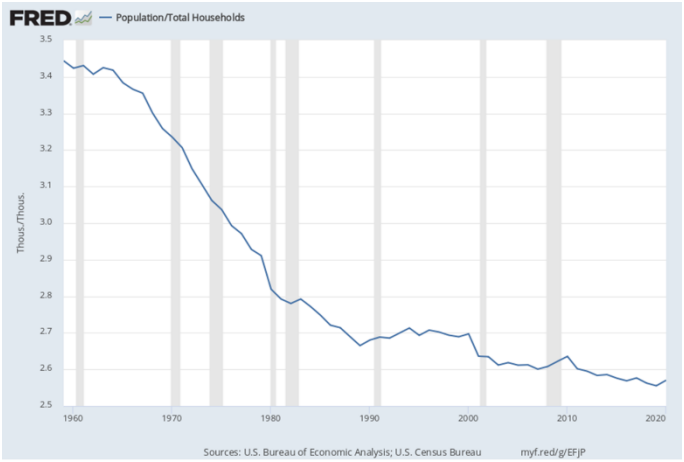



## Casteel Commentary

The greatest challenge we are going to face for perhaps the next decade is workforce. This challenge is the result of many overlapping factors. Manufacturing was seen as dark, dangerous, and dirty work that was for losers in the economy. College education allowed a successful career and a prosperous future. An English major who was a librarian paid $25k was seen as successful while a welder making $75k with full benefits creating nuclear submarines was seen as a failure. The incoming workforce had not been raised with any economic constraints and are less motivated by incremental compensation and more interested in comfort and freedom. Capital intensive industries continued to shrink in size of employment and number of firms while maintaining their capacity.

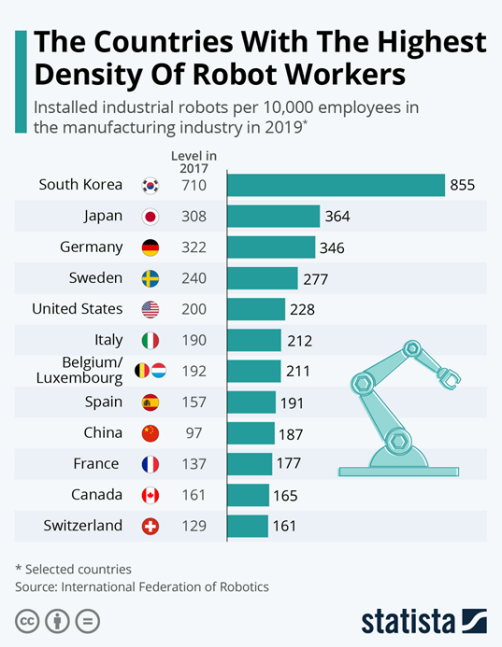



A bigger factor may be the change in family makeup and institutionalization. The graph shows the dramatic recent drop in the U.S. from the 60's to the 70's. With the introduction of the birth control pill and the prosperity of modern economies, large families were not necessary or even desirable. The current fertility rate for the U.S. in 2020 was 1.73 children per woman during her lifetime. Replacement requires 2.1.




This with later marriages and fragmented families to a precipitous drop in the size of households from well over 3.4 to less than 2.6 persons. Smaller families mean that each child becomes more valued and less pressed to find employment. The wealth of our society and the small size of families significantly reduces the number of people who would value good manufacturing jobs. Institutionalization from early ages in pre-school, sports activities, clubs, classes, schools, etc. means the family often becomes a logistical staging platform instead of an intimate community. Families rarely have the habit of common meals and regular schedules. This shift means that young people assess their worth by the status in their important

institutional roles instead in the love and care of their family. This extends to our current idea that the meaning of life is to succeed in our passion rather than to love and care for our family and community.




Other countries have already had to grapple with this reality. Automation in Japan was driven not by the desire for quality or lower cost but in large part by the lack of new workers. Automation replaced the workforce and after it was adopted, became efficient and able to meet higher quality standards. Robots are most common in the largest manufacturing economies with the lowest fertility rates.

So our industry needs to take two approaches to the future challenge of a diminishing workforce; we need Industry 4.0 and we need to culturally manage our organization to connect our team with the importance and value of the products we are making.

SFSA is organizing and sponsoring efforts for automation for low production levels. We are concentrating on labor-intensive finishing operations. Unlike high volume production, we are unable to create a unique program for the equipment or robot for each casting so we need a smart program that allows an operator with the part definition to direct the equipment for each unique casting.

We will still need a workforce but we only need a few people from society that would value and master our skills of making castings. The Cast in Steel competition is the best example of a program that helps identify and e3ngage college students that would be interested in working in our industry. We need to find pockets of people in our local community that have a history and interest in skilled craft labor. This might be through a local community college engaging not just the welding classes but also the other skilled classes like auto mechanics, electricians, etc. We should also host tours for scouts, 4H, etc. Find those few people that would enjoy making real products is one key to our future workforce.

We also need a team culture that values the artisanship of making our castings. Our team needs to see the value of our products and the meaningfulness of our work. What we do is important!

Raymond

**STEEL FOUNDERS' SOCIETY OF AMERICA**
**BUSINESS REPORT**

| **SFSA Trend Cards** (%-12 mos. Ago) | 12 Mo Avg | 3 Mo Avg | April | March | February |
|---|---|---|---|---|---|
| **Carbon & Low Alloy** | | | | | |
| Shipments | -12.4 | 7.9 | 21.2 | 2.5 | 0.0 |
| Bookings | -11.9 | 16.2 | 26.3 | 9.6 | 12.9 |
| Backlog (wks) | 8.2 | 9.0 | 11.0 | 8.0 | 8.0 |
| **High Alloy** | | | | | |
| Shipments | -9.4 | 5.2 | 18.2 | -2.5 | 0.0 |
| Bookings | -5.9 | 14.2 | 17.5 | 8.0 | 17.0 |
| Backlog (wks) | 9.2 | 10.0 | 10.0 | 9.9 | 10.0 |
| **Department of Commerce Census Data** | | | | | |
| **Iron & Steel Foundries (million $)** | | | | | |
| Shipments | 1,189.7 | 1,203.3 | 1,241 | 1,234 | 1,135 |
| New Orders | 1,283.8 | 1,343.7 | 1,375 | 1,407 | 1,249 |
| Inventories | 2,131.4 | 2,284.7 | 2,290 | 2,303 | 2,261 |
| **Nondefense Capital Goods (billion $)** | | | | | |
| Shipments | 72.0 | 76.4 | 78.9 | 75.8 | 74.5 |
| New Orders | 69.4 | 78.6 | 80.0 | 77.4 | 78.3 |
| Inventories | 194.1 | 196.4 | 196.4 | 196.7 | 196.0 |
| **Nondefense Capital Goods less Aircraft (billion $)** | | | | | |
| Shipments | 68.7 | 71.7 | 72.5 | 71.9 | 70.8 |
| New Orders | 70.0 | 73.5 | 74.9 | 73.3 | 72.2 |
| Inventories | 128.6 | 130.6 | 130.9 | 130.7 | 130.3 |
| Inventory/Orders | 1.8 | 1.8 | 1.75 | 1.78 | 1.81 |
| Inventory/Shipments | 0.0 | 1.8 | 1.81 | 1.82 | 1.84 |
| Orders/Shipments | 0.0 | 1.0 | 1.03 | 1.02 | 1.02 |
| **American Iron and Steel Institute** | | | | | |
| Raw Steel Shipments million net tons) | 6.8 | 7.5 | 7.8 | 8.0 | 6.7 |