



SFSA CASTEEL REPORTER

Steel Founders' Society of America

a publication serving
SFSA steel casting industry members

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March — 2021

Casteel Commentary

Insanity is the only apt descriptor of our current financial environment. Federal spending, borrowing, equity prices, and interest rates are in an unsustainable place and headed away from any responsible path forward. This is not a political observation and is the result of the polarization and lack of responsible decision-making or policies by all parties, political and commercial...

New! Cast in Steel Scholarship

The Cast in Steel Scholarship provides \$5,000 for students without the financial resources to pursue an education for a career in the steel casting industry. This offering is intended to help alleviate the financial strain for students who have a real passion for the industry. It may not be a good fit for every student.

Students don't have to be involved in the Cast in Steel competition to apply for the Scholarship. The 'Cast in Steel' slogan simply represents the pride we take in being a part of the steel casting industry. The Scholarship came from the 'pay it forward' idea of several members who struggled to pay for their education. Awards will only be granted if qualified applications are received.

If you have an intern, family member, or friend who is seriously pursuing a career in the steel casting industry and would like more information about the scholarship, contact [Kimberley Schumacher](#).

Member Interns: Peaslee & Schumo Scholarships

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>. Last year's recipients:



Rosemary Barrass



Schumo Scholarship



William Schmidt



Peaslee Scholarship



Max Selbach



Schumo Scholarship



Hannah Ullberg



Schumo Scholarship

Cast in Steel: Performance Testing & Event Dates

Steel Founders' Society Foundation appreciates Joel Jacobson and Claude Hutchens of General Kinematics for hosting this year's performance testing at their facility in Crystal Lake, IL, and for generously sponsoring the Judges commemorative gifts.

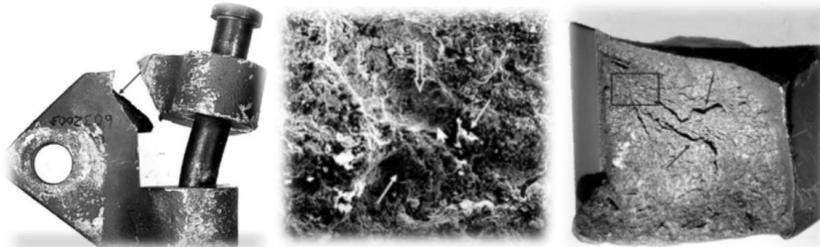


Performance Test filming will take place on Saturday, April 24th. The online event will premier on Friday, April 30th. Gather your team to watch the results! After the event, explore the team listings to get better acquainted with the students and view their project's testing. This year each team created their own Test Video as a kind of pre-test to prove the worthiness of their hammer. Learn more about [supporting the event](#), or contact [Kimberley Schumacher](#) with questions.

Research Highlight: The University of Arizona

The University of Arizona is investigating the effect of indications on the performance of steel castings for use in building construction. They have developed a new analytical quantity, the Ductile Fracture Index (DFI), that considers the stress state near an indication and its effect on the ductility of the material near the indication. During their 2020 T&O presentation, they showed that, based on analytical and experimental test results, the DFI appears to be a robust methodology to predict the effect of an indication on a steel casting's ductile fracture performance. They have developed an analytical "test" matrix that will allow them to simulate many variations of indication size, shape, location, distribution, etc. to further develop an understanding of the impact on performance. Targeted experimental trials will then be performed to validate the simulations without having to physically test every possible combination of indications.

Keeping the Team Sharp: Failure is Not Always a Result of the Casting Process



'[Understanding Steel Casting Failures](#)' is a twenty-minute video that equips foundry personnel and designers with critical information about why steel castings fail. Defects are not always the culprit and the foundry is not always to blame. Design, misuse, and performance limitations, are just a few situations that may point to problems.

Who Should Watch: Customer service personnel, those who make steel castings, buyers, and designers will all benefit from understanding this important topic.

<https://www.sfsa.org/education.php#understand>

Member Webinars

Two member webinars held in February are now posted on the wiki. The Future Leaders webinar series on Data Analysis concluded with a webinar showcasing how to apply the data analysis techniques and tools that were discussed in Parts 1 to 5 on analyzing actual data and solving foundry issues. This webinar series provided necessary tools and skill set that are valuable to Future Leaders and provided an opportunity for the Group to stay engaged in the absence of the regular Future Leaders in-person meeting. The webinar series can be watched [here](#).

Lehigh University presented their multi-linear regression model that they developed for correlating composition, microstructure and carbides, and tensile properties of heat resistant steels. This tool can provide some guidance on how composition can be adjusted to improve mechanical properties and reduce susceptibility to cracking during process. This approach also has the potential to be expanded to other alloys. Twenty-two member foundries participated in this virtual meeting. The webinar can be watched [here](#).

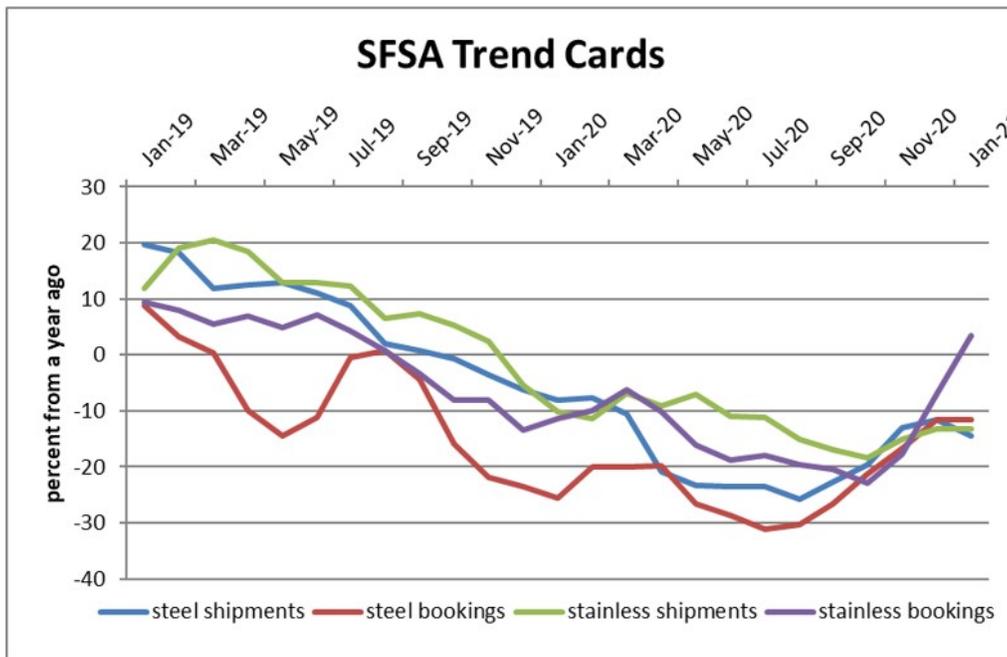
75th T&O Conference, Dec. 8-11

Celebrating 75 years of hosting the Technical and Operating Conference, SFSA will hold a children's art contest. The winning work may become the face of this year's conference. With the focus on operations, the artwork should illustrate plant work or the people who do foundry work, or both. Watch for more details to come.

Market News

Nearing the end of the first quarter in 2021, business activity across all the steel casting markets continues to show signs of recovery and growing demand for steel castings. January bookings for stainless steel castings were above prior-year levels for the first time since August 2019. Nondefense capital goods shipments and new orders are up while inventories have declined. Price of oil, copper, and steel scrap have trended upwards and are above pre-pandemic levels.

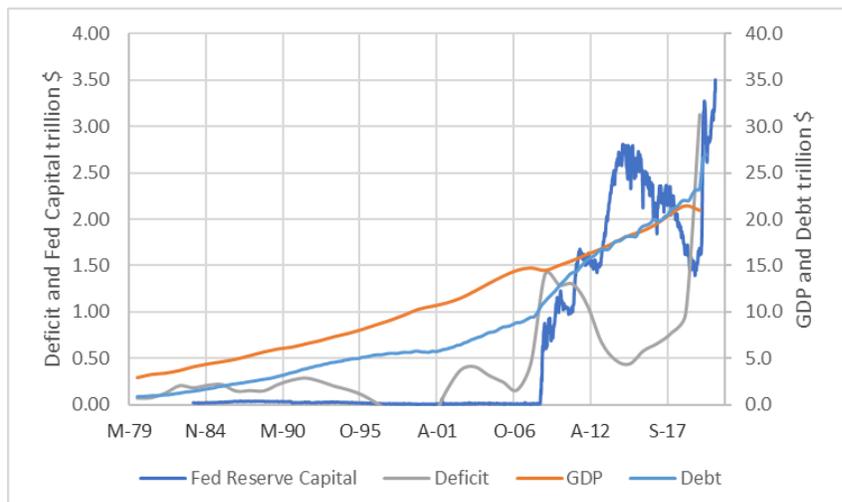
The latest report from ITR Economics indicates that US Metalworking Machinery New Orders, overall US Machinery New Orders, and US Construction Machinery New Orders are nearing levels above a year ago. ITR revised their outlook upward for both US industrial production and oil and gas, by 3% and 5% respectively.



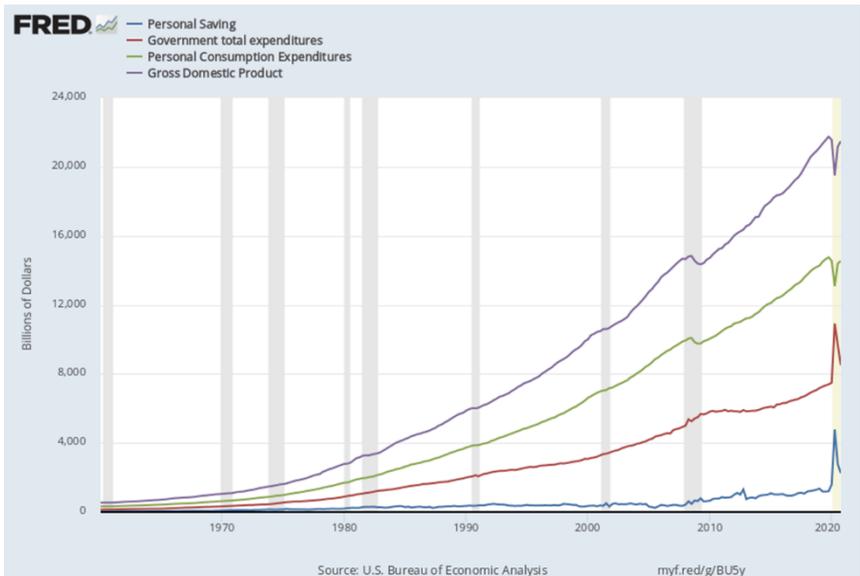
Casteel Commentary

We are in an unprecedented place financially in the U.S. and it will have unforeseeable but dramatic effects when the resolution comes and reality forces reconciliation between our financial hubris and reality. To get some sense of how irrational our current financial environment is we can look at the spending and debt for the past 20 years.

Since the 2009 financial crisis, the monetary system has taken unprecedented steps to support financial institutions and values. Instead of allowing speculators to have losses and the economy adjust to reality, our response protected the financial speculators at the expense of the non-financial sector. The Federal Reserve has purchased commercial paper, generated capital reserves for banks, paid interest on reserves, etc. Public debt exceeds the



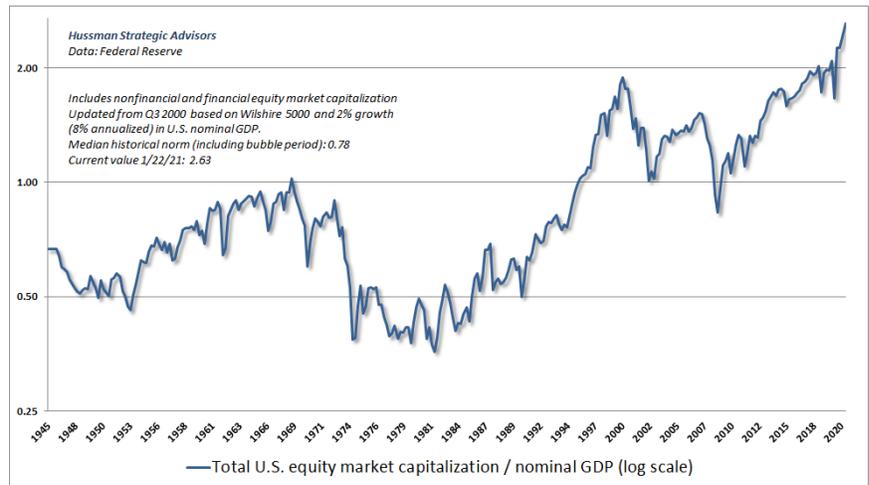
national GDP even before we add the additional \$1.9 trillion expenditure premised on pandemic relief. Many of the “temporary” programs initiated in the COVID relief package are intended to become permanent additions to the host of un-funded support programs already in place. It is shocking that the graph using the numbers from FRED, the Federal Reserve St. Louis website, requires using trillions to express our current, deficits and debts. Our current deficits for last year and this year will exceed 10% of the nation’s GDP.



Did dumping money into unemployment and into households mitigate the contraction of the economy? No. The FRED graph of GDP and personal consumption shows the deep contraction due to the policy of lockdowns and the effect of the pandemic. But the increased government expenditures went almost totally to personal savings. The savings rate during the pandemic was at historically high levels.

The consequences of near-zero interest rates and dramatic increases in the money supply have been used speculatively to push equity and debt instruments to historic highs. One useful metric of

valuations from Hussman, but common, is the ratio of equity values to the GDP. Companies are commonly worth about half their annual sales. Many times, the book value is also half the annual sales. These ratios reflect, at least partially, the goal to have a return on investment that is twice the return on sales. As can be seen in the ratio of capitalization to GDP, the U.S. is at historic high levels for equity values. From ratio levels below half (0.50), the ratio is over twice (2).



Low interest rates have been used to justify these high stock valuations but that implies that the economy will be stagnant for over a decade with economic growth rates below 2% on average. This is also implied by the stability of prices and the low interest rates. Economic growth depends on increases in the workforce and improvements in productivity. The increase in the workforce will be muted with the low birthrate and the wealth allowing non-participation. The increase in productivity will required investment in capital equipment. The current fiscal and monetary environment discourages domestic capital investment. Low interest rates make borrowing inexpensive but also imply no need for added investment and no time value for the money invested. So, capital investment is risky with an uncertain return.

Given the instability of the current economic environment and future public policy, conservative approaches to weather dramatic future events are needed. It is not clear if the overhang of savings and a dramatic increase in the money supply will trigger inflation. Will the evolving policy lock-in these reserves and, like Japan, resulting in decades of stagnant economic performance? Will the dollar fall creating more domestic demand or will it rise increasing imports due to global uncertainty? Will the

new administration's changes in the approach to China improve the environment for domestic manufacturing or facilitate increases in trade? Will changes in policy in the Middle East allow withdrawal and stability or conflict? Will commodity prices spur investment in equipment and stimulate demand or will regulations to discourage fossil fuels and encourage EV production reduce demand?

We may be faced with the challenge of a decade of inadequate capacity, difficult production requirements, and robust sales or stagnant markets with tepid demand and increased global competition. But we need to be prepared for the uncertainty, whatever that means, as we try to manage the operation of our plants. The one thing that seems certain to me is that we are facing a time when dramatic changes in our business environment should not be a surprise and are likely to characterize our near future.

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

SFSA Trend Cards (%-12 mos. Ago)	12 Mo Avg	3 Mo Avg	January	December	November
Carbon & Low Alloy					
Shipments	-19.6	-14.5	-30.0	-3.6	-10.0
Bookings	-21.0	-11.6	-19.8	0.6	-15.5
Backlog (wks)	7.9	8.0	8.0	8.0	8.0
High Alloy					
Shipments	-13.0	-13.3	-20.0	-10.0	-10.0
Bookings	-11.9	3.3	6.0	14.0	-10.0
Backlog (wks)	8.9	11.0	12.0	11.0	10.0
Department of Commerce Census Data					
Iron & Steel Foundries (million \$)					
Shipments	1,207.4	1,191.0	1,192	1,182	1,199
New Orders	1,256.6	1,276.7	1,301	1,215	1,314
Inventories	2,113.0	2,038.3	2,036	2,047	2,032
Nondefense Capital Goods (billion \$)					
Shipments	70.3	74.4	76.9	74.5	71.8
New Orders	63.7	72.8	75.5	71.0	71.9
Inventories	192.4	194.1	191.8	194.4	196.1
Nondefense Capital Goods less Aircraft (billion \$)					
Shipments	66.9	70.8	71.9	70.6	69.9
New Orders	67.7	72.3	72.9	72.6	71.5
Inventories	128.0	128.3	128.7	128.3	127.8
Inventory/Orders	1.9	1.8	1.77	1.77	1.79
Inventory/Shipments	0.0	1.8	1.79	1.82	1.83
Orders/Shipments	0.0	1.0	1.01	1.03	1.02
American Iron and Steel Institute					
Raw Steel Shipments (million net tons)	6.7	7.1	7.4	7.0	6.8