



# SFSA CASTEEL REPORTER

Steel Founders' Society of America

a publication serving  
SFSA steel casting industry Members

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## June — 2017

### Casteel Commentary

Steel castings are essential for economic prosperity, raising the standard of living and for providing national security. The best technology and economic performance is enabled by competition in the marketplace. Steel casting production is a difficult business with volatility including wide swings in demands and requirements. Recent challenges include the addition of global competition that often is damaging and predatory to North American industry. The U.S. government is initiating an investigation into the effects of steel imports on national security. While our industry is happy to compete, we cannot succeed when our global competitors have systemic advantages based on their government support and not on their efficiency or technology. This month's Casteel Commentary is a copy of testimony submitted to provide critical information to this investigation. A video of Raymond's 232 testimony to the Department of Commerce is available at <https://www.sfsa.org/video/misc/RWM%20Testimony.php>.

### David Poweleit Recognized for 20 Years at SFSA

Wow! Dave Poweleit has now worked for SFSA for 20 years! Dave has been a strong contributor and a persistent advocate and a good friend and an essential supporter for SFSA and for the steel foundry industry. He has shown leadership and passion in his time in our group. The next time you see Dave, take a moment and thank him for his efforts, his investment and his love for our industry. Thank you, Dave!

### SFSA Fall Leadership Meeting

SFSA Fall Leadership Meeting September 9-12, 2017

Registration for the 2017 Fall Leadership Meeting is now open: Register online now

This is an educational and networking meeting set in beautiful South Lake Tahoe, California. Early registration rates are available now through June 30. Also, member companies sending more than one attendee will receive a \$500 discount on each additional registration.

This year's business sessions will include the SFSA 2018 market forecast, industry round table, and presentations from the following speakers.

Speaker	Organization	Topic
Larry Mersereau	Promo Power	<b>Stand Out – Differentiate or Disappear</b> Larry will deliver proven strategies and tactics on how to position and grow your business.
Jack Harris	PDES, Inc.	<b>Industry 4.0 for SME's</b> Industry 4.0 is the current trend in automation and data exchange in manufacturing technologies. Small and medium-sized manufacturers are the drivers of manufacturing growth and need to learn how to adopt these new technologies.

Speaker	Organization	Topic
Steve Fox	Security Pursuit, LLC.	<b>Cyber Security – How To Protect Your Business</b> Small businesses are most vulnerable to cyberattacks due to their limited resources. This session will identify the most common cyberattacks, organizational cultures that contribute to these attacks and best practice strategies to protect your business.
Willy Oyarzabal	Fimex	<b>SFSA Market Forecast</b> A forecast of the 2018 steel casting markets developed by the SFSA marketing committee.
Skip & Martha Guimond	Guimond & Associates	<b>EHS Regulatory Update</b> The Guimond's will review the current and future issues with OSHA and EPA and resources to assist SFSA members with compliance and training.
Kris Bledowski	Manufacturers' Alliance for Productivity and Innovation (MAPI)	<b>Global Economic Update</b> MAPI is a recognized source for extensive economic analysis and forecasting for manufacturing. Kris is a senior economist with MAPI and will provide a perspective on the world economy for manufacturing and what lies ahead.

#### Schedule of Events

##### **Saturday September 9**

###### Morning

Executive Committee Meeting  
Executive Committee Spouse Breakfast

###### Afternoon

Group Activity

Evening

Welcome Reception

##### **Monday September 11**

###### Morning

Business Session  
Spouse Breakfast

###### Afternoon

Group Activity

Evening

Dinner

##### **Sunday September 10**

###### Morning

Board of Directors Meeting  
Board of Directors Spouse Breakfast

###### Afternoon

Group Activity

Evening

Dinner

##### **Tuesday September 12**

###### Morning

Business Session  
Spouse Breakfast

###### Evening

Reception

#### **Welding Event**

Production Welding is an important manufacturing step in achieving the customer's requirement for steel castings. SFSA has a white paper on welding steel castings (<https://sfsa.org/doc/WhitePaper-Welding.pdf>) and is working with specification bodies to reword "repair welding" to terminology that is more technically accurate such as production welding. At this subject-focused meeting on the afternoon of Wednesday 7/19, we will discuss welding steel castings through an industry roundtable and with presentations such as Navy Tech Pub 248, petrochem furnace welding and fabrication, welding high alloy castings, and purchasing and certification of filler metal. We will also offer a unique opportunity for members on Thursday 7/20 to partake in a one-day training seminar by Walt Sperko on the secrets of using ASME BPVC Section IX plus welder qualification. This event will be held in Milwaukee, WI on July 19th-20th, and include a tour of MetalTek – Wisconsin Centrifugal on the morning of Friday 7/21. Registration for this event is required and can be done through the SFSA Member Portal at <https://sfsa.memberclicks.net>. Contact David Poweleit, [poweleit@sfsa.org](mailto:poweleit@sfsa.org), with any questions.

## **Duplex Stainless Steels and Future Leaders Meetings**

The Duplex Stainless Steels (DSS) offer the corrosion resistance of CF grades but with higher mechanical properties. With advances in the wrought industry, additional opportunity for cast components has been created and their marketplace has been growing over the years. The subject-focused meeting will focus on a seminar by Tom Stevens on the development of DSS through the years to provide a fundamental understanding of the alloys. The Future Leaders Group will meet in advance but also participate in the DSS meeting. These meetings are scheduled for September 20-22 with a tour of Omaha Steel Castings on the morning of the 22<sup>nd</sup>. Contact David Poweleit with any questions.

## **Digital Innovation Design for Reliable Casting Performance**

The SFSA Board has identified designing new castings as the most important challenge for the future of our industry. We need a technically sound set of tools that allows new engineers to confidently design reliable steel castings gaining the benefits of the geometric freedom and alloy performance available in steel castings. We have worked in Washington with Congress and the Department of Defense to start a program to develop and provide this set of tools in a project called, "Digital Innovative Design for reliable Casting performance" (DID). The heart of the program is to measure a statistically valid set of design property values including the effect of welding and NDT. We want to use these to develop a simple design approach with a pre-packaged NDT first article test to make it as easy to buy a steel casting from a solid model as to machine the part from a billet. We also for critical and weight sensitive parts want a fully documented approach using solidification modeling to predict design values in each location of the casting to assess reliability. This approach will be supported with new NDT standards that are related to part performance. The goal is to create an engineering environment for new designers that allow them to fully use elegant castings to achieve the cost and performance goals while growing our target market.

## **Videos**

With the success of the webinars, SFSA is creating additional opportunities to document tribal knowledge for current and future use. Making videos of meeting presentations is one means of adding to our e-Learning resources and enables members who were unable to attend an opportunity to still receive the information. The wiki now features a "Steel Casting Technology Videos" page at [http://wiki.sfsa.org/index.php/Steel\\_Casting\\_Technology\\_Videos](http://wiki.sfsa.org/index.php/Steel_Casting_Technology_Videos) with videos from the Wear Castings meeting and Raymond's DOE presentation at Magma's User Group meeting. The DOE video compliments the three webinars on Design of Experiments ([http://wiki.sfsa.org/index.php/SFSA\\_Webinars#Design\\_of\\_Experiments\\_-\\_Part\\_1\\_-\\_Measurements](http://wiki.sfsa.org/index.php/SFSA_Webinars#Design_of_Experiments_-_Part_1_-_Measurements)). We have also added recorded presentations of the research presented at the 2016 T&O at [http://wiki.sfsa.org/index.php/2016\\_Technical\\_%26\\_Operating\\_Conference](http://wiki.sfsa.org/index.php/2016_Technical_%26_Operating_Conference).

## **Specification Committee**

The following key initiatives are being pursued by the committee. For more information on these projects or to join the Spec Committee, please contact David Poweleit at [poweleit@sfsa.org](mailto:poweleit@sfsa.org).

## **ASTM**

1. The addition of a note to the first general requirement standard (A781) to better describe test material. It is to characterize the tensile properties of the heat and that tensile properties will vary within a heat or individual casting as a function of chemical composition, processing, testing procedure and other factors.
2. Adding the allowance for test coupons from castings to the general requirement standard (A781) in place of product standards.
3. Update to A781 for test coupons made to Figure 4 of A1067. The text will clarify only when this coupon can be used based on the alloy and section size.
4. The use of "repair welding" is technically a poor choice of words when applying to castings and leads to confusion. In initial purchaser/producer discussions, the use of "production welding" would be preferred, and this would be harmonious with ISO standards.
5. Recent work developed an ASTM practice for the Telebrineller (portable hardness tester) with a precision and bias statement. SFSA, through the support of UAB, would like to investigate a similar effort for the NewAge Shear Pin and initiated a recent survey. If you use the NewAge

Shear Pin but have not responded to the survey, please contact David Poweleit at [poweleit@sfsa.org](mailto:poweleit@sfsa.org).

## ISO

The following ISO standards have been designated for updates:

1. DIS for ISO 4986 - Magnetic particle inspection
2. DIS for ISO 4987 - Liquid penetrant inspection
3. DIS for ISO 10679 - Cast tool steel
4. DIS for ISO 19959 - Visual examination of the surface condition of investment castings
5. CD for ISO 4992 (Part 1 and 2) - Ultrasonic examination
6. SR for ISO 11971 - Visual examination of surface quality

## AWS

SFSA continues to pursue the inclusion of cast steel grades as prequalified weldable base metals in AWS D1.1, to reduce the challenge of steel castings being eliminated from building construction projects even when castings had been called for by the building's designers. SFSA confirmed with an industry expert that D1.1 does nothing to qualify the quality of the base material. SFSA met with representatives at NASCC and established a plan to work with the committee to include cast grades. SFSA has prepared a comparison between current wrought grades in the standard to cast grades to be included.

## **Foundry Intern Scholarship Registrations Due July 3<sup>rd</sup>!**

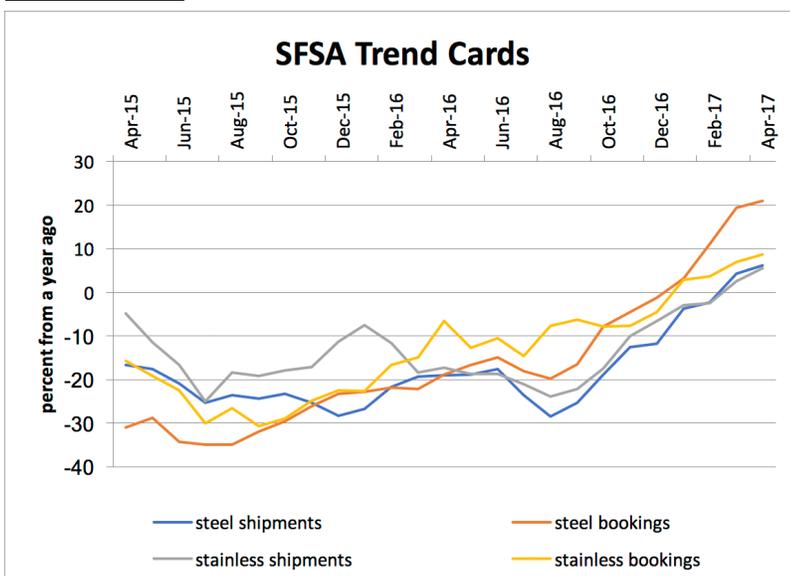
Recruiting students to join our industry and grow into leadership positions remains a critical need in the steel casting industry and a strategic initiative of the Society. The SFSA Foundation aims to attract the next generation workforce by providing scholarships to student interns. To compete for the scholarships, interns are required to work at a member foundry and carry out a specific task or investigation and selected works are presented at the annual T&O conference. We encourage all members that employ interns in 2017 to give them an opportunity to receive a scholarship by registering these interns using the following forms:

Peaslee Scholarship Intern Sponsorship Application: [https://www.sfsa.org/doc/Intern2017\\_Peaslee.pdf](https://www.sfsa.org/doc/Intern2017_Peaslee.pdf)

Schumo Foundation Intern Sponsorship Application: [https://www.sfsa.org/doc/Intern2017\\_Schumo.pdf](https://www.sfsa.org/doc/Intern2017_Schumo.pdf)

The SFSA foundation has two scholarship programs: the Peaslee Scholarship and the Schumo Scholarship. The Peaslee Scholarship was established by the SFSA Board in honor of the late Dr. Kent Peaslee, the Chair of Steelmaking Technology and Curators' Teaching Professor of metallurgical engineering at Missouri University of Science and Technology. The \$1,000 scholarship is to be awarded to a student intern that has worked at an SFSA member foundry during 2017 in the area of melting or refining. The Schumo Foundation scholarship program awards \$1,000 scholarships to interns that submit papers based on their projects. The scholarships are competitive; each applicant is required to submit a paper and PowerPoint presentation on a particular project they have completed during their employment. Internship registrations are due by July 3, 2017.

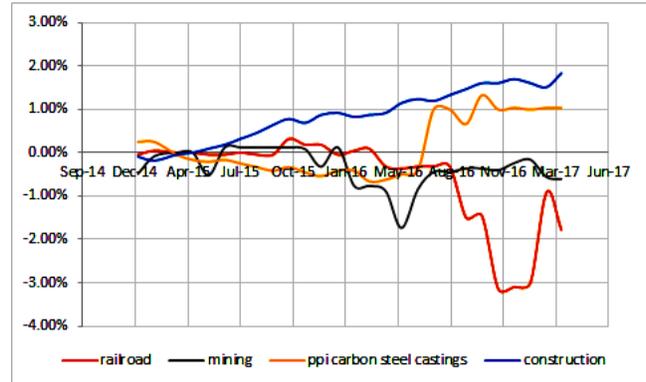
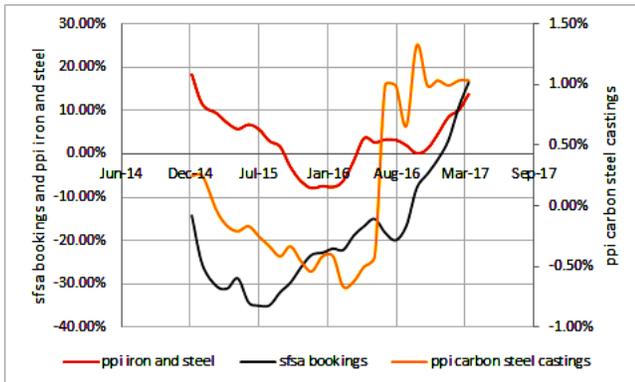
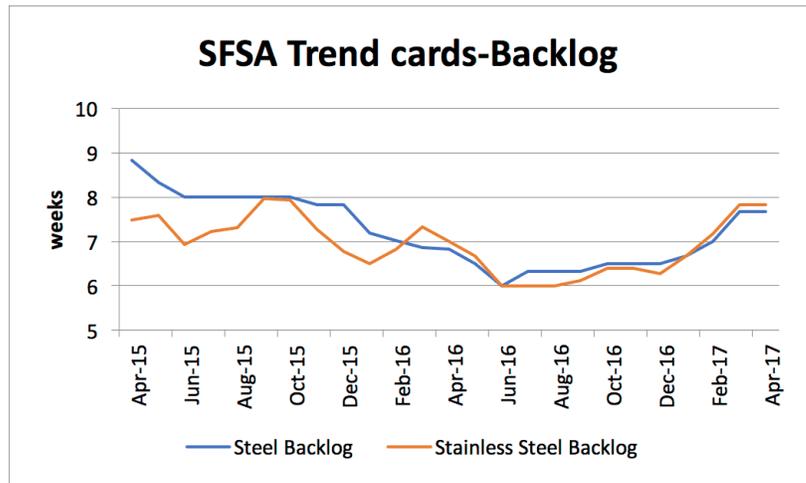
## **Market News**



Steel casting bookings and shipments for steel and stainless steel castings are up sharply. This reflects in part the low levels of business in March of 2016 and does not suggest total market growth over our recent levels but is encouraging that market conditions have improved compared to a poor situation last year. Bookings are up double digits. The backlog has grown since January and is approaching eight weeks in the three-month average, close to a normal market level.

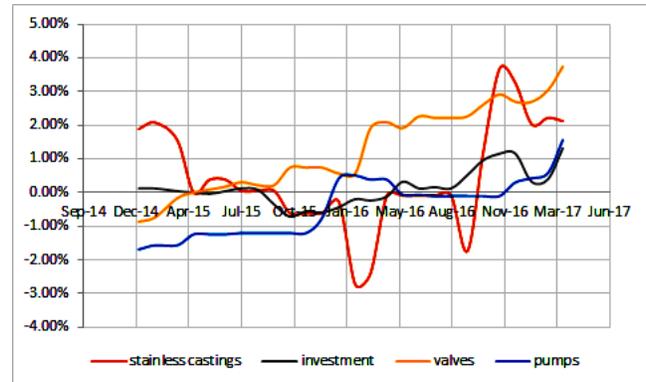
Since March, the demand for steel mill products has softened suggesting a moderation in market demand for the next period. This is also seen in the price of oil and copper making the balance of this year less likely to see continued growth. Non-defense capital goods have seen modest increases through March.

The trend reported by SFSA on backlog shows improving market conditions. In a “normal” market, the backlog for steel and stainless castings is around 8 weeks. In the severe downturn in early 2016 backlogs fell to six weeks.



Orders for capital goods also fell reaching a low in mid-2016 and now showing ordinary growth rates. Steel mill shipments have improved since late 2016 but have moderated for the past month.

We can see this same type market information looking at the producer price index for steel castings and iron and steel products totally. The prices of steel products including steel castings was low for the first half of 2016 and saw some recovery in late 2016. Since price activity is related to market demand, ppi indications may give some information about our customer markets.



For major markets in steel castings, railroad, mining and construction, rail parts prices fell in late 2016, mining showed some decline and construction prices improved. For stainless steel and investment casting compared to the pump and valve market, stainless casting prices were volatile like steel prices with a dip in early 2016 and improvements later in the year. Investment casting prices were stable. Pumps and valves showed ongoing increases more completely keeping up with the general inflation rate.

The production of steel, the price of copper and oil have moderated in the past month suggesting a slowing demand for steel castings for the balance of 2017.

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

**SFSA Trend Cards**      12 Mo Avg    3 Mo Avg    April    March    February  
(%-12 mos. Ago)

**Carbon & Low Alloy**

Shipments	-10.1	6.1	9.5	9.8	-1.0
Bookings	-0.5	21.0	20.0	25.0	18.0
Backlog (wks)	6.8	7.7	8.0	8.0	7.0

**High Alloy**

Shipments	-9.0	5.6	10.0	5.0	1.7
Bookings	-2.8	8.7	10.0	10.0	6.0
Backlog (wks)	6.7	7.8	8.0	8.0	7.5

**Department of Commerce  
Census Data**

**Iron & Steel Foundries (million \$)**

Shipments	1,405.9	1,290.7	1,267	1,298	1,307
New Orders	1,424.5	1,293.0	1,252	1,311	1,316
Inventories	2,013.4	1,916.0	1,921	1,908	1,919

**Nondefense Capital Goods (billion \$)**

Shipments	71.1	69.8	69.8	70.0	69.5
New Orders	69.9	70.9	70.5	71.8	70.4
Inventories	171.9	177.3	176.8	178.0	177.1

**Nondefense Capital Goods  
less Aircraft (billion \$)**

Shipments	62.8	62.6	62.7	62.6	62.5
New Orders	63.3	62.9	62.9	62.9	62.8
Inventories	119.4	121.6	121.8	121.9	121.0

Inventory/Orders	1.9	1.9	1.94	1.94	1.93
Inventory/Shipments	0.2	1.9	1.94	1.95	1.94
Orders/Shipments	0.1	1.0	1.00	1.00	1.01

**American Iron and Steel Institute**

Raw Steel Shipments (million net tons)	7.3	7.5	7.4	7.7	7.2
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## **Casteel Commentary**

### ***Section 232 Investigation: The Effect of Steel Imports on National Security***

**Submitted by:** Raymond Monroe, Executive Vice President, Steel Founders' Society of America, [monroe@sfsa.org](mailto:monroe@sfsa.org)

On September 9<sup>th</sup>, 2003, Amite Foundry in Amite, Louisiana poured a seven ton casting made with steel scrap from the World Trade Center to make the bow stem for the USS New York. Amite Foundry is a part of the U.S. foundry industry that manufactures thousands of custom designed, high performance castings ranging in size from 1 pound to 50 tons for critical sectors of the U.S. economy.

On behalf of Steel Founders' Society of America (SFSA), we appreciate this opportunity to provide comments for the U.S. Department of Commerce investigation to determine the effects of the imports of steel on national security.

Steel Founders' Society of America (SFSA) is a trade association for advancing the steel casting industry. We are over 100 years old and since World War II have worked to develop the advanced technology in steel casting production and use. Our industry is a distributed industry of mostly small privately held plants making proprietary engineered products of our customer's design. We have worked with federal agencies such as the Departments of Commerce, Energy and Defense to develop leading edge technical solutions for domestic needs. Steel foundries are not large plants owned by corporations and our plants do not have the staff or resources to independently develop the technology required for advanced products, including castings for use in weapons systems or for other security requirements. Changes in markets, globalization, and pressure from foreign competition have all decreased both the capacity and the capability of U.S. steel foundry suppliers of critical defense parts.

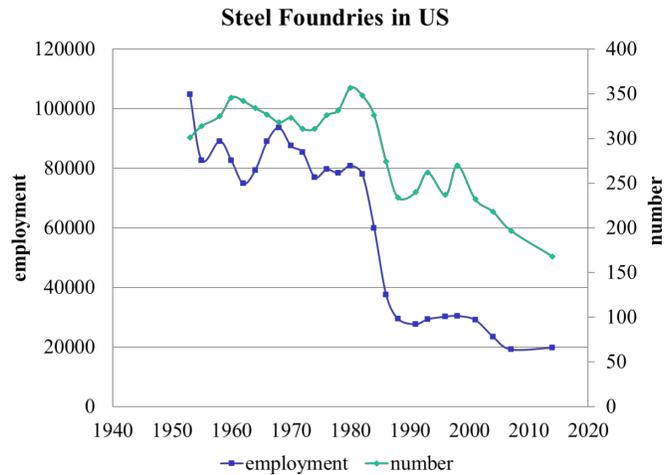
U.S. steel foundries operate about 220 plants that make over a million tons of castings each year with only 160 plants devoted as a primary business to steel sand casting production. We are a part of the U.S. metal casting industry that supplies about 10 million tons of steel, iron, titanium, nickel, copper, magnesium and aluminum castings. We are also a small part of the U.S. steel industry that makes about 100 million tons of steel bars, plates, pipes, etc. a year. Global competitors, primarily China, have taken at least 25 percent of the U.S. steel casting market. All steel industries face unfair global competition that reduces our ability to support the needs of national security

Since 2000, eighty steel foundries have shut their doors, one third of the entire industry. Over 8,000 foundry workers have lost good paying jobs and these closures have reduced our capacity by 500,000 tons to 1,400,000 tons. The 8,000 lost jobs are only the direct reduction in employment. Each manufacturing job supports the community infrastructure of school teachers, police and firefighters, shop keepers and accountants, etc. Traditionally in a small town with one factory, the town population was ten times the plant employment. Plant closures can kill small towns or neighborhoods.

Steel casting producers are small companies compared to their customers and suffer from global competitors that often have subsidized or other financial support that give them advantages in trade. After two decades of tough conditions, steel foundry capacity was lower and the capital infrastructure was inadequate in the global market such that beginning in 2004 there were sharp price increases and supply limits in mining and energy production. This exposed the lack of adequate supply for steel castings, especially for large steel casting necessary for defense requirements and energy production. Our industry suffered severe downturns in 2009 and early in 2016 and is currently operating at about 60% of our capability. Being a labor intensive industry, we are having a challenging

time staffing our factories. Staffing will be more difficult as business improves with the lack of employable and skilled workers.

The macro-economic policies of encouraging capital investments in the 1970's resulted in excess capital stock and capacity in steel casting production and markets. Steel casting production has always been volatile since it is tied to capital infrastructure and industrial commodities and not to the general or consumer economy. The low levels of business through much of the 1980's and 1990's combined with this systemic over capacity led to a continuous reduction in the number of plants that was offset in part by improvements in productivity. A list of closed plants and the lost capacity is located in Appendix A.



Amite Foundry is one of those steel foundries that is closed. They are part of a group that includes Atchison Foundry in Atchison, Kansas that survived the manufacturing depression of the 1980s by producing the turret ring for the M1 Abrams Tank. Now Atchison is working with SFSA and the Army to produce a cast steel armor capable of defeating IEDs but they are operating at less than 50% of their capacity. Their sister plant in Tacoma, Washington makes critical castings for the *Virginia*-class submarine program as the only qualified U.S. source. They are also operating at less than half their capacity. These poor business conditions put their plants at risk of closure and jeopardize their ability to supply these needed items for defense.

### **Steel Foundries are a vital part of the supply chain for defense and national security.**

The self-reported capacity devoted to defense and military parts by steel casting producers in the U.S. is presented in Appendix B.

Working with the Defense Logistics Agency (DLA) since 1992, the metal casting industry has identified suppliers and tools for castings needed by the U.S. Department of Defense (DOD). Over 75 steel foundries provide more than 10,000 parts for the DOD. Our program with DLA provides engineering support and technical expertise to help in the procurement of long lead time or unavailable items containing castings and forgings. DLA has an ongoing MANTECH effort to improve casting quality and cost to meet defense needs.



An example of the DLA program and need for casting suppliers is the F-5 Crossbleed Valve. This is a DLA Aviation managed item and was problematic in acquisition. The foundry supplier was unable to meet the requirements of the technical data package making the part unavailable. The casting experts worked with DLA Engineering to modify the drawing tolerances for a lower part cost and worked with the producing foundry to meet the DLA technical requirements.



Castings are needed for the:

- Ground vehicle structures and armor
- Aircraft loading systems
- Bomb racks
- Fluid handling and hydraulic power
- Inter-ship material transfer
- Missiles / Bombs
- Mobile missile launchers
- Naval Nuclear
- Submarine propulsion
- Surface and sub-surface propulsion
- Turbine heat exchangers

These examples highlight the critical yet specialized products we make for defense. We not only make military parts but also other things related to national security. Around the buildings on Capitol Hill, Sivyer Steel of Bettendorf, Iowa makes the cast steel bollards for protection and Nova Precision of Auburn, Pennsylvania casts the artful custom tops.

Steel casting technology holds the promise for improved protection and effectiveness at affordable costs for defense needs. New steel castings using higher strength alloys are being developed to provide ground combat vehicles protection against IEDs. When normal steel armor plate is welded to provide an underbody for blast protection, the welds fail in an event. Castings allow flexible geometry and a unitary structure without welds. This higher strength steel, AF9628, was developed by the Air Force and is available as a forging at higher cost with part geometry limitations. In addition to making this steel casting as an underbody for protection, castings using this alloy are also being developed for bunker buster and other munitions for the Air Force.

This alloy development for future requirements reveals the fundamental problem with trade policy and global sourcing. McConway & Torley in Kutztown, PA had a foundry with special melting equipment, a vacuum treatment station. They used this equipment to make high performance castings and forging ingot stock. They were the initial producers of the high strength steel alloy for the Air Force and were able to achieve all the desired properties. However, as a result of offshore competition, the demand for forging ingots fell and the price collapsed. This led to the closure of the plant. The work continued at the most capable alternative plants with steel refining capability but not vacuum treatment. We have struggled to get the properties produced by the McConway & Torley plant using other heat treatments and refining processes.

**To remain capable and available for Defense needs, the steel foundry industry needs viable commercial business.**



As suppliers of defense needs, steel foundries need their capabilities to be successful commercially in the non-defense market. Defense needs are volatile and sporadic. If the specialized production plants needed for security are closed because of competitive pressures from global suppliers, they are not available when needed for critical defense requirements.

This is noted in the Annual *Industrial Capabilities Report to Congress for 2015 issued September 2016* by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. In section 5.4 the Materials Sector Industrial Summary, it states:

Access to the basic materials required for producing finished and intermediate products and components is integral to the U.S. manufacturing base and the Nation's overall economic and national security. Typically, materials supply chains rely on considerable international trade, including basic raw material inputs through intermediate and fabricated materials products. In general, globalization results in lower costs, more efficient supply chains, and access to more resources. However, it may also create a dependency on foreign resources, which could lead to a range of actions that distort supply chains and price structures such as export controls and differing approaches to the regimes governing mining (e.g., production controls, permitting) and investment activities. ....

Generally, the requirements of the DIB (Defense Industrial Base) represent a small percentage of overall U.S. demand for materials such that U.S. consumption and supply chains are focused on serving the needs of the commercial sector. **Therefore, maintaining a vibrant commercial manufacturing base is essential to the health of DIB.** However, the Department closely monitors the materials required by the DIB and their supply chains- especially those materials where there may not be a strong demand impetus from the commercial sector. **Given these dynamics, the Department's concern regarding materials has increasingly shifted away from the mined raw material and has moved toward chemicals, compounds, and semi-finished manufactured goods.**

The lack of casting and forging domestic capability caused the Office of the Secretary of Defense to conduct a survey of our SFSA members in 2009 to assess our industry capability as a critical supplier. They identified ongoing concerns especially for large castings for Navy ships. Large complex technically demanding steel castings are needed for ship construction. We have only one foundry that can make critical components for the Virginia and Columbia class submarines. These large high strength steel castings require Navy qualification and there is one plant qualified in the US. Their size is limited to 50 tons. This means that ship builders and designers need to either fit their design into that size capability or procure these critical parts from global suppliers. This size limitation of 50 tons means that U.S. steel foundries are unable to supply the large castings that are over 100 tons to build new nuclear power plants.

**Our current system allows our global competitors to practice trade distorting behavior with no remedy for us as U.S. suppliers.**

Unfair trading practices, U.S. economic policies, the strength of the dollar, globalization, regulatory burdens and foreign competition have made maintaining our businesses as reliable suppliers for the military challenging. We are in an extremely competitive U.S. market and are not afraid to compete but we cannot compete with global suppliers that are supported by their government policies to gain dominance in the global market to eliminate our production.

The U.S. metalcasting industry continues to face intense global competition. China is now the largest producer of all types of castings of any country in the world, with over 30,000 foundries. Chinese imports now make-up 25 percent of the U.S. marketplace imports. Like the steel mill industry globally where China can make over half the steel-over 800 million tons, China has the capacity to make half the world's supply of steel castings--five million tons--in a world capacity of ten million tons.

**Globalization reduces cost by increasing the supply base but reduces the supply base in the U.S. and makes it more vulnerable.**

Globalization has exploited the benefits of modern information technology and innovations in transportation and communications to allow an explosion of trade. In traditional economic models, free trade that enables globalization is a benefit to all. It allows a firm or region to use their advantage in value or costs to provide lower cost products to a broader market. If regional producers have an advantage because of support or subsidies, customers still get the benefit of lower costs. The harm from unfair trading practices is felt not by the importing country but by the exporting producing economy. If the subsidized producer in the future seeks to reap the benefit of market dominance, other competitors will step in and take the market.

This may be sound traditional economic analysis but it fails to account for the loss of capital intensive plants and facilities, technology and skills, and the need for security and innovation for improved standards of living.

**Fair and efficient free trade requires reciprocity.**

It is not an economic maximizer to allow free trade that is not reciprocal. The fundamental precept of free trade that makes it efficient as well as fair is full reciprocation of the terms of market exchanges. This is an application of a Kantian notion of the categorical imperative but is also necessary for the market to function. Lack of reciprocity is market distorting.

Government policy often has the intention of transferring the social costs of production to the producer, instituting policies that require the producer not only to bear the private costs of production but also the social costs. For example, air quality requirements impose the cost of maintaining clean air on the manufacturer that has the potential to emit pollution. This is the policy that tries to deal with a negative externality, a societal cost that is now paid for by the producer.

What if in globalization, a domestic producer is responsible to bear this cost and their global competitors are not? Then the clean producer is at an economic disadvantage and if the global competitor becomes the market dominant supplier, the societal cost is not included in that producer's costs and the global air quality is compromised.

Governmental policies are themselves market distorting. Subsidies provide the subsidized producer with a market advantage while regulations impose added costs that make the regulated producer have a market disadvantage. Unless these governmental policy effects are included in the definition of reciprocity, then the free trade is not market efficient or fair.

Reciprocity is recognized as an essential attribute of free and fair trade. There is an idea that less developed countries need added assistance to become integrated into the global economy and cannot reciprocate. Trade agreements often then are not reciprocal but are complex tradeoffs to achieve a wide range of policy goals. These tradeoffs may include but are not restricted to economic or trade issues in trade agreements. Externalities and government policies are not included in the reciprocal conditions in trade agreements and this leads to market distortions that are not subject to the current rules-based market disciplines.

Steel manufacturers and foundries in the U.S. suffer since trade agreements have not placed a high value on maintaining reciprocity in traded goods like steel. While the U.S. has a formal commitment to rules-based trading, the recent movement has been to weaken these rules to allow more open markets. This is often done at the expense of trade in manufactured goods.

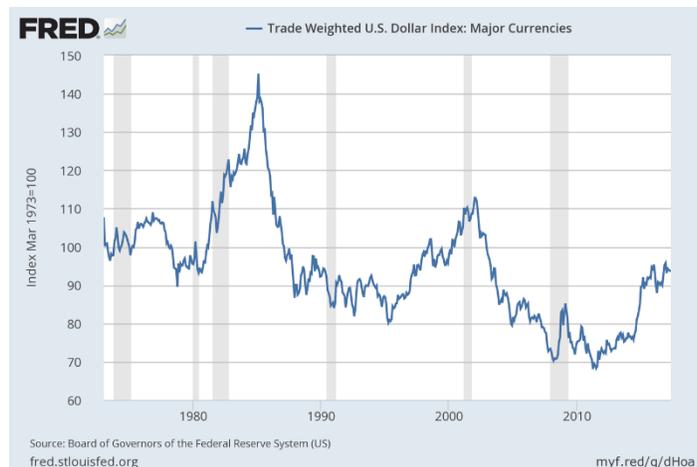
Most of our competitors for example employ a value-added tax. Whether or not that is a good tax policy, it clearly has a market distorting effect in the trade for goods. Our most successful developed competitor in metal products is Germany and they have a VAT of 19%. Since we have no border adjustable tax, we are vulnerable to exploitation.

The balance of trade in goods for 2016 was about -\$750 billion while the balance of trade in services was about +\$250 billion for an annual total trade deficit of -\$500 billion. Services suffer from fewer trade distorting regulations and subsidies. They need intellectual property rights and market access. Trade agreements have often retained the rules for goods but the impetus from the U.S. is to facilitate trade in services to enhance our exports. Given the regulatory environment, tax and fiscal policy and existing trade agreements; goods are less able to compete. This is not the result of economic inefficiencies but due to the market and trade distorting externalities. We are sacrificing our manufacturing to gain benefits for our services.

Global sourcing strategies of our U.S. customers gain the benefit of a global supply chain at the expense of reducing the U.S. supply chain. Before the move to globalization, the U.S. had at least 2 qualified suppliers for every critical item. Globalization has reduced that to one. With the reduction of U.S. suppliers, our global competitors seek to eliminate our U.S. supply and establish a market dominant position that is monopolistic, especially in small specialty products. This behavior violates our antitrust laws but is beyond the reach of our current rules-based trading system. Also, globalization has resulted in the acquisition of critical U.S. suppliers by foreign entities. This undermines our technical advantages by disseminating our technologies to the global suppliers of foreign parent companies.

**Exploiting the variations of currency valuations is not included in the trade distorting behavior subject to our current set of rules.**

One example of a trade distorting externality that compromises our ability to remain vital is exchange rates. The strong dollar in the 1980's aided Japan as a competitor and the strong dollar did the same for China in the 2000's. The current increase in the value of the dollar is of concern as well. Our customers are often large companies chasing the global supply marketplace to get the lowest cost. This remains a huge challenge as we work to remain viable and still be profitable to maintain and advance our industry.



Fluctuations in exchange rates have a dramatic effect on trade. The U.S. dollar is the reserve currency of the world. Our global competitors exploit the value of the dollar to displace U.S. suppliers from the market. While it is not within the purview of the Commerce Department to comment on or be involved in the value of currency, it remains a major issue.

**Trade remedies in the U.S. cost too much, take too long and provide too little benefit to allow our trading rules to work for niche or advanced manufactured products like steel castings.**

Our trade remedies envision only large volume commodity product violations. For advanced manufacturing and high quality niche products of limited supply and market size, the U.S. trade remedy structure is unworkable. There are no small claims courts, no alternative complaint approaches, no relief for small market segments to access; no matter how egregious the violations. The industry needs

to use this cumbersome system that provides no direct relief for violations even if they have spent the money to bring a case and were successful. Our system provides no solution to the modern market of small custom products of high value traded in small dollar volumes in a global system. This is a problem for the steel casting industry but is a much larger and pressing problem for U.S. manufacturers as the modern market moves to more advanced and custom products of smaller volumes.

### **Our trade remedies cost too much.**

In our industry, we had a member who was the only supplier of a specialty product in the U.S. This product was a piston insert for every aluminum diesel engine piston. They were the last U.S. supplier of this part and were exporting to Mexico, England, Germany, and France. This product is used in industrial, mining, construction and military ground vehicles. This product competed with a global supplier who was clearly violating the rules of our trade agreements. After doing extensive work, it became clear that to pursue the case would require representation by a law firm specializing in trade law cases. The cost for representation for any such action is typically in excess of \$500,000.

### **Our trade remedies take too long.**

If this company had decided to pursue this case and agreed to fund the legal representation, the effort would take at least two years. This is in addition to the year they had already used in building their case and pursuing this option.

### **Our trade remedies provide no relief.**

As the only company damaged by the unfair trading practice, if this company was ultimately successful, they would receive only the benefit of tariffs imposed on this unfairly imported product, but the damaged company who spent the money and took the time for litigation would receive no direct benefit or compensation from their effort.

### **Enforcement of our trade laws is ineffective to protect the interests of U.S. manufacturers that make small volumes of valuable products and lack transparency in their application.**

Enforcement is the other challenge. Since our trade system deals with discrete products, the violating party can take steps to avoid it. They can move up or down the supply chain. The ability to embed castings into a later product is an example. This damages not only the steel casting producer but also his customer. They can mislabel the product or transship through another country in violation of agreements. They can ship to another country and complete enough work to evade restrictions on the country of origin. Our enforcement is too little and too late to protect U.S. companies. It lacks the transparency to allow U.S. manufacturers to gain confidence that their interests are being protected. It provides no relief to the injured industry.

When the company making the piston inserts began their efforts, the volume traded in the casting from the global competitor dropped. In looking into what happened, the competitor mislabeled their product into a different category to avoid the existing tariff. The U.S. company raised this issue with customs and made a formal complaint. In following up, they were unable to get any report of progress or enforcement. They still do not know if any action was taken. Now every one of these parts is imported.

It is easy to see that since this is a small volume high value specialty product, Customs could assess that this is too small to be worth the effort for enforcement. Yet if we look to the future and even the present, the global markets are increasingly these small market niches. These specialty products can be vital to national security and commercial stability but are vulnerable to predatory trading practices.

These predatory actions incrementally eliminate domestic suppliers of specialty products commercially and therefore from the defense industrial base. Maintaining a healthy supply chain for defense needs will require improved approaches to trade agreements and trade remedies with enhanced enforcement.

Global competitors that have a different cultural background may come from an environment where only enforced commitments are kept. In our current rules based trading system, the inability to anticipate meaningful enforcement means that we are vulnerable to the elimination or critical suppliers for national security by unfair trading practices.

- **Steel Foundries are a vital part of the supply chain for defense and national security.**
- **To remain capable and available for Defense needs, the steel foundry industry needs viable commercial business.**
- **Our current system allows our global competitors to practice trade distorting behavior with no remedy for us as U.S. suppliers.**
- **Globalization reduces cost by increasing the supply base but reduces the supply base in the U.S. and makes it more vulnerable.**
- **Fair and efficient free trade requires reciprocity.**
- **Exploiting the variations of currency valuations is not included in the trade distorting behavior subject to our current set of rules.**
- **Trade remedies in the U.S. cost too much, take too long and provide too little benefit to allow our trading rules to work for niche or advanced manufactured products like steel castings.**
  - **Our trade remedies cost too much.**
  - **Our trade remedies take too long.**
  - **Our trade remedies provide no relief.**
- **Enforcement of our trade laws is ineffective to protect the interests of U.S. manufacturers that make small volumes of valuable products and lack transparency in their application.**

### Appendix A

#### Closed Steel Foundries and Lost Capacity since 2000

#### SFSA Capacity of Steel Casting Industry in 2017

Annual Capacity, tons		
1998 Capacity, tons	2,030,000	
Annual steel casting capacity closed, tons	537,060	
Current annual steel casting capacity, tons	1,400,000	
	Directory Capacity	Closed by
ASF East Chicago	24000	2002
Claremont	9600	2002
Penn Steel	3300	2002
Beloit	3600	2002
ABC NACO Anderson	5400	2002

ABC NACO Melrose	24000	2002
ABC NACO Dominion	24000	2002
McConway Anniston	6000	2002
Durametal Tualatin	1200	2002
Pelton	8400	2002
Newell	9600	2002
Flow Technology	1320	2002
Metso	8400	2002
Sulzer	480	2002
Smith	4800	2002
Racine	18000	2002
Process Metals	240	2002
Grede Milwaukee	22800	2003
Texas Steel Ft. Worth	20400	2003
Racine Milwaukee	18000	2003
Thomas Birmingham	8400	2003
K O San Antonio	7500	2003
Quaker Myerstown	6000	2003
Missouri Steel	6000	2003
WCC Dayton	4800	2003
Electric Indianapolis	3900	2003
Western Seattle	3600	2003
Westlectric	3600	2003
U S Castings Canal	3000	2003
St Louis Sauget	2400	2003
BCI	2280	2003
Castmasters	1200	2003
Specialty	720	2003
Big 4	600	2003
Process metals	240	2003
B&S	240	2003
Aelco	5400	2003
Berne	9600	2004
St Louis Sterling	1560	2004
Hiler	1200	2004
Durametal Tuallatin	1200	2004
Independent	720	2004
Nadler	720	2004
Gold	240	2004
Empire	4800	2006
Penncast	1200	2006
Western	3600	2010
Cicero Casting Company	30000	2010
Richmond	16800	2010
Bartels Co.	6000	2010
Smith Steel Texas	4800	2010
Reliance Foundry Company, Ltd.	2880	2010
Ferralloy, Inc.	2040	2010
Casteel Service, Inc.	1800	2010
Midwest Metallurgical Laboratory, Inc.	1800	2010
Independent Steel Castings Co., Inc.	720	2010
Alloy Cast Products, Inc.	360	2010

Carolina Casting Corporation	360	2010
Shogun Precision Castings, Inc.	300	2010
Casting Technology, Inc.	48	2010
American Centrifugal	7200	2017
Ancast, Inc.	720	2017
Bradken-Atlas Chehalis	2040	2017
Columbus Steel Castings	54000	2017
Delray Steel Casting, Inc.	4800	2017
McConway & Torley Kutztown	24000	2017
Falk Corporation	12912	2017
Hendrix Manufacturing Company, Inc.	4800	2017
IIT Industries, Inc	120	2017
Marengo Valve & Foundry Corporation	600	2017
Maritime Steel and Foundries Limited	16200	2017
Michigan Steel, Inc.	14400	2017
Vancouver Iron & Steel, Inc.	4200	2017
Vancouver Iron & Steel, Inc.	3360	2017
Funk Finecast	1080	2010
Precision Metalsmiths - Cleveland	1020	2015
American Industrial Casting	540	2017
Cast-Rite Steel Castings	720	2017
American Alloy Products	180	2017
Whemco - Johnstown	18000	2017

**Appendix B**  
**Steel Foundries Involved in Supplying Defense Castings**

**Foundries reported DoD capacity** 31,286

<b>Company</b>	<b>City</b>	<b>State</b>	
Bradken	Tacoma	WA	5400.00
Rock Island Arsenal	Rock Island	IL	5040.00
Newport News Shipbuilding	Newport News	VA	2400.00
Huron Casting, Inc.	Pigeon	MI	1728.00
Metaltek International	Watertown	WI	1650.00
Bradken	Atchison	KS	1440.00
Delta Centrifugal Corporation	Temple	TX	1170.00
The Carondelet Corporation	Pevely	MO	1080.00
Bradken- closed	Amite	LA	1056.00
Maynard Steel Casting Company	Milwaukee	WI	1008.00
International Casting Corporation	New Baltimore	MI	855.00
Pacific Steel Casting Company	Berkeley	CA	792.00
Shenango Industries, Inc.	Terre Haute	IN	780.00
ESCO Corporation- closed	Portland	OR	720.00
Wisconsin Centrifugal Division	Waukesha	WI	720.00
Quaker City Castings, Inc.	Salem	OH	360.00
Ferralloy, Inc.	Cleveland	OH	315.00
Sawbrook Steel Castings Company	Lockland	OH	300.00

Waukesha Foundry Co. Inc.	Waukesha	WI	300.00
Fansteel Intercast Escast	North Chicago	IL	300.00
Spokane Industries, Inc.	Spokane Valley	WA	288.00
Sivyer Steel Corporation	Bettendorf	IA	240.00
Wollaston Alloys, Inc.	Braintree	MA	240.00
American Industrial Casting, Inc.	E. Greenwich	RI	189.00
Precision Technology Stainless Foundry & Engineering, Inc.	Douglassville	PA	180.00
Modern Investment Casting Co.	Milwaukee	WI	132.00
Berkley Machine Works & Foundry	Ponca City	OK	120.00
D.W. Clark, Inc.	Norfolk	VA	120.00
Castalloy, Inc.	E. Bridgewater	MA	120.00
Kovatch Castings Inc.	Cleveland	OH	120.00
Precision Castings of TN Inc.	Uniontown	OH	120.00
American Spincast Inc.	Gallatin	TN	102.00
American Foundry Group Plant 2	Belton	TX	102.00
Harbor Castings Inc.	Muskogee	OK	96.00
Effort Foundry, Inc.	North Canton	OH	96.00
Northern Precision Casting Company	Bath	PA	90.00
MedCast Inc.	Lake Geneva	WI	90.00
Milwaukee Precision Casting Inc.	Warsaw	IN	82.80
Chicago Vacuum Casting Corporation	Milwaukee	WI	72.00
Shellcast Inc.	Milwaukee	WI	72.00
Mackenzie Castings, LLC.	Montague	MI	72.00
Naval Foundry and Propeller Center	Arlington	WA	60.00
Xcel-Premet Inc.	Philadelphia	PA	60.00
Aristo-Cast	Huntington	WV	60.00
Smith Castings, Inc.	Almont	MI	60.00
American Foundry Group, Inc.	Kingsford	MI	60.00
Badger Alloys, Inc.	Bixby	OK	60.00
Regal Cast, Inc.	Milwaukee	WI	60.00
Monett Metals, Inc.	Lebanon	PA	57.60
Klune Spanish Fork - Casting Alpha Investment Casting Corporation	Monett	MO	48.00
The Taylor & Fenn Company	Spanish Fork	UT	48.00
PCC Structural	Tulsa	OK	45.00
Cast-Rite Steel Castings Corp.	Windsor	CT	45.00
Dolphin, Inc.	Groton	CT	36.00
Eutectic Engineering	Chicago	IL	36.00
Tonkawa Foundry, Inc.	Phoenix	AZ	36.00
SeaCast Inc.	Detroit	MI	36.00
Rimer Enterprises, Inc.	Tonkawa	OK	36.00
	Marysville	WA	30.00
	Waterville	OH	27.60

American Aerospace Technical Castings	Phoenix	AZ	24.00
Nova Precision Casting Corp.	Auburn	PA	24.00
Barroncast Inc.	Oxford	MI	24.00
GSC Foundries, Inc.	Ogden	UT	24.00
Quality Electric Steel Castings, L.P.	Houston	TX	24.00
Avalon Precision Casting Co.	Brookpark	OH	19.20
Net Shapes, Inc.	Ontario	CA	15.00
Independent Steel Castings Co., Inc.	New Buffalo	MI	14.40
Accu-Cast	Chattanooga	TN	12.00
PMM Investment Castings Inc.	Houston	TX	12.00
Aero Metals Inc.	La Porte	IN	12.00
Lodi Iron Works, Inc.	Lodi	CA	12.00
Intermountain Precision Casting, Inc.	Lindon	UT	4.80
Invest Cast Incorporated	Minneapolis	MN	3.60
Craft-Cast Co. Inc.	Jackson	WI	1.20
Tidewater Castings Inc.	Portsmouth	VA	0.60
New England Castings, LLC	Hiram	ME	0.30