Casteel Commentary

The Casteel Commentary considers the steel casting intensity of the countries that are the largest producers of steel castings. The country’s population, level of industrialization and use of castings in the rail system help sort out the needed capacity. This analysis helps understand which countries are likely to be importers or exporters of our product.

Technical & Operating Conference

The National T&O Conference is drawing near. Where can you find another three-day conference totally devoted to the production of steel castings? Where could you find such a conference anywhere in the world? The answer is simple – Nowhere!

Here are a series of questions that you might want to consider in determining how many people you might send to the conference;

1. What valuable opportunities are you going to pass up on that your peers are going to present?
2. How are you going to ensure that you improve your safety performance? Do you know about NFPA 70E Standard for Electrical Safety in the Workplace – what effects will it have on your operation – will it affect Arc/Air operations?
3. What do you think are the best ways to improve the performance of your employees?
4. What valuable opportunities are you going to pass up on that researchers will present?
5. Take a look at the T&O Program enclosed with this newsletter

Safety Awards

It is time to participate in our Safety Award Program! To be eligible for safety awards, participants must report a safety record DART that is equal to or less than 3.0. This is the composite average for all manufacturing industries. We will be awarding "Perfect" and "Outstanding" awards. Forms and more information are available online at http://www.sfsa.org/safety. Submit your application to SFSA by November 18 in order to be eligible for an award.

Future Leaders

The Future Leaders recently toured Rexnord-Falk, Metaltek-Wisconsin Centrifugal, and Stainless Foundry and Engineering. These tours offered attendees the opportunity to see unique processes, parts, and alloys. The meetings also afforded attendees time with industry experts at each of the sites visited. As we continue to strive for a strong future, learning from our past and networking with peers will be important assets. The group also discussed the tools at the society that can be leveraged. For further information, please contact David Poweleit at poweleit@sfsa.org.

Surcharges

SFSA is conducting an industry survey on past surcharge practices. Please submit your survey as soon as possible to be included. Email us (monroe@sfsa.org) if you need another copy of the survey. Thanks.
Slag and Furnace Dust Disposal
A member commented on the slag and furnace dust disposal mentioned in last month’s Casteel Reporter.

“At our plant we will capture the furnace dust in a conventional baghouse, auger the dust into 55 gallons drums and then bury the drums into the charge bucket. We have found that, while there is some recirculating load of dust, the majority ultimately is tied up in the slag with a minimal amount going back into the molten bath. We do this under permit. The dust, being tied up in the slag does not leach out (water or acid test) and the cost of disposal is reduced.”

Market News
The markets for steel castings appear to have bottomed out in July. Reports since then indicate a weak but steady improvement in business. The SFSA Trend cards indicate that the bookings in August were flat compared with last year while production was still off dramatically. Backlogs are growing.

This slight recovery is seen in the Commerce numbers for new orders and shipments for iron and steel castings. Rolled steel shipments showed an improvement in August as well. New orders for nondefense capital goods without aircraft showed an increase. Orders and shipments increased relative to inventories. All of these signs point to continued improved business to the end of the year.

One steel market analyst proposed three possible scenarios going forward. The most likely outcome at 70% is that we will continue to see a weak and slow recovery. There is about a 10% chance that we will see another significant downturn and that the present improvement is a dead cat bounce. More likely is that we will have a stronger and more rapid recovery than expected.

One positive sign for our markets is the continued strength in oil and copper pricing. The weak dollar may be poor public and economic policy but will be advantageous for steel casting producers. Growth in developing countries will pull global demand for steel castings higher and a weaker dollar should allow us to prosper. It would be timely to look at export possibilities moving forward.

Casteel Commentary
Steel casting production varies significantly around the world. Why do some countries produce much larger quantities of steel castings than others? What factors seem to determine the level of steel casting production?
One factor to consider is the level of industrial activity in a country. From the graph of total production of all steel products compared to steel castings you can see that this activity level does explain the big differences. While not perfectly correlated, steel production and steel casting production are related.

The largest producers of steel are the US and the BRIC countries (Brazil, Russia, India and China). From this graph you can see some distortions from government policy. Most countries encourage steel production and so in cases like South Korea or Japan, the production of steel exceeds the steel casting production considerably.

Another factor that would determine the needed size of steel for economy beyond their level of industrial development is their size. We can take the population as a meaningful measure of the size of the economy. If we divide the production of steel by the population, the per capita production gives a different picture of steel intensity.

As you can see in the picture the numbers are more uniform. The global economy in 2007 consumed 191 kgs (420 lbs) of all steel products and 1.5 kgs (3.3 lbs) of steel castings. Industrialized economies are clearly going to consume more than the global average. The US as a mature industrial economy consumes about 300 kgs (660 lbs) of steel per person. Here you can see the major steel exporters with the highest per capita numbers, Japan, Ukraine, South Korea, Taiwan, and Belgium. This helps us see the competitive picture in steel castings.

The US produced in 2007 a little over 4 kgs (9 lbs) of steel castings per person. Only Russia, Ukraine, the Czech Republic and Belgium exceeded the US total. This however is not yet the complete picture. Half of the US steel casting production is direct to the rail industry. Without rail steel castings the US would be about half as big. While China and much of the developing world is like the US in their use of
castings in rail, Europe does not use as many castings and depends on fabrications for their system. This makes Germany and Belgium the big producers in Western Europe.

Globally, Russia, Ukraine, and the Czech Republic are large steel casting producers. These economies were centrally planned and developed steel castings in applications where many economies use ductile iron. They also needed the industrial capacity for defense needs. Much of this capacity is antiquated and may not survive. China has a mix of antiquated state operated capacity and new competitive private production. By this measure however, China has not yet over expanded. This year China is producing all steel products at a rate of 600 million tons. India, Mexico, and Brazil will needed added capacity or will be net importers to meet their steel casting requirements.

It is not clear whether on a secular trend basis developed economies will need fewer steel castings. Global energy production requirements look to need larger more productive capital equipment that will increasingly rely on steel castings for their performance. Globally, the production of larger more complex, higher strength steel casting should be a growing market for the next decade.

*Raymond Monroe*
<table>
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<th>Month</th>
<th>Event</th>
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<td>2009</td>
<td>November</td>
<td>Specifications Committee</td>
<td>Atlanta, GA</td>
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<td></td>
<td>December</td>
<td>National T&amp;O Conference</td>
<td>Chicago, IL</td>
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## SFSA Trend Cards

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<tr>
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<th>12 Mo Avg</th>
<th>3 Mo Avg</th>
<th>Aug</th>
<th>Jul</th>
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<td><strong>Carbon &amp; Low Alloy</strong></td>
<td></td>
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<tr>
<td>Shipments</td>
<td>-23.3</td>
<td>-52.9</td>
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<td>6.1</td>
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<td>6.3</td>
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<tr>
<td><strong>High Alloy</strong></td>
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<tr>
<td>Shipments</td>
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## Department of Commerce

### Census Data

#### Iron & Steel Foundries (million $)

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#### Nondefense Capital Goods (billion $)

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#### Nondefense Capital Goods less Aircraft (billion $)

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<tr>
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<td>1.92</td>
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<td>1.90</td>
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<td>0.98</td>
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## American Iron and Steel Institute

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<td>Raw Steel Shipments</td>
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MEMORANDUM

TO: ALL SFSA MEMBERS
SUBJECT: 2009 63RD NATIONAL TECHNICAL & OPERATING CONFERENCE

We take great pleasure in inviting you and your technical personnel to attend the 63rd Annual Technical and Operating Conference on December 10-12, 2009. Your T&O Committee is presenting a solid program of practical papers relating to most operating areas of your plant and operating issues.

We have attached a copy of the programs for the National Technical and Operating Conference and the Workshop. The program brings the most comprehensive review of SFSA members’ experiences and the most up to date reviews of the research program. The program reflects the considerable effort by the T&O Committee and the members who are willing to share their experiences. We are confident that you will find this program to be of great value to you and your company. We look forward to seeing you in Chicago in December.

The Conference will be held at the Drake Hotel located on Michigan Avenue in downtown Chicago and the format will be the Thursday, Friday and half-day Saturday. A Members’ T&O Workshop has been scheduled on Wednesday afternoon, December 9, prior to the Conference.

The Conference registration fees have been kept down to the same prices as last year, and will be $775 for all three days including the Workshop or $715 for the Conference excluding the Workshop. However if you register and pay for the Conference by November 2, these prices are reduced to $715 and $670 respectively. Should you wish to register for single days the fee is $310 ($285 if paid by November 2) per day on Thursday and Friday, $245 ($220 if paid by November 2) for Saturday only or for the Workshop. The Conference fee also includes a CD of the proceedings. To register for the Conference please use the enclosed form, note and observe the attached cancellation policy.

Also, please make sure to make your hotel reservations before November 9. The hotel must receive them no later than November 9 to guarantee accommodations and the special rate.

After reviewing the program we are certain that you will want your foundry to attend this Conference given for and by the steel casting industry. We look forward to your participation in December.

Kind regards,

Malcolm Blair
Vice President - Technology
Steel Founders' Society of America

National T&O Conference – December 10-12 2009
Drake Hotel, Chicago, IL

Session 1  Thursday Morning – December 10 – 9:00 am

1.1 Role of Manufacturing in Climate Policy
   R. Neal Elliott, Ph.D., P.E., Anna K. Chittum
   American Council for an Energy-Efficient Economy

1.2 Supervisory Training That Pays Off
   Lisa Bond, Bradken - Amite

1.3 Molder Training
   Fred Jacques, Bradken - Atlas

1.4 Electrical Safety in the Foundry
   Jeremy Allyn, Harrison Steel Castings Company

1.5 Hexavalent Chromium: Citation and Sampling
   John Hoffman, Sivyer Steel Corporation

1.6 Development of a Ventilated Booth to Control Hexavalent Chromium Fume Exposure during Welding and Air-carbon Arc Gouging Stainless Steel
   Ted Butch, Badger Alloys, Inc.

1.7 Welder Training
   John Cory, Bradken - Atchison / St. Joseph

Industry Luncheon – 12:00 pm

Session 2  Thursday Afternoon – December 10 – 1:30 pm

2.1 Foundry Binder Raw Material Market Conditions
   Douglas M. Trinowski, HA International, LLC

2.2 Alloys and Current Market Conditions
   Dave Gelwicks, Jim Csonka, Hickman, Williams & Company

2.3 Integrated Design of Steel Castings: Case Studies
   Richard A. Hardin, Christoph Beckermann, University of Iowa

2.4 A review of two specifications - API 2SC and A217 C12A
   Malcolm Blair, SFSA

2.5 Developing a New Standard for Building Construction Castings
   William C. Gibb, North Star Casteel Products, Inc.

2.6 A New Standard for Radiographic Acceptance Criteria for Steel Castings: Gage R&R Study
   Richard A. Hardin, Christoph Beckermann, University of Iowa

2.7 Computed Radiology in the Casting Industry
   Stuart Kleven, Alloyweld Inspection Company

Discussion Session – 4:30 pm

Industry Reception – 6:00 – 7:30 pm
Session 3  Friday Morning – December 11 – 9:00 am

3.1 Optimizing the Corrosion Performance of Welds on 6 wt% Super Austenitic Stainless Steel  
Andrew Stockdale, John DuPont, Lehigh University

3.2 Lightweight Steel and P900 Castings  
David Van Aken, Missouri University of Science & Technology

3.3 Extending the Capabilities of High Strength Cast Stainless Steels  
Rachel Abrahams, Paul Lynch, Dr. Robert C. Voigt, Pennsylvania State University

3.4 Allying and Practical Heat Treatment Approaches for Toughness and Strength Enhancement of 17-4 PH  
Arpana Murthy, Von Richards, David Van Aken, Simon Lekakh

3.5 Foundry Equipment - Air-Arc Power Source Trials and Mold Wash Drying System  
Robert Murillo, Pacific Steel Casting Company

3.6 Heat Treat Super Oven  
Nick Gerard, Bill Dudley, Lee Rabe, M E Global, Inc.

3.7 Heat Treatment Optimizations Using Non-Contact Infrared Load Temperature Sensing  
Tom Karnezos, Rachel Abrahams, Dr. Robert Voigt, Pennsylvania State University

3.8 Heat Treat Optimization  
Steve Klimowicz, Eagle Alloy, Inc.

Industry Luncheon – 12:00 pm

Session 4  Friday Afternoon – December 11 – 1:30 pm

4.1 Experience with the FARO ARM at Fundidora Morelia  
Emmanuel Valenzuela, Fundidora Morelia SA de CV

4.2 Laser Scanning Steel Castings  
Greg Bosel, Capture 3D

4.3 Vacuum Assisted NaSiO4  
Jim Furness, Furness-Newburge, Inc.

4.4 A Method for Dryness Assessment of Mold Coatings  
Bob Puhakka, Alloy Casting Industries Limited

4.5 Iron Oxide in Molds and Cores for the Production of Steel Castings  
Raymond Monroe, SFSA

4.6 Crack Formation in Ceramic Shell During Foam Pattern Firing  
Von Richards, D. Kline, Simon Lekakh, C. Mahimkar, Missouri University of Science & Technology

4.7 Measurement of Elastic Modulus of PUNB Molds as a Function of Temperature  
Jacob Thole, Christoph Beckermann, University of Iowa

4.8 Modeling of the Autoclave De-Waxing Process for Investment Casting Shells  
Edward A. Druschitz, Dr. Preston Scarber Jr., Dr. Alan P. Druschitz, University of Alabama - Birmingham

4.9 High Temperature Physical Properties of Molding Aggregates  
Jerry Thiel, University of Northern Iowa

Discussion Session – 4:40 pm
Session 5  Saturday Morning – December 12 8:00 am

5.1 Improving Efficiency through Technology  
Brian Raub, Southern Cast Products, Inc.

5.2 A Statistical Analysis of Grinding Room Operations  
Andrew McMinimee, May Foundry & Machine Company

5.3 Acid V Basic (Basic Practice in the foundry)  
Brent Hanquist, Harrison Steel Castings Company

5.4 Prediction of Aluminum Nitride Embrittlement in Heavy Section Steel Castings  
Charles Monroe, Caterpillar

5.5 Use of Automated Inclusion Analysis to Evaluate the Effects of Ladle Treatment on Steel Cleanliness  
Kent Peaslee, Vintee Singh, Simon Lekakh and Edith Martinez,  
Missouri University of Science & Technology

5.6 Modeling of Reoxidation Inclusion Formation in Steel Sand Casting  
Kent D. Carlson, Antonio Melendez, Christoph Beckermann

5.7 Surface/Near Surface Indication – Variation of Surface Indications from Magnetic Particle and Liquid Penetrant Inspection  
John A. Griffin, Robin D. Foley, University of Alabama - Birmingham

Adjourn 11:30 am

Thank you for attending the 2009 National Technical and Operating Conference
A Review of the Causes and Prevention of Cracks in Steel Castings – Rod Duncan, Casteeltec

Rod has many years experience working in member foundries solving persistent problems in all areas of the steel casting process. Defects often described as cracks are attributed to many causes and Rod has taken a particular interest in this problem.

Rod will review the types of cracks, their causes and ways of preventing a recurrence. If you have a casting that you would like Rod to discuss you can bring it to the meeting or provide either a short PowerPoint presentation or digital photographs we can project for discussion.

A Hands-on Gage R&R Study – Frank Peters, Iowa State University

One of the most popular activities we have carried out at the T&O over the years has been determining the Reproducibility and Repeatability of various measurement and inspection systems.

This year we want to look at a quantifiable method for determining whether a casting meets a specified radiographic standard. This is an examination of the proposed radiographic standard that will allow designers to set quality standards that will have an influence on the performance of the part being produced.
To: T&O Conference Registrations  
Steel Founders’ Society of America  
780 McArdle Dr Unit G  
Crystal Lake, IL 60014-8155, USA  
FAX: 815 455-8241

Please register the following individuals for the 63rd Technical & Operating Conference:

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<th>First Name</th>
<th>Full Conference Including Workshop</th>
<th>Full Conference Excluding Workshop</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
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Conference Fees

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<td>Full Conference Registration (3 days including Workshop)</td>
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<td>Day 2 (Friday)</td>
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<tr>
<td>Printed Proceedings Book*</td>
<td>____</td>
<td>@ $200</td>
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TOTAL $ _____

PLEASE SEND PAYMENT OR CREDIT CARD INFORMATION WITH REGISTRATIONS

Amex-Visa-M/C No. ___________________________ Exp. ___________ CVV2 ___________
Company ____________________________________________
Address ____________________________________________
City, State, Zip _____________________________________
Signed ____________________________________________

PLEASE MAKE HOTEL RESERVATIONS BEFORE NOVEMBER 9, 2009

* Not included with registration. Registration includes Conference Proceedings on CD, along with the Conference Program.
Please make the following reservations:       Arrive       Depart

Name _______________________________        __________  __________

Company ______________________________________________________

Address _____________________________________________________________________________

City, State, Zip_______________________________________________________________

Room preference: King Bed ______  2 Beds _______  Smoking? _____

Number of persons sharing room: __________

Method of Guarantee:

Amer. Express _____  MasterCard_____  Visa _____  Other _____________________________

Check or Money Order _____

Credit Card Number _______________________________  Exp. Date_______________

Signature __________________________________________________________________________

Phone_______________________________________________________________________________

Please note that reservations must be guaranteed by credit card or one night’s deposit. Cancellation policy is three (3) working days prior to arrival to avoid loss of first night’s deposit.

Steel Founders’ Society of America – December 9-12, 2009

|        | Single: $184.00 | Double: $184.00 | Triple: $224.00 |

Cut off date: November 9, 2009

Reservations requested beyond the cut-off date are subject to availability and higher rates. Please note all rates are subject to applicable taxes. Upon receipt, a confirmation will be forwarded to you. Departure date will be reconfirmed at check-in. Early departures are subject to an administrative fee. Please fax your reservation request as shown above. Thank you.
STEEL FOUNDERS' SOCIETY OF AMERICA

Meetings Registration
Cancellation Policy

For Cancellations Received...

More than 10 Business Days Prior (November 25) NO PENALTY
8 or 9 Business Days Prior (November 27) 50% OF FEE
7 or Less Business Days Prior (November 30) 100% OF FEE

SUBSTITUTIONS PERMITTED AT ANY TIME.
Please note -

Hotel reservations must be made before November 9, 2009.

The Drake Hotel as well as all other hotels in the city will once again be busy at this time due to many conventions. There may be a problem with price and availability after this date.

We urge you to make your room reservations early.