SFSA CASTEEL REPORTER

Steel Founders' Society of America

a monthly publication serving SFSA steel casting industry Members

780 McArdle Drive Unit G, Crystal Lake IL 60014
815-455-8240 Fax: 815-455-8241
www.sfsa.org

March — 2007

Casteel Commentary Highlights:

The next generation of foundrymen probably already works in the industry. We need to take responsibility to develop these people with the skills and experience needed. We must mentor and train to nurture these future leaders. The largest unexploited opportunity is participation in ASTM, AFS and (of course) SFSA. The Casteel Commentary suggests way to accomplish this critical task.

Spring Management Meeting

SFSA will hold a Spring Management Meeting at the Spring Hill Suites Chicago O'Hare, on April 13, 2007. Bernard Lashinsky will deliver an economic update, Malcolm will speak about Steel Foundries in China, and Raymond Monroe plans to do a talk on culture and trade in China. Details have been sent to SFSA members via email. Mark your calendars and make your room reservations before the cut-off date of March 29, 2007.

SFSA Marketing Committee

The SFSA Marketing Committee meeting is schedule for April 23 and 24 at Amite foundry.

AFS Steel Casting Seminar

AFS is hosting a steel casting seminar on the web on March 15th. Malcolm and Raymond are participating as speakers on riser and gating design. Contact AFS if you are interested.

Porosity Seminar

Charles Bates is hosting a seminar on porosity in castings on April 12 and 13. Raymond is presenting an overview on porosity formation. More details are available at his website, www.alchemcast.com.

End Use Survey and Capacity Study

SFSA will be sending out this month the End Use Survey and the Capacity Study. It is important that we get your input. The Census has dropped the routine reporting of steel casting production and SFSA surveys have become the only source of key business information. We need your input.

SFSA Annual Meeting

Come join other SFSA members in the "Land of the Midnight Sun" in Alaska August 18-22 for the 105th Annual Meeting. The meeting is to be held at the Alyeska Resort in Girdwood, AK (37 miles South of Anchorage). Along with the business sessions, experience the wildlife, flowers, glaciers, taste the fresh Alaskan seafood and take day trips into the interior of our vast 49th state. You will have 18 hours of sunshine per day, so a lot can be accomplished during your stay.

Maintenance and Repair

Twenty member plants submitted results for the survey on maintenance and repair costs per ton of castings shipped. This is a tricky question. Some contract out some of this effort especially forktruck work. It is not clear how to account for environmental equipment, is the upkeep maintenance and repair or environmental costs. Also like sales and marketing, lower costs may not be better. It may be that some higher level of investment is needed to ensure maximum uptime. The range of expenditures went from around $100 to over $1,000. The lower numbers where larger arc furnace shops, with a typical number of about $110 for labor and $165 for Materials. For a base of $3000, this would represent 9%. Induction furnace shops had higher results with the typical value of $350 for labor and $350 for materials or $700 per ton.

Persons Available

A1219 will graduate in May with a B.S. in Metallurgical Engineering with experience in metals manufacturing including die casting, seeking a position in metallurgical engineering.

CERP Metal Casting Technology Forum

Raymond Monroe will be speaking at the Metal Casting Technology Forum being held in Saginaw, MI May 1-2. Information is attached to the PDF version of this newsletter.

Hexavalent Chromium

Several members shared their testing on hexavalent chromium exposures and a compilation of results is attached to the PDF version of this newsletter and available on the newsletter web page. If you have done testing, please forward a copy of your results so that we can update this summary with more complete results.

Specification Note

One older practice that steel foundries used to meet customer requirements was the differential heat treatment of test bars from the castings. The idea was that since the test bar had a lighter section than the casting adjusting the tempering temperature of the test bar so its hardness would match the casting would give a better idea of the properties achieved. While this practice may have been acceptable and worthwhile in earlier times it is no longer permitted. Tempering the test bar differently than the casting is indefensible when the user has a failure. The one specification where the primary requirement was to meet properties, ASTM A 148, used to be a problem since the test bar had to meet the specification requirements but the casting might be significantly thicker and the test bar and casting were required to be heat treated the same. This is still the requirement but in quenched and tempered sections exceeding 3 in. the test bar must be the appropriate size as required in ASTM A148 Para. 11.1.1 that invokes supplementary requirement S 15 of ASTM A 781.

Technical Innovation

Energy costs are high. One inefficient use of energy in steel foundries is ladle preheating. With a few exceptions, steel foundries do a poor job preheating ladles. Most frequently a gas torch is placed in an upright ladle to dry and preheat. The burner is inefficient, most of the heat is wasted, the ladle temperature is rarely over 1000°F, and the operation is uncontrolled. By failing to preheat thee ladle efficiently we need to overheat the steel by 100 to 200 degrees to use the steel to preheat the ladle. Preheating efficiently requires a better system. We need to treat the ladle like a furnace body and have a cover like a furnace floor that has an efficient burner. While the lid can be placed on an upright or inverted ladle, a sealed lid with a smaller efficient burner can quickly and in a controlled way bring the ladle to a much higher temperature, over 1600°F is desirable. This improves ladle refractory life, allows lower tapping temperatures and gives higher quality castings. In this day of high-energy prices, savings in production costs will quickly offset the cost of buying the equipment.

Market News

Lead times fell in December as bookings fell compared to the robust last year by more than 10%. For carbon and low alloy castings, bookings fell 12% and for high alloy castings they fell 17%. For the three month average the trend is almost neutral. Bookings are down more than shipments suggesting further softening in the first quarter of 2007. Steel shipments are off sharply, the result of a slowing demand and an explosion of imports from China The slowing demand can be seen in the falling orders for capital goods and the increase in inventories relative to orders or shipments. As long as commodity prices remain high, capital equipment markets should remain robust. It would seem that the first half of 2007 will see some added softening but the balance of the year should be strong unless a general slowdown causes a reduction in commodity prices and reduces the incentive for added capacity. The trend in ferroalloys, energy and mining would suggest that capacity is still limited and added capital investment is needed to meet global demand. Additional information on economic conditions can be found in the SteelGuru document on the Casteel Reporter web page.

On trade, the U.S. has filed a WTO case against China for the use of prohibited subsidies. This is the most important step taken so far by the US in the trade imbalance with China. Mexico and Japan have joined in the suit. This action is thought to cover 60% of the exports from China. It would be good to pay close attention to this developing story. China Foundry, November 2006 Vol.3 No. 4, has their normal summary of casting prices. Carbon steel castings are quoted at 6300 rmb or about $813 a metric ton. Stainless steel is cited as 30,000 rmb or $3,875 a metric ton.

Casteel Commentary

Last month we reflected on the lack of a clear path or strategy to develop the next generation of steel foundrymen. While we have more recently begun to recruit and develop our key staffing in areas like plant engineering, manufacturing, metallurgy, and foundry engineering, we have not generally begun to develop the generalists needed to run the foundry. We have no path to recruit or develop the individual with production experience, technical knowledge, management skills, and practical judgment.

When a corporation buys a foundry, there is not a pool of mid career foundrymen ready to step up to the challenge of turning around a plant. They hire a turn around expert or seasoned manager. This normally turns out badly since the conventional wisdom is to reduce technical staff, limit capital and maintenance investment, and concentrate on sales. This results in the inability to make work that is won by underpricing the product. It is often a financial disaster.

When an owner wants to retire and needs a replacement to buy out the company with earnings, there is no pool of mid level qualified management ready for the challenge. Frequently a candidate is found with nonfoundry experience. This often turns out badly as well. The retiring owner has been conflating salary and ROI. He often fills many roles that take time and experience to master. Frequently he is the technical staff, the chief salesman, the quoting department, the HR guy, etc. Without an understudy that has experience and knowledge, success is unlikely. Especially when the owner has been a one man show making all the critical decisions.

How do we find and develop the mid career infrastructure necessary for our companies success and the future of the industry? Where do we find the bright ambitious guys and gals needed? What tools and tasks, projects and programs, roles and responsibilities will help develop these critical people?

First and foremost, each plant must, (I think must is the right word) identify and develop their own successors. It may be that we fail finally and need to look outside but fundamentally our best chance of success will be to grow our own. This means investing in the future of our people in new ways. We may need to encourage and support enrollment in Toastmasters or a Dale Carnegie Course. It maybe required to identify and pay for community college or university courses. If there are a number of potential leaders it may be beneficial to develop our own internal management and technical courses to create the pool of people we need. Even more important we may need to mentor these precious resources. We may need to individually share our skills and insights with the junior guy so he can develop the needed skills.

One tremendously under exploited resource is participation. Much of the traditional industry infrastructure is gone for the development of these people. In the past, the local AFS chapter or the SFSA Divisional Meetings allowed midlevel people to meet others, learn the industry, develop leadership skills, and become foundrymen. The changes in our industry and society limit the opportunity. Many of these meetings no longer exist and the remaining meetings look often more like an oldtimers group than a vital resource. It may be that instead of waiting until later, we may need to involve these people nationally earlier in their careers.

One example of an opportunity is participation in ASTM specifications. ASTM membership is open and our staff can join and participate in ASTM A01.18 steel castings. ASTM membership costs $75 a year and you get a copy of the latest book of steel casting standards each year. As a member of the committee you can propose changes to the standards and you review and approve any modification to the standards. By voting on proposed changes you are up to date with the latest changes, understand what is likely to come up next. Attending the meetings allows you to meet and discuss the proposed changes with experts in the standard, customers interested in the products and other foundries. The committee meets twice a year. This is only one opportunity but finding a early or midcareer person to be involved in ASTM will pay benefits not only through the companies involvement in ASTM but also in the development of that key person.

SFSA has many opportunities and as a member no added fee is necessary. Our specification committee meets at the ASTM meetings and is free and open only to members. Our research committees are a great place for technical and metallurgical staff to be up to date and knowledgeable about our products and processes. The T&O committee is an opportunity for operators and foundrymen to shape the program but also to meet others in the industry. The large number of new people at the National T&O encouraged me this year; but I think we are still not fully exploiting this opportunity. Some small members bring the bulk of their staff while some large companies has meager representation. Our marketing committee is a great place to learn the marketplace.

We do need to recruit new people into the industry especially those early in their career. We also desperately need to self-consciously identify people already in our organizations and plot out a path for their development and our success.

Raymond

STEEL FOUNDERS' SOCIETY OF AMERICA
MEETINGS CALENDAR

2007

April	
13	Spring Management Meeting, Chicago, IL
23/24	SFSA Marketing Committee Meeting, Amite Foundry, Amite, LA
August	
18/22	SFSA Annual Report, Alyeska Resort, AK
December	
12/15	National Technical & Operating Conference, The Drake Hotel, Chicago, IL

STEEL FOUNDERS' SOCIETY OF AMERICA
BUSINESS REPORT

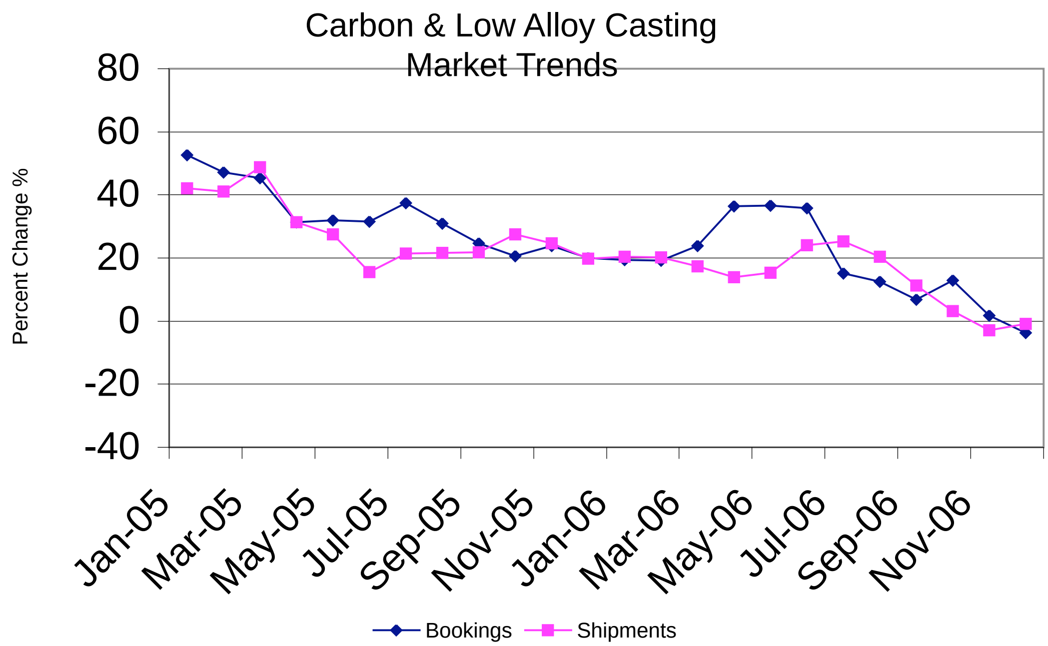
SFSA Trend Cards (%-12 mos. Ago)	3 Mo Avg	Dec	Nov
Carbon & Low Alloy			
Shipments	-0.9	0.6	-5.0
Bookings	-3.8	-12.0	-10.9
Backlog (wks)	12.0	11.6	11.8
High Alloy			
Shipments	4.1	-23.6	12.8
Bookings	2.5	-17.7	35.7
Backlog (wks)	11.2	10.7	11.0

Department of Commerce
Census Data

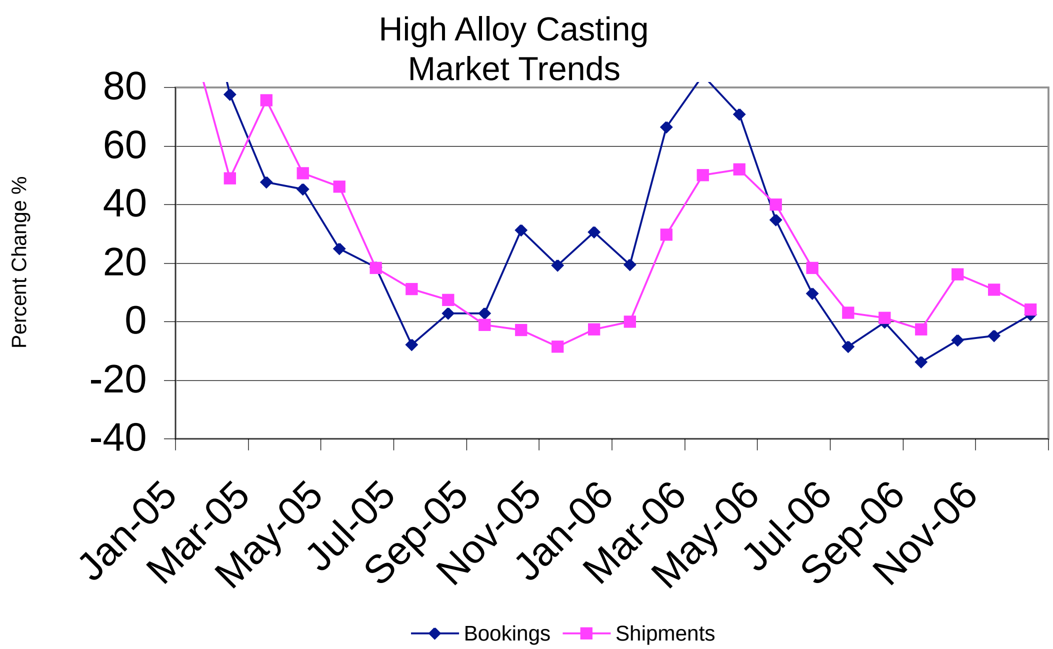
Iron & Steel Foundries (million $)			
Shipments	1,608	1,612	1,613
New Orders	1,602	1,696	1,600
Inventories	2,289	2,309	2,299
Nondefense Capital Goods (billion $)			
Shipments	67.0	67.3	67.5
New Orders	76.1	81.1	74.0
Inventories	114.5	115.8	114.0
Nondefense Capital Goods less Aircraft (billion $)			
Shipments	61.8	62.2	62.3
New Orders	64.0	65.2	63.3
Inventories	95.8	96.6	95.6
Inventory/Orders	1.50	1.48	1.51
Inventory/Shipments	1.55	1.55	1.54
Orders/Shipments	1.04	1.05	1.02

American Iron and Steel Institute

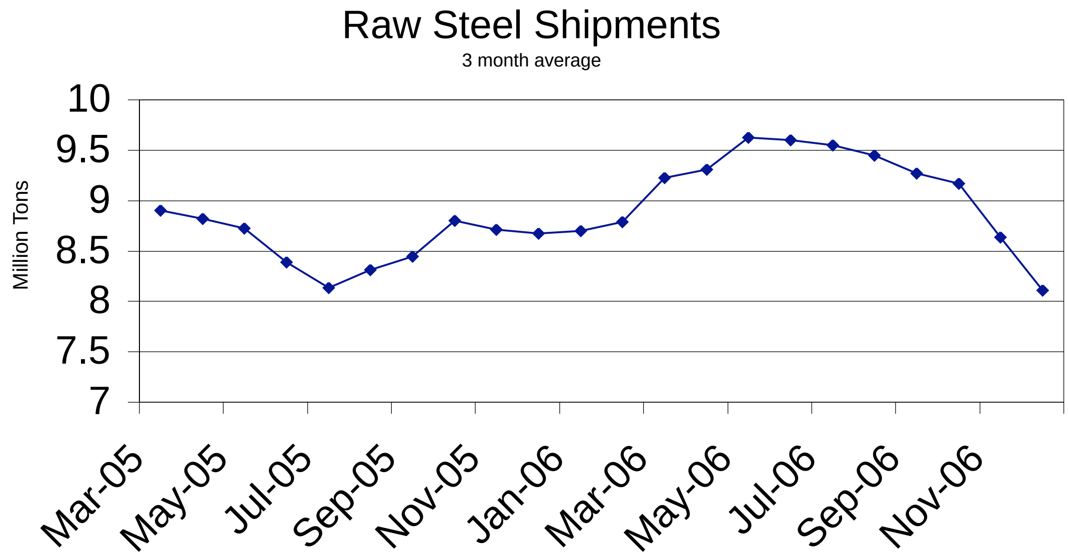
Raw Steel Shipments (million net tons)	8.1	7.6	8.0



SFSA Postcards

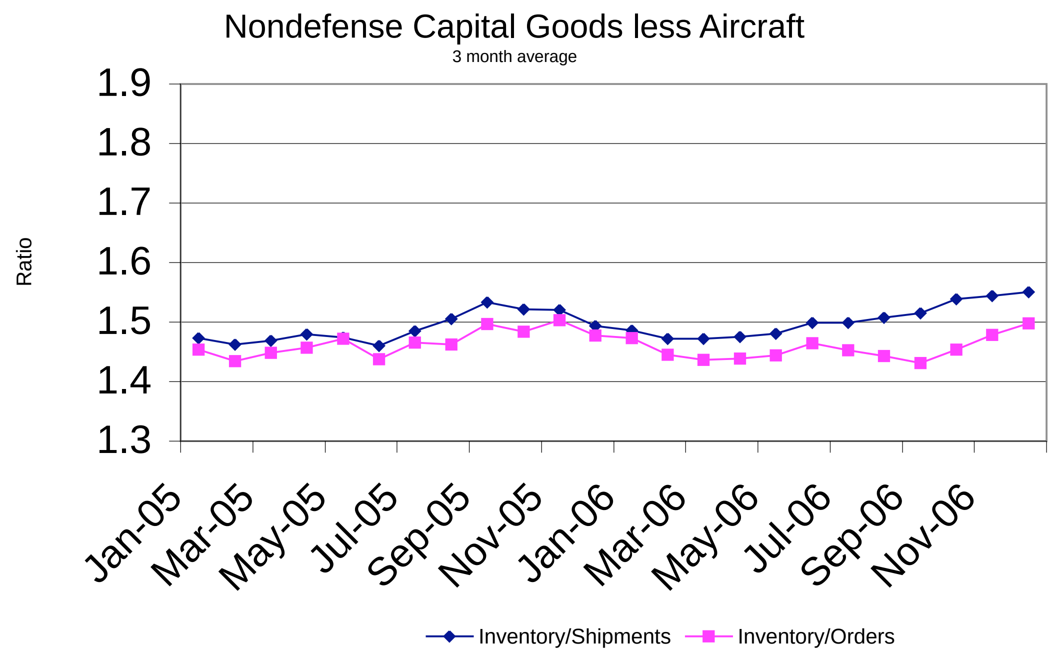


SFSA Postcards

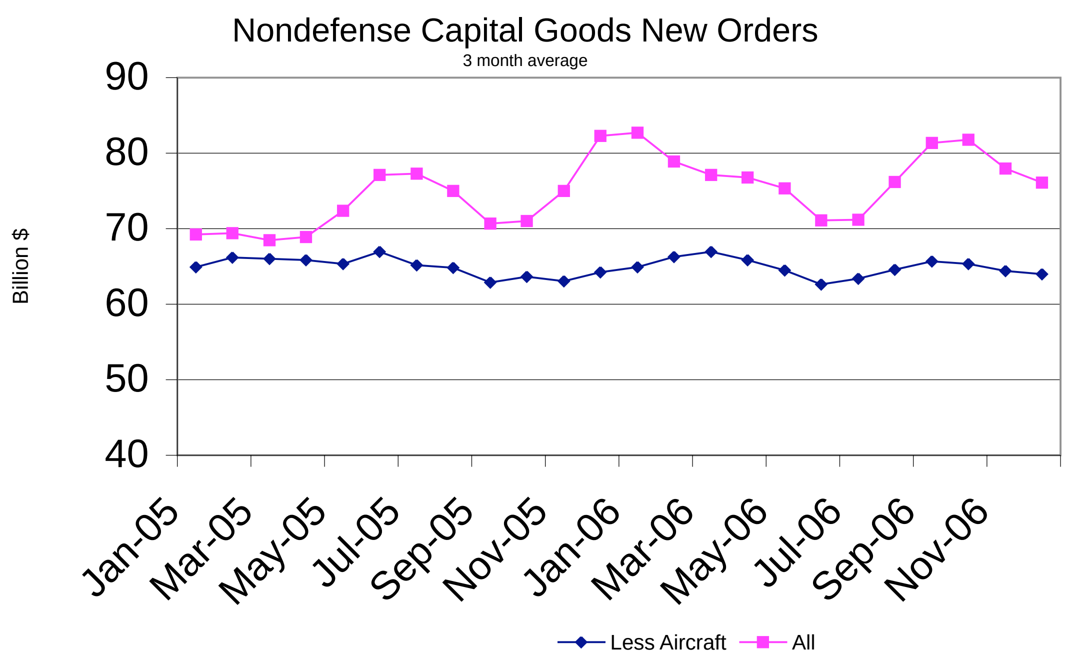


AISI Data

SFSA



Department of Commerce



Department of Commerce

MARK YOUR CALENDAR

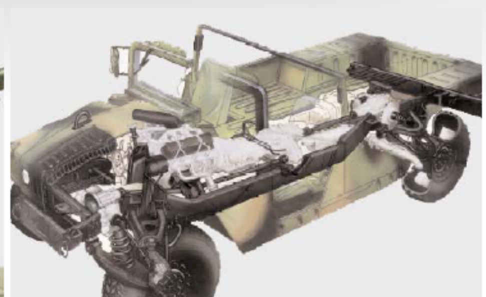
Help Shape the Future of the Metal Casting Industry

METAL CASTING TECHNOLOGY FORUM 2007

Ensuring a Strong Manufacturing Capability

May 1-2, 2007

Saginaw Valley State University - Saginaw, Michigan



CERP

Casting Emission Reduction Program

Operated by Technikon, LLC
5301 Price Avenue
McClellan, CA 95652

GM Powertrain

Armament Research, Development & Engineering Center, Picatinny, NJ

AFS American Foundry Society

Online Reservations
available @
www.cerp-us.org

METAL CASTING TECHNOLOGY FORUM 2007
Ensuring a Strong Manufacturing Capability

Tuesday and Wednesday

May 1-2, 2007

Saginaw Valley State University
Saginaw, Michigan

Lodging:

Four Points Sheraton
4960 Towne Centre Road
Saginaw, Michigan 48604

Room Rate: $ 65 + tax
Reservations: 989.790.5050
Ask for CERP Meeting Group rate.

Conference Fee: $250
Includes registration, meals and tour.

Preliminary List of Speakers:

- John R. Buttermore, *VP Global Manufacturing, General Motors Powertrain*
- Kevin Fahey, *PEO for Ground Combat Systems, US Army*
- Brad Botwin, *Department of Commerce, Bureau of Industry and Security*
- Rex Blackwell, *Plant Manager SMCO and Saginaw Malleable Iron, General Motors Powertrain*
- Ray Monroe, *Executive VP, Steel Founders' Society of America*
- Sheila Ronis, *Director of MBA/MSM Programs, Walsh College*
- Jerry Call, *Executive VP, American Foundry Society*
- Richard McCormack, *Editor and Publisher, Manufacturing and Technology News*
- George Crandell, *VP Operations, Technikon*

Presented by

- General Motors Corporation
- The American Foundry Society
- The CERP* Partnership which includes the US Army, USCAR (Ford Motor Company, General Motors Corporation, DaimlerChrysler), Casting Industry Suppliers Association and the American Foundry Society.

Why You Should Attend:

The 2007 Forum will identify 2 to 3 key challenges and focus on strategies and actions that need to be taken to address the identified challenges. The primary challenges that will be addressed are:

- Education: Training the next generation – attracting and retaining qualified personnel at all skill levels
- Research and Development, Production Advances and Light Weight Casting Technologies: Embracing and promoting appropriate new technologies and process improvements
- Tour of SVSU Engineering Facilities
- Tour of GM Powertrain Saginaw Metal Casting Operations - *All attendees of the CERP Metal Casting Technology Forum, May 1-2, 2007, are eligible to participate (subject to space limitations), in the plant tours of the General Motors Powertrain Saginaw Metal Casting Operations. This tour invitation includes competitors of General Motors attending the forum, who are welcome to participate in the tours. No audio or video taping equipment is allowed. No cameras are allowed.*

This Event Builds on The 2003 and 2004 Forums:

The 2003 Forum focused on identifying and defining technology needs and directions. It resulted in a report that summarizes the top identified needs and challenges facing the U.S. Metal Casting Industry. These challenges include:

- Foreign Competition
- Education
- Environment
- Image
- Production and Manufacturing
- Research and Development/Technology Transfer
- Lightweight Casting Efforts

The 2004 Forum built on these challenges and introduced the National Security and Department of Defense implications of the eroding metal casting industrial base. The Forum explored the implications of foreign source dependence of this vital industry to our nation's industrial infrastructure. Together, metal casting customers, producers from various sectors (including automotive, aerospace, etc.) and researchers helped to plan strategies to ensure a strong domestic metal casting capability, not just survival of this vital industry. The 2004 Forum:

- Reviewed the state of the domestic metal casting industry.
- Explored the metal casting industry as a Diminishing Manufacturing Source issue for the Department of Defense and DOD Major Prime Contractors, including the risks from reliance on off-shore sources for cast parts.
- Reviewed existing programs and research to identify gaps where additional work is needed to benefit the industry and its customers.
- Discussed methods, products and technologies that can help the metal casting industry compete.

** CERP is a unique Government-Industry Partnership dedicated to improving, developing and validating new products, processes or technologies that help keep the domestic metal casting industry competitive in a global economy. CERP is operated by Technikon, LLC for the US Army ARDEC and industrial partners under a Cooperative Research and Development Agreement (CRADA).*

Hexavalent Chromium Exposure Testing in Steel Foundries

As a result of new regulatory requirements, steel foundries have conducted tests to determine exposures of certain workers to hexavalent chromium. A paper given by Susan R. Fiore at the 2006 SFSA T&O Conference gave some of the background and requirements of the regulation. The background and requirements of the standard from that paper are given below:

Reducing Exposure to Hexavalent Chromium in Welding Fumes

Susan R. Fiore
Edison Welding Institute

Background

In October of 2004, the Occupational Safety and Health Administration (OSHA) announced a proposal to amend the 8-hour time-weighted average permissible exposure limit (PEL) for hexavalent chromium (Cr(VI)), and for all Cr(VI) compounds. On February 28, 2006, OSHA issued its final rule. The new standard lowers the PEL from 52 to 5 micrograms (g) of hexavalent chromium per cubic meter of air as an 8-hour time-weighted average (TWA). The new action level has been set at 2.5 g/m^3 of air. Although lower limits were considered by OSHA, it was determined that a PEL of 5 µg/m³ is the lowest level that is technologically and economically feasible for industries impacted by this standard.

There are three separate standards that cover general industry (29 CFR 1910.1026), shipyards (29 CFR 1915.1026), and construction (29 CFR 1926.1126). Although the proposed standards for the three industry sectors differed in some of the detail (e.g., provisions for exposure determination) in the final standards, the requirements are very similar.

The decision to lower the exposure limit was based on a finding that employees exposed to Cr(VI) face an increased risk of significant health effects. The health effects cited by OSHA which are associated with Cr(VI) include lung cancer, asthma, nasal septum ulcerations and perforations, skin ulcerations ("chrome holes"), and allergic and irritant contact dermatitis. One group cited by OSHA as being at risk is workers who are involved with welding of stainless steels. Specifically, OSHA stated that "In general, the studies found an excess number of lung cancer deaths among stainless steel welders. However, few of the studies found clear trends with Cr(VI) exposure duration or cumulative Cr(VI). In most studies, the reported excess lung cancer mortality among stainless steel welders was no greater than mild steel welders, even though Cr(VI) exposure is much greater during stainless steel welding. This weak association between lung cancer and indices of exposure limits the evidence provided by these studies. Other limitations include the coexposures to other potential lung carcinogens, such as nickel, asbestos, and cigarette smoke, as well as possible healthy worker effects and exposure misclassification in some studies, which may obscure a relationship between Cr(VI) and lung cancer risk." And "Nevertheless, these studies add some further support to the much stronger link between Cr(VI) and lung cancer found in soluble chromate production workers, chromate pigment production workers, and chrome platers."

The final rule took effect on May 30, 2006, which was 90 days after the date of publication in the Federal Register, February 28, 2006. Employers have until November 27, 2006, 180 days from the effective date, to comply with the rule (1 year for employers with fewer than 20 employees). The deadline for implementing engineering controls is 4 years after the effective date, or May 31, 2010. Complete details of the standard can be found at www.osha.gov. The following section provides some highlights.

Requirements of the new standard

The first step to complying with the standard is to determine the 8-hour TWA exposure for each employee exposed to Cr(VI). Exposure testing should be done by taking a sufficient number of personal breathing zone samples to characterize full shift exposure on each shift for each job classification, in each work area. Representative sampling can be done instead of sampling all employees in order to meet this requirement. However if representative sampling is performed, the employer must sample the employee(s) expected to have the highest Cr(VI) exposure. As an alternative, the employer can determine the 8-hour TWA exposure for each employee based on any combination of air monitoring data, historical monitoring data, or objective data which is sufficient to accurately characterize employee exposure to Cr(VI).

If the initial monitoring shows that employee exposures are below the action level (2.5 g/m^3), the employer may discontinue monitoring for those employees who are represented by that monitoring. If, on the other hand, exposures are found to exceed the action level, the employer must perform monitoring at a minimum of every 6 months. If the initial monitoring shows that employee exposures are above the PEL, then the employer must perform periodic monitoring at a minimum frequency of every 3 months. It is important to note that there is a specific prohibition in the standard against rotating employees to different jobs in order to comply with the standard.

In order to comply with the standard, employers must implement engineering controls to protect those workers whose exposures exceed the PEL. Respirators may be used as an interim measure while engineering controls are being implemented or in the case where the employer can demonstrate that a process or task does not result in any employee being exposed to Cr(VI) above the PEL for 30 or more days per year. Respirators can also be used in those cases where engineering controls are not feasible, or in those cases in which they have been implemented but are not sufficient to reduce exposures to below the PEL.

SFSA Survey

As a result of the regulatory requirement, SFSA asked member companies to share some of their test results to allow a summary report to be prepared. This shows the results from tests from ten plants. Tests included melting and welding operations predominantly. Tests were conducted by outside laboratories specializing in this type of compliance testing.

Melting

The results of melting trials are shown in Table 1. There are no reported instances of being above either the PEL of 5 or the action limit of 2.5.

Table 1 Results of tests for Hexavalent Chromium in Steel Foundry Melting Operations

Position	Plant Type	Exposure μg/m^3
Melter	Induction melting carbon steel	N.D.
Melter	Induction melting stainless and other steel	<0.012
Melt Crane Operator	Arc Melting Steels	<0.02
Melter	Arc Melting Steels	<0.02
Melter	Induction of stainless and other steel	0.059
Melter	Induction of stainless and other steel	0.061

Melt Furnace	Arc Melting Steels	0.072
Melter	Induction of stainless and other steel	0.073
Melter	Induction melting stainless steel	0.10
Melter	Induction melting stainless steel	0.46
Melter	Induction melting stainless steel	0.49
Melter	Induction of stainless and other steel	0.63
Melter	Induction melting stainless steel	0.54
Melter	Arc melting stainless and other steel	0.64
Melter	Induction melting stainless steel	0.74
Melter	Induction melting stainless steel	0.82
Melter	Induction melting stainless steel	1.3
Melter	Induction melting stainless steel	1.5
Melter	Induction melting stainless steel	1.5
Melter	Induction melting stainless steel	1.5
Melter	Induction melting stainless steel	1.8
Operator	AOD melting stainless	0.49
Operator	AOD melting stainless steel	1.1
Pourer	Pouring stainless and other steel	N.D.
Pourer	Pouring carbon steel	0.085
Pourer	Pouring stainless steel	0.27
Pourer	Pouring stainless and other steel	0.95
Pourer and shotblast	Pouring stainless steel	1.3

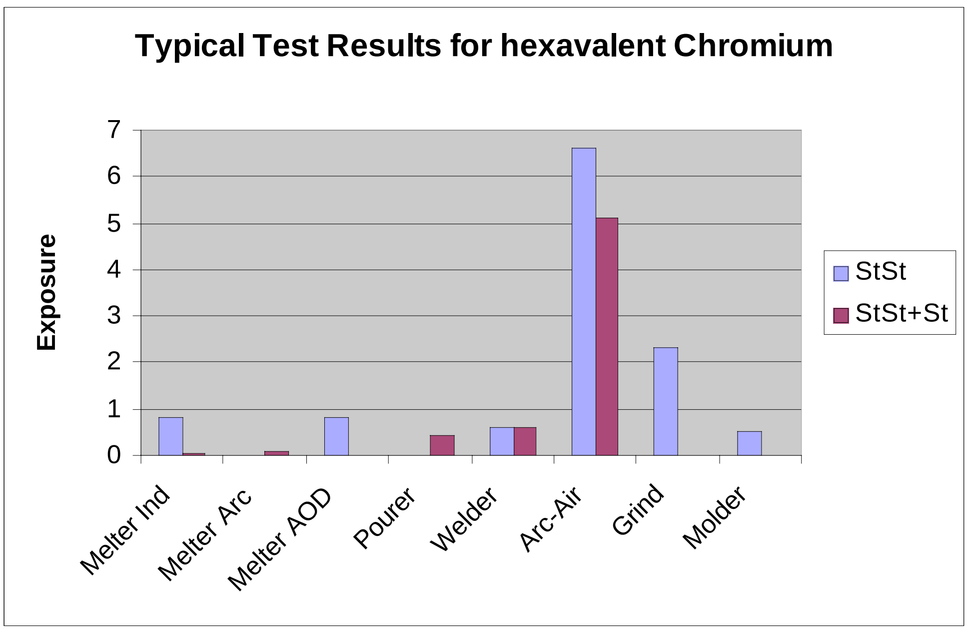
The rest of the reported tests are included in Table 2. There the results show some areas with reported levels well above the PEL. The lowest numbers reported are from welders with air-supplied helmets. Surprisingly the highest numbers are from arc-air, grinding and welding.

Table 2 Results for Hexavalent Chromium in Steel Foundry Cleaning and Other Areas

Position	Plant Type	Exposure μg/m^3
Welder	Stainless and other steel production	<0.015
Welder	Stainless and other steel production	<0.015
Welder	Stainless and other steel production	<0.015
Welder	Stainless and other steel production	<0.017
Welder	Stainless and other steel production	0.04
Welder	Stainless and other steel production	0.04

Welder	Stainless and other steel production	0.06
Welder	Stainless production	0.10
Welder	Stainless production	0.17
Molder	Stainless production	0.18
Welder	Stainless production	0.19
Shakeout	Stainless production	0.21
Welder	Stainless and other steel production	0.26
Welder	Stainless production	0.26
Welder	Steel production	0.29
Welder	Stainless production	0.34
Shakeout	Stainless production	0.34
Welder	Stainless production	0.41
Grinder	Steel production	0.41
Arc-Air	Stainless and other steel production	0.43
Molding	Stainless production	0.47
Arc-Air	Stainless production	0.50
Molding	Stainless production	0.52
Welder	Stainless production	0.6
Welder	Stainless and other steel production	0.61
Shot blast	Stainless production	0.68
Molding	Stainless production	0.8
Welder	Steel production	0.87
Arc-Air	Stainless production	1.1
Welder	Stainless production	1.1
Welder	Steel production	1.2
Shot Blast	Stainless production	1.3
Grinding	Stainless production	1.4
Welder	Steel production	1.5
Molding	Stainless production	1.5
Welder	Steel production	1.6
Grinding	Stainless production	1.7
Welder	Steel production	2.2
Welder	Steel production	2.3
Grinding	Stainless production	2.3
Grinding	Stainless production	2.7
Welder	Steel production	3.3
Welder	Stainless production	3.8
Welder	Stainless production	4.0
Arc-Air	Stainless and other steel production	4.9

Arc-Air	Steel production	5.1
Arc-Air	Stainless production	5.1,1.5
Arc-Air	Stainless and other steel production	5.7
Cutting	Stainless production	6.6
Arc-Air	Stainless and other steel production	6.7
Cutting	Stainless production	6.7
Grinder	Stainless production	6.8
Arc-Air	Stainless production	12
Arc-Air	Stainless and other steel production	12
Welding	Stainless production	20, 0.92
Welding	Stainless production	28
Arc-Air	Stainless production	89,23,2.5
Arc-Air	Stainless production	41,74,106



AMC

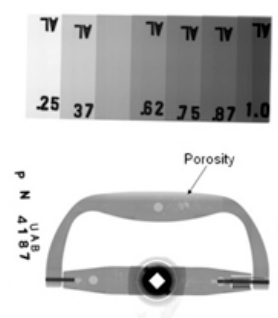
AMERICAN METALCASTING CONSORTIUM

Digital Radiographic Inspection for Aluminum Castings

Digital radiography technology is becoming increasingly available as an in-house inspection tool for metalcasting quality assessment. However, the absence of industry recognized digital standards limits the application of the technology in many critical military parts. The American Metalcasting Consortium team consisting of University of Alabama Birmingham, the Defense Logistics Agency, and the American Foundry Society are working together with ASTM and suppliers to create the required standards for digitized reference radiographs. The digital standards are being developed to create reference images that replicate current universally recognized radiographic film standards.

The University of Alabama Birmingham has previously worked with ASTM and Boeing to develop digital radiographic standards for aluminum castings. The current effort is in the development of digital reference images for investment steel castings. Once the master prints are digitized, a new digital reference standard will be developed and submitted to the ASTM governing board for approval and acceptance.

The potential time and cost savings for digital radiographic technology are far-reaching. For example, a single aerospace qualified foundry consumes more radiographic film than a very large metropolitan hospital. Radiographic inspection time could be reduced as much as 75% with real-time three dimensional imaging techniques to capture indications with the inspection volume. The development and application of this Radiographic Standard will ultimately permit metalcasters to reap the benefits of time, cost and accuracy that digital technology provides.



"This opens the door for inspecting production hardware, which was not allowed in many industries before this standard was developed."

Michael Horky
Boeing Commercial Airplanes

AMC
AMERICAN METALCASTING CONSORTIUM
Phone: (843) 760-3219
email: amc@aticorp.org
www.amc.aticorp.org

SFSA AWARD NOMINATION

A. Award. (Check one, refer to write-up for award description and nominee qualifications).

1. Lorenz Medal____________________
2. Briggs T&O Medal____________________
3. Award of Honor-Barlow____________________
4. Honorary Membership____________________

B. Individual nominated.

1. Name
____

2. Title
____

3. Company
____

C. Reason nominated. (Please be as specific as possible).

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____

D. Nominated by:

1. An Individual
   a) Name____

   b) Company____

2. A Company
   a) Name of company____

b) Name of person completing form____

3. A Division
   a) Division name____

   b) Name of person completing form____

4. A Product Group
   a) Product group name____

   b) Name of person completing form

   ____

5. A Committee
   a) Committee name____

   b) Name of person completing form____

Please return by April 16, 2007 to:

Raymond W. Monroe
Steel Founders Society
780 McArdle Dr. Unit G
Crystal Lake, IL 60014
Phone: (815) 455-8240
Fax: (815) 455-8241

Edward Curtis, Chairman
Harrison Steel Casting Co.
900 Mound Street
Attica, IN 47918
Phone: (765) 762-2481
Fax: (765) 762-2487

Joseph Korff
Quaker City Castings
310 Euclid Street
Salem, OH 44460
Phone: (330) 332-1566
Fax: (330) 332-5655

George Hartay
The Falk Corporation
P. O. Box 495
Milwaukee, WI 53201
Phone: (414) 342-3131
Fax: (414) 937-4142