

STEEL FOUNDERS' SOCIETY OF AMERICA

2021 T&O Seminar

9:00 to 11:30 a.m. Wednesday, December 8th



High Chromium Irons

Tom Stevens – Cast Teach

The 75th T&O features many “diamond” T&O papers. One such paper will be presented as a seminar at this year’s workshop. This special morning session for those who produce high chromium irons will be presented by SFSA alumni, Tom Stevens. In recent years, Tom has supported the society by sharing his Steel Casting Technology class, which this seminar topic is from. The cost to attend this special session is included in the cost to attend the afternoon workshop.

The wear resistant high chromium irons present many challenges in manufacture and use. Customers want the best performance possible without breakage. These two opposing ideals present the foundry with many difficult choices. During this discussion the following topics will be investigated:

- A. Metallurgy of High Chromium Irons. Note: this topic uses common metallurgical terms, but due to time constraints will not provide the background; thus, to gain the biggest benefit from the seminar, please review in advance:
 - a. Solidification and Segregation
 - b. Austenite – Face Centered Cubic (FCC)
 - c. Ferrite – Body Centered Cubic (BCC)
 - d. Carbide
 - e. Pearlite – Combination of Carbide and Ferrite
 - f. Martensite – Body Centered Tetragonal
 - g. Phase diagrams – Binary and Ternary
 - h. TTT diagrams and Ideal Diameter (Di)
- B. Manufacturing processes.
- C. Picking the specific alloy to fit the requirements.
- D. Why do castings from the same specification have such different wear performance?
- E. How can cracking and breakage be reduced?

Preliminary program subject to change

STEEL FOUNDERS' SOCIETY OF AMERICA

2021 T&O Workshop

2:00 p.m. to 6:00 p.m. Wednesday, December 8th



Wash the problems it can create instead of solve, and how to test your wash

Guillermo Oyarzabal – Fimex

Sairam Ravi – University of Northern Iowa

We know that more does not mean better when it comes to wash. However, have you considered that wash may be causing more problems than it is solving? Fimex will share their extensive study on the challenge from gases given off from almost every commercial wash, and how this leads to porosity and inclusion issues. They will also share strategies for ensuring one problem is not replaced by another such as burn-in defects or poor surface finish. Of course, there are other dependencies such as part size that may affect how this applies to your foundry. The presentation will provide you with the background to look at your own wash practice, and builds upon Ken Murphy's 2020 T&O paper, "Observations on Mold Wash". UNI will demonstrate how to do wash testing to enable benchmarking and quality control of your wash products.

Next Generation Manufacturing and Non Destructive Testing Innovation

Frank Peters and David Eisenmann – Iowa State University

Jerry Thiel and Sairam Ravi – University of Northern Iowa

Learn about the latest research in steel casting Next Gen Mfg from ISU on automation of foundry processes and development of improved NDT, and UNI on the Sensor Collective initiative. After an introduction to the activities, attendees will be able to rotate through hands-on demonstrations on:

1. MPI: expert system that analyzes new images to identify indications to aid the inspector.
2. PAUT: latest Phased Array UT equipment and how it works on steel castings.
3. Grinding: operator driven robotic grinding without part specific programming.
4. Arc Air Cobots: 'show' the cobot where the riser is at to then 'cut' the riser off.
5. Welding Automation: interactive discussion on the challenges with automating welding of castings to help steer research objectives.
6. Sensors: see how low cost sensors will play an important role in steel foundries of the future, and how you can start using them today.

Preliminary program subject to change