



## NetCastPL4.0 Seminars Series

22 January 2025, 15:00 – 16:15

### Aims of the seminars

Today's seminars are focused on Austempered Ductile Irons (ADIs), and they are meant to give an insight on the scientific collaboration lasting longer than 10 years between CNR-ICMATE and Zanardi Fonderie S.p.A. that is one of the leaders in Europe in the ADI production. As one of the aims of NetCastPL4.0 is to build a Networking Pole for exchange of knowledge between research entities and foundries for improving foundry innovation and sustainability, the seminars held by Dr Giuliano Angella (CNR-ICMATE, Italy) and Mr. Franco Zanardi (Zanardi Fonderie S.p.A., Italy) are meant to report results from the positive interaction between research and industry.

15:00 – Giuliano Angella (20-25 minutes)	15:30 – Franco Zanardi (20-25 minutes)
<b>Austempering time optimization through tensile behaviour analysis: a refining procedure of Dorazil method.</b>	<b>The importance of scientific collaboration between foundry and Accademia for materials engineering: the case of Austempered Ductile Irons.</b>
<p>The Austempered Ductile Irons (ADIs) production consists of a two-step heat treatment of a conventional ductile iron: first, austenitization at high temperature to have homogeneous austenite rich in C; then, quenching in salt bath to trigger the isothermal austempering solid-state transformation. After a proper austempering time, the resulting microstructure is the dual phase acicular ausferrite, that is, metastable austenite rich in C (<math>\gamma_{HC}</math>) and bainitic ferrite (<math>\alpha</math>). However, if the casting is held at the austempering temperature for longer times, the reaction <math>\gamma_{HC} \rightarrow \alpha + \varepsilon</math> occurs, where <math>\varepsilon</math> is a FeC carbide that dramatically reduces the ausferrite ductility. The proper austempering time window can be found through an innovative procedure based on tensile strain hardening analysis that results to be more reliable than the traditional Dorazil method based on the tensile ductility analysis against the austempering time. Significant examples of the goodness of this procedure are here reported.</p>	<p>Austempered Ductile Irons (ADIs) are still considered as “new” materials and technologies after 50 years from the first industrial successful solutions, in Europe ADIs are not widespread as they should deserve, because of little awareness of austempering parameter production effects on the ADIs microstructure and of certain relationships between ADIs microstructure stability and mechanical properties. Professionals prefer to avoid the exploration of new development risks, even if they know that they could support great competitive advantages in long term perspectives, because the time necessary is out of their life scale. The case of Zanardi Fonderie is of great high-quality cooperation with a number of universities with activity of measurement and teaching, taking care directly about the deep evolution of new industrial technologies, assisting end users and professionals in developing new solutions also outside the proprietary supply chain perimeter. Examples of significant results from these collaborations are here reported.</p>
<p><u><a href="#">Giuliano Angella</a></u></p> <p>After achieving the Philosophical Doctor degree in Materials Engineering at the University of Sheffield (UK), since 2001 he has been employed in the research institute CNR-ICMATE, and now he is senior researcher working on mechanical and microstructure characterization of metal alloys for industrial applications. From scientific collaborations with some of the main Italian metallurgical companies, he has dedicated his recent research activity to the development of constitutive equations and correlations between production-microstructure-properties of conventional and advanced cast irons.</p>	<p><u><a href="#">Franco Zanardi</a></u></p> <p>After his Master Degree in Mechanical Engineering at Padova University, he has begun his professional activity in 1972 at Zanardi Fonderie S.p.A. Now, as honorary president, he inspires the research and technological innovation projects, using the applicable results inside the standardization working groups dedicated to Ductile Iron materials, material properties dissemination, patenting activities. He has been Vice president, in charge of the economic and research sector of Assofond (National Association of Foundries), and he is member of the External Advisory Board of the project NetCastPL4.0.</p>

The link to the registration page of the Seminar is the following:

[Registration](#)