

Phase Transformation and Tribological Characteristics of Austempered Ductile Iron Produced by Designed Heat Treatment Processes

The Oakland University and School of Engineering and Computer Science communities are invited to attend Bingxu Wang's defense of his Ph.D. dissertation. Seating is limited. RSVP with Katie Loodeen at loodeen@oakland.edu.

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Committee: Gary C. Barber, Ph.D. (Chair), Lumin Chen, Ph.D. (Co-chair), J.David Schall, Ph.D., Guangzhi Qu, Ph.D., Xichen Sun, Ph.D.

Austempered ductile iron (ADI) is a type of ductile iron produced by an isothermal heat treatment process. ADI has been widely used in diverse applications such as automobiles and agricultural tools. The exceptional mechanical properties of high strength-to-weight ratio, excellent ductility and toughness, low cost and good machinability compared with traditional iron forgings and castings can be attributed to its unique ausferritic structure including the acicular ferrite and carbon enriched austenite. The properties of ADI are strongly dependent on the specific chemical composition, austempering temperature, holding time and cooling rate in quenching mediums.

In this research, the graphite ductile iron with and without Ni element was subjected to different austempering temperatures and holding times. The addition of Ni on the formation of ausferritic structure was investigated by evaluating the microstructure and analyzing the transformation kinetics. Then, rolling contact fatigue test was used to evaluate the fatigue resistance of ADI. After that, various tempering cycles with constant low tempering temperatures were applied on ADI to study the responses of ADI materials. Finally, the study of the influences of tempering temperatures on the phase transformation and tribological properties of tempered ADI was conducted.

Time: 9:00 – 11:00 a.m.
Date: Tuesday, October 23, 2018
Location: 470 EC

