AMC

AMERICAN METALCASTING CONSORTIUM

Intensive Quenching to Produce High Performance Cast Parts

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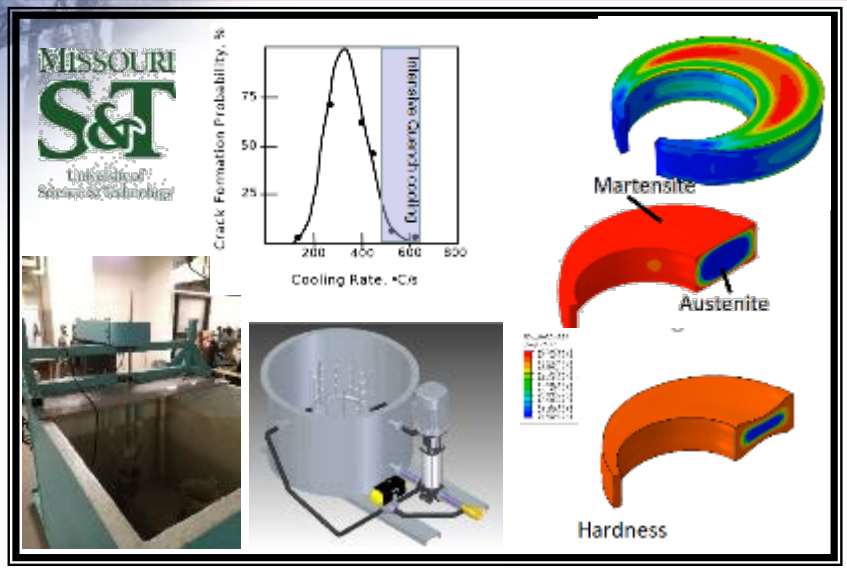

Problem

- Traditional quenching technologies - produce non-uniform cooling and result in distortion, cracking, and tensile residual stress on the surface

Objectives

- Evaluate the use of IQ technology to decrease distortion and quench cracking in:
- Complex geometry cast parts
- Hard to quench steel chemistries prone to distortion and cracking
- Castings with different surface conditions: scale, surface roughness and surface defects
- Produce compressive residual stress for better fatigue performance

Benefits to Warfighter

- Reduce operation and sustainment costs of weapon systems through better reliability of replacement part

Description of Project:

This project will evaluate the use of intensive quenching technologies to produce beneficial compressive residual stress and reduce distortion and cracking in difficult to quench steel chemistries

Team:

Missouri University of Science & Technology, Steel Founders' Society of America

Milestones / Deliverables

- Missouri S&T intensive quench facility operational
- Casting of Navy C-Ring castings – 43XX steels with different levels of inclusions and surface roughness
- Evaluation of intensive quenching in comparison Missouri S&T draft tube quenching
- Low temperature stage one temper to preserve residual compressive stress
- Determination of improvement in fatigue properties
- In-plant (foundry) trial of intensive quench on actual casting