

DANTE TIMES

DANTE Solutions had a successful HTS and AGMA Conference & Exposition in Columbus, OH, this October 24-26th.



- DANTE staff gave 4 talks in the conference covering: low pressure carburizing; distortion control and tooling design for press quenching; and using advanced modeling techniques to solve heat treating problems!
- Charlie Li and Lynn Ferguson were instructors in the joint AGMA/HTS Education Course, "Materials Selection and Heat Treatment of Gears"

- Kept current customers and collaborators updated with Dante's latest advancements in heat treatment modeling, and provided insights to future customers.

Quick News:

- DANTE expanded its users group in 2017:
 Rolls-Royce
 Sikorsky Aircraft
 Cummins
 John Deere
- Charlie Li has continued to teach 'Engineering Materials & Manufacturing Processes' as part of the Mechanical Engineering curriculum at Cleveland State University.
- DANTE Solutions is active in projects funded by Industry, US Government (e.g. Army), and the American Foundry Society.

DANTE Project Updates



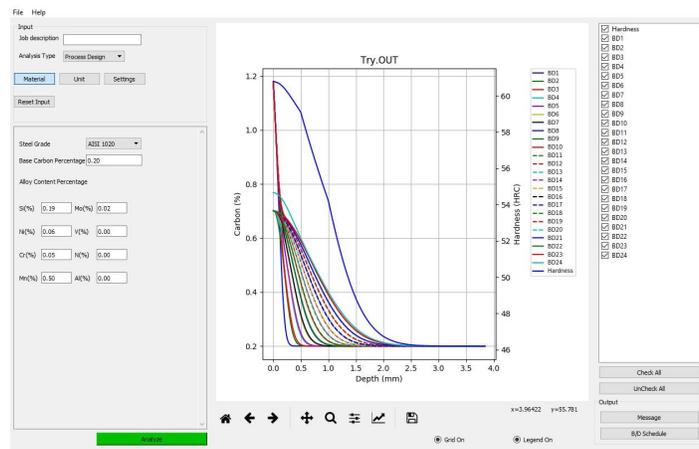
DANTE Solutions, in collaboration with Atmosphere Engineering and Akron Steel Treating, designed an innovative gas quenching unit to minimize component distortion during the hardening process. The DANTE Controlled Gas Quenching (DCGQ) unit is capable of quenching single components following a time-temperature schedule designed for a specific component and steel alloy using the DANTE software.

Upcoming DANTE Solutions meeting

DANTE will attend ACRC / CHTE Joint Fall Meeting December 5-6, 2017 at Worcester Polytechnic Institute (Center for Heat Treating Excellence)

DANTE Software Updates

DANTE Utilities software (Vcarb, Gcarb, DilotFit, MecFit, TTT/CCT, etc.) have been updated with Python GUI (graphic user interface) and now are more user friendly and robust. Below is a screenshot from Vcarb, the Low Pressure (Vacuum) Carburizing Utility.



DANTE is ready to release its **ACT-2.1** for **ANSYS**. This user-friendly interface improves the linkage between thermal and mechanical models, the designation of multiple carburization steps and provides robust error checking.

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www.Dante-Solutions.com

Since 1982 we have provided engineering services to the metalworking industries, and for over 30 years we have focused on thermal processing. Our range of services has expanded to include several software products, with our DANTE software being the premier package in the world for modeling heat treatment of ferrous parts. In recognition of this, we re-branded ourselves as Dante Solutions, Inc. in January, 2014.

While we use computer analysis tools for most of our work, we are much more than analysts using computer software tools. Our staff includes experts in mechanical and metallurgical engineering. Let us help you improve your heat treatment and deformation processes, use new materials, and develop new products.

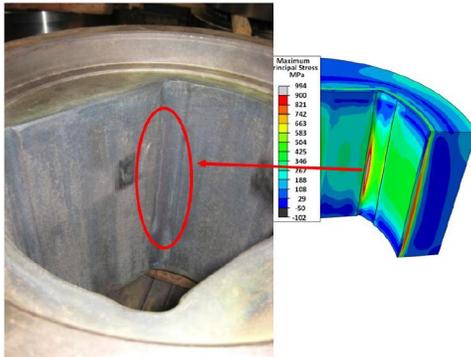
For more information, contact us.

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Project Highlights

Induction hardening

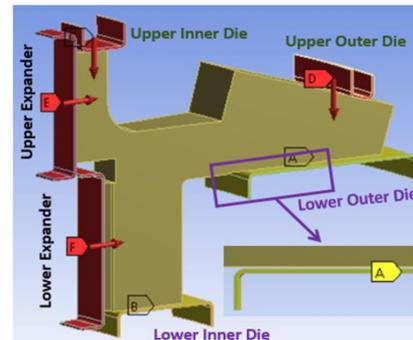


A thick-walled component made of AISI 4150 steel suffered cracking on the inner bore during a scanning induction hardening process. The cracks were visible immediately after quenching.

A finite element model was constructed and the scanning induction hardening process was modeled using DANTE. Using micrographs from a previously hardened and cracked part, along with the inductor scan speed, Joule heating as a function of time was determined. The root cause of the cracking was ascertained to be a result of bending stresses induced during the solid-state phase transformation from austenite to martensite.

The DANTE model showed high tensile stresses corresponding to the crack location. Several DANTE models were executed to examine the effects of process conditions and case depth on the in-process stresses. A preheat was found to solve the issue.

Bevel gear press quench



Our DANTE software was used to investigate a bevel gear press quench process. The simplified model is shown above. The main concern was radial shrinkage and taper of the bore.

A baseline immersion quenching model was constructed to observe the gear's behavior in the absence of tooling constraints. These DANTE model results were then compared to the current tooling load conditions used to process the gear. Results showed that the tooling with the current loading conditions did not offer much benefit over a free oil quench process, and actually may have been making the shrinkage of the bore worse. Use of a plug or a locked expander did a much better job of controlling the radial dimension than a conventional expander in this case.