

2018 Engineered Residual Stress

Implementation (ERSI)

Workshop

Held in Layton Utah

September 13 – 14, 2018



HILL
ENGINEERING
Predict. Test. Perform.



analytical processes / engineered solutions

LOCKHEED MARTIN



ARCONIC



communications



NORTHROP GRUMMAN



Constellium



Australian Government
Department of Defence
Science and Technology



An Operating Unit Of Mercer University

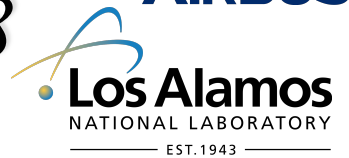


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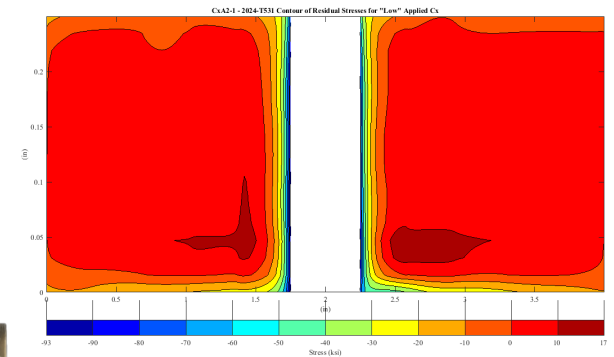
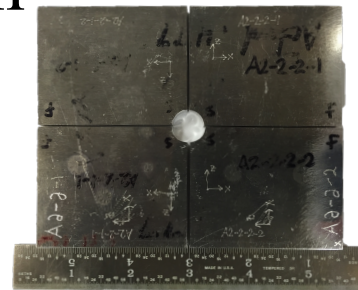
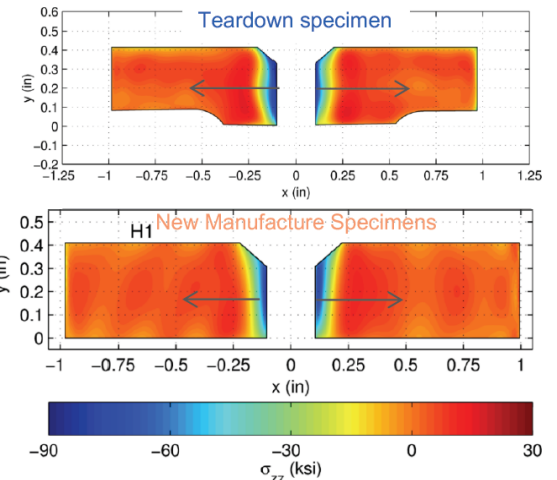
AIRBUS



EST. 1943

Welcome to the 2018 ERSI Workshop

- Thank you all for coming!
 - Food and Funding
- Restrooms and Break Area are Upstairs
- Internet is Provided for Free as a Guest
- Agenda and Proposed Discussion Format
- Purpose Focused Discussion
 - Closing the gaps
 - Developing the documents
- ERSI Website



Overview of Working Group Structure

Total Individuals within the Working Group - 78

- Countries Involved - 4
- DoD Organizations - 3 + FAA
- National Laboratory - 1
- Universities - 5
- OEMs - 3
- Industry Partners - 16
- Weapon Systems - 8

Integrators - Dr. Mark Thomsen - A-10 ASIP Manager, Dr. Dale Ball - Lockheed Martin Aero, Dr. TJ Spradlin - USAF/AFRL



Integrator Subcommittee

Organizational Group – Mr. Robert Pilarczyk – Hill Engineering, LLC., Mr. Dallen Andrew and Dr. Scott Carlson, LM-Aero

Verification and Validation Through Test – Dr. Tom Mills – APES, Inc.

Fatigue Crack Growth Analytical Methods – Mr. Robert Pilarczyk – Hill Engineering, LLC.

Residual Stress Process Simulation – Mr. Keith Hitchman – FTI – A PPC Company

Data Management and Quality Assurance – Dr. Carl Magnuson – TRI Austin

Effects of Residual Stress on Non-Destructive Inspection (NDI) Methods – Mr. John Brausch – USAF/AFRL

Residual Stress Measurements – Dr. Mike Hill - Hill Engineering, LLC.

Risk Analysis with the Inclusion of Engineered Residual Stresses – Mr. Lucky Smith & Ms. Laura Domyancic - SwRI

Purpose of ERSI Workshop

1. To identify and lay out a road map for the implementation of engineered deep residual stress which can be used in the calculation of initial and recurring inspection intervals for fatigue and fracture critical aerospace components.
2. To highlight gaps in the stat-of-the-art and define how those gaps will be filled.
3. Then to define the most effective way to document requirements and guidelines for fleet-wide implementation.

Vision of ERSI Working Group

Within 3-7 years have developed a framework for fleet-wide implementation of a more holistic, physics-based approach for taking analytical advantage of the deep residual stresses field, induced through the Cold Expansion process, into the calculations of initial and recurring inspection intervals for fatigue and fracture critical aerospace components. Then move from there to other deep residual stress inducing processes, like Laser Shock Peening , and Low Plasticity Burnishing.