Residual Stress and Effect on Crack Growth and Fracture in Weldments

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Abstract: This paper will begin with an overview of computational weld modeling procedures. This will include discussion of current weld modeling procedures of theory, practice, and validation of the modeling approaches that are popular today. This will include a very brief discussion of additive manufacturing modeling approaches. Next methods of residual stress and distortion control procedures will be summarized.

The next segment of the discussion will provide examples relevant to aerospace structures applications and especially crack growth and fracture response in residual stress fields. These different examples will include:

- Distortion control of a laser welded engine component
- Critical flaw size evaluation of the ARES IX upper stage simulator
- Fracture procedures for NASA layered pressure vessels

It is hoped that after the presentation there will be time for the NASA Fracture Control Document Specialists to provide discussion and comment.

DOI: 10.32604/icces.2019.05802 www.techscience.com/icces