ICAM2024

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ASTM INTERNATIONAL CONFERENCE ON ADVANCED MANUFACTURING

Research to Application through Standardization

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Value Chain: Fatigue and Fracture

The rapid adoption of additive manufacturing (AM) across numerous industry sectors with a wide variety of applications requires methodologies for the characterization and mitigation of risk arising from material flaws. For safety-critical applications, it is particularly important to understand how material characteristics and process defects typical to AM (e.g., pores, lack of fusion, surface roughness, etc.) affect component integrity. Understanding these effects is complicated by the lack of historical data, the potential for variability in AM processes, and the rapid evolution of the technology. The qualification, certification, and safe continued use of AM products in fatigue critical applications will depend not only on a basic understanding of damage mechanisms and the associated behavior of typical AM defects, but also on the development of robust, validated models and software for predicting fatigue life and fracture risk. In addition, the applicability of current fatigue and fracture standards needs to be evaluated to identify standardization gaps for generating the necessary supporting materials data.

Topics of interest include but are not limited to:

- Structural Integrity of AM parts and components
- Modeling and verification of fatigue and fracture behavior of AM metallic materials
- Effect of defects on fatigue and damage tolerance
- Crack nucleation and damage formation mechanisms in AM materials
- Development of new fatigue and fracture test methods
- Defining acceptance criteria for AM components in fatigue critical applications
- Establishing process-structure-property-performance relationships
- Predictive models and software for fatigue and damage tolerance of AM parts

Symposium Organizers

- **Stefano Beretta,** Politecnico di Milano, Italy
- **Thomas Niendorf,** University of Kassel, Germany
- **Jutima Simsiriwong,** University of North Florida, USA
- **William Tilson,** NASA-MSFC, USA
- **Zachary Whitman,** Boeing Commercial Airplanes, USA

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