

Aircraft Structural Analysis

KEYWORDS

Structural Analysis

Finite Element
Modeling (FEM)

Finite Element
Analysis (FEA)

Classical Analysis

Bonded Composite
Structure

Structural Repair and
Modification

Damage Tolerance
Analysis (DTA)

Durability and
Damage Tolerance
Analysis (DADTA)

Structural Life
Enhancement

Simulation

Idealization

Validation

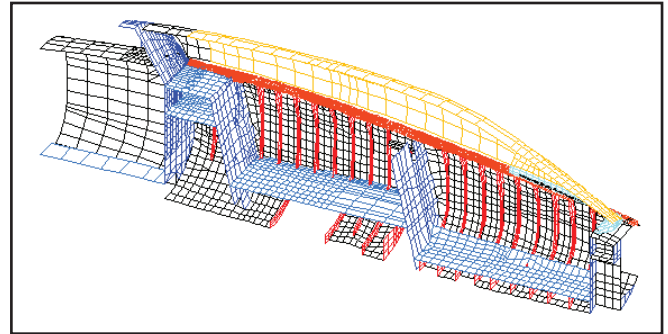
Southwest Research Institute® (SwRI®) structural engineering specialists have a combined total of more than 150 years of experience in analysis of structures under various load conditions. SwRI employs the latest technology in computational simulation to provide clients with real-time data formatted for accurate analysis and verification of finite element analysis. SwRI's analytical capabilities are supplemented by testing of structures to substantiate the models.

Capabilities

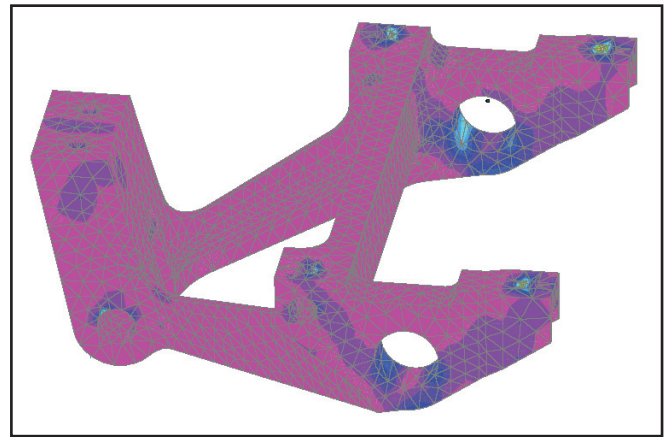
SwRI has the capability to perform all levels of structural analysis, from individual components to complete assemblies. Development of finite element models from geometric data or modification of existing models for component improvement or repair is included in these capabilities. The staff has performed stress analysis services for commercial and government clients in many areas of aircraft structures, including wing, empennage, fuselage, landing gear, and whole aircraft modeling and simulation.

Experience

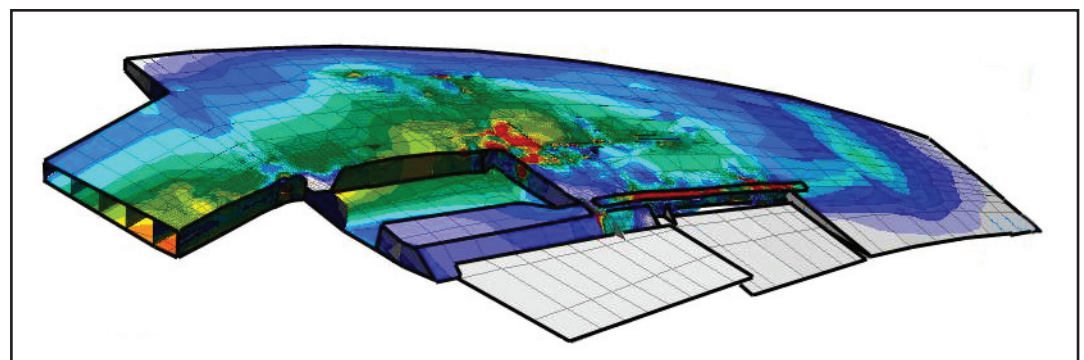
- Expand/review/refine existing finite element models (FEM)
- Idealization of wing, fuselage and specialized structural models
- Experimental validation of FEM
- New finite models from geometric models (CAD) or historical loft data
- FEM usage; development of component repair scheme
- Models for composite repair of metallic structures
- Modeling of composite materials
- Analysis of repair and maintenance actions
- Engineering support at customer location



Finite element model (FEM) of aircraft forward fuselage



Detailed modeling for repair development and support for damage tolerance analysis



Typical FEM stress contours on deformed wing

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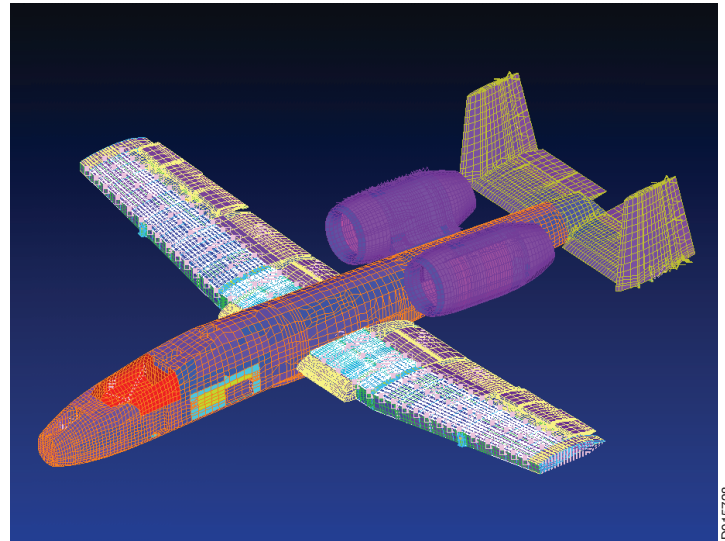
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industry and the public
through innovative
science and technology

Analysis Tools

- MSC.NASTRAN®, ANSYS®, ABAQUS® FEM solvers
- StressCheck®
- PATRAN®, FEMAP, Pro/ENGINEER® pre- and post-processors
- Software supported by high-end PC platforms for multiple users simultaneously



Full aircraft FEM development, verification, validation and analytical application



Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,100 employees who perform contract work for industry and government clients.

**We welcome
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