

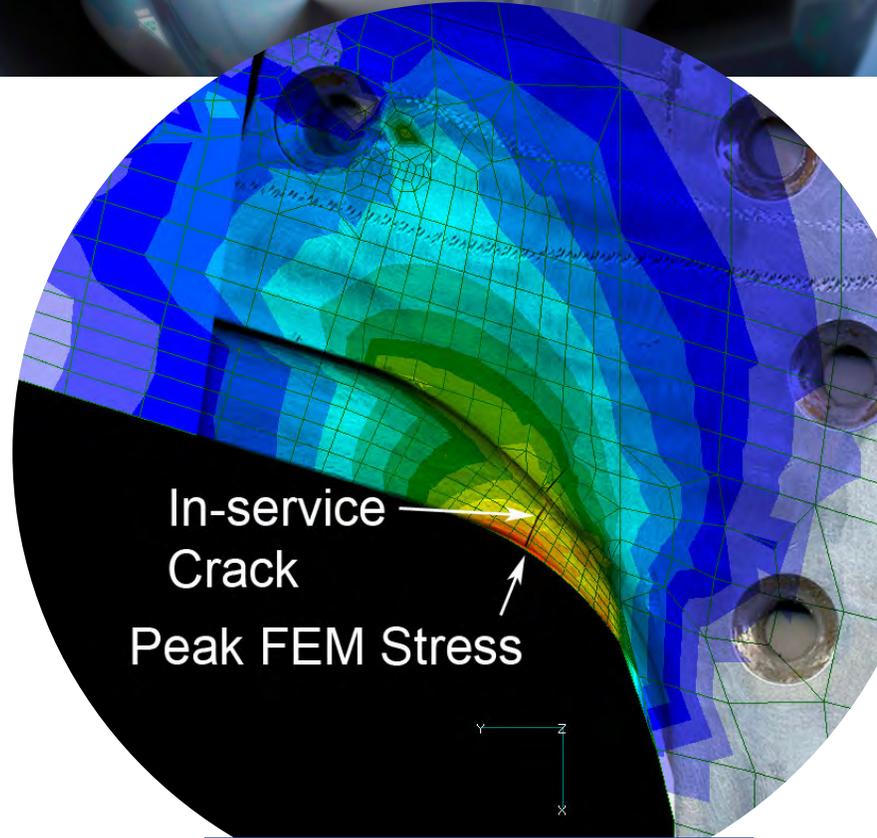


SOUTHWEST RESEARCH INSTITUTE



## Aircraft Damage Tolerance Analysis

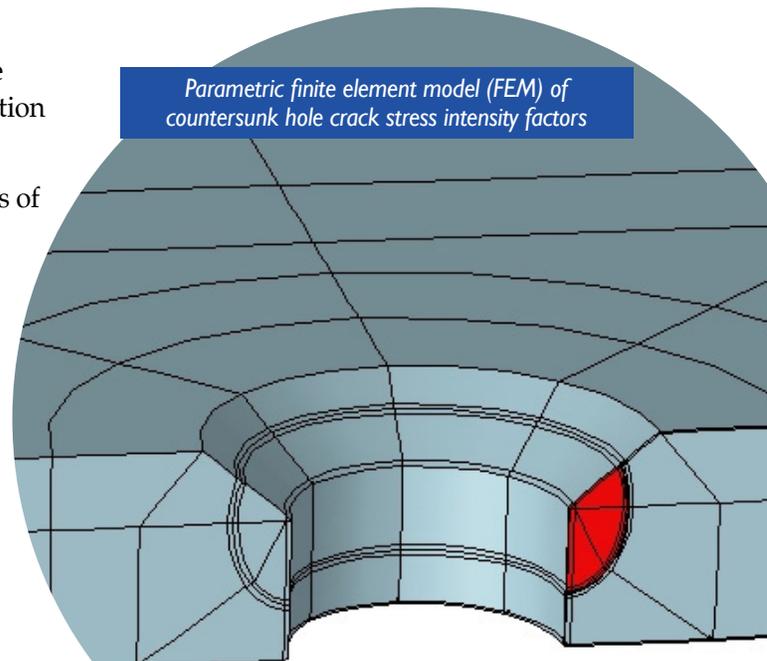
Southwest Research Institute® (SwRI®) structural engineers perform damage tolerance analysis for military and commercial aircraft to give clients the information necessary to safely and effectively manage the structural health of their fleets. SwRI has expertise using state-of-the-art tools such as AFGROW, NASGRO® and StressCheck® along with significant experience correlating analyses to crack growth test results. Proficiency with automating these tools allows for efficient and timely results.



Cracked aircraft structure image overlaid on finite element analysis (FEA) stress gradients

### Capabilities

- Crack growth analysis software tools (AFGROW, NASGRO®, CRACKS, etc.)
- Stress intensity calculation using finite element and boundary element tools (StressCheck®, NASBEM, etc.)
- Correlation to spectrum test results from coupon and full-scale tests to determine crack growth rates and crack growth retardation due to spectrum effects
- Automation for efficient and accurate analysis of large numbers of locations and/or variation of parameters
- Stress determination using hand stress analysis and finite element tools such as FEMAP and NASTRAN
- Risk and probabilistic crack growth analysis using state-of-the-art tools such as PROF and NESSUS®
- Material, component, and full-scale testing
- Damage tolerance training/short course



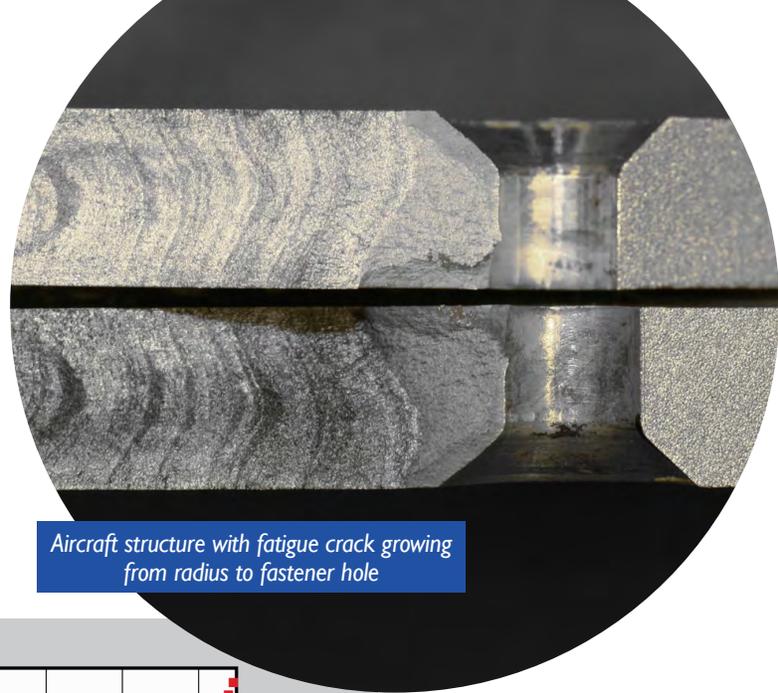
Parametric finite element model (FEM) of countersunk hole crack stress intensity factors

## Experience

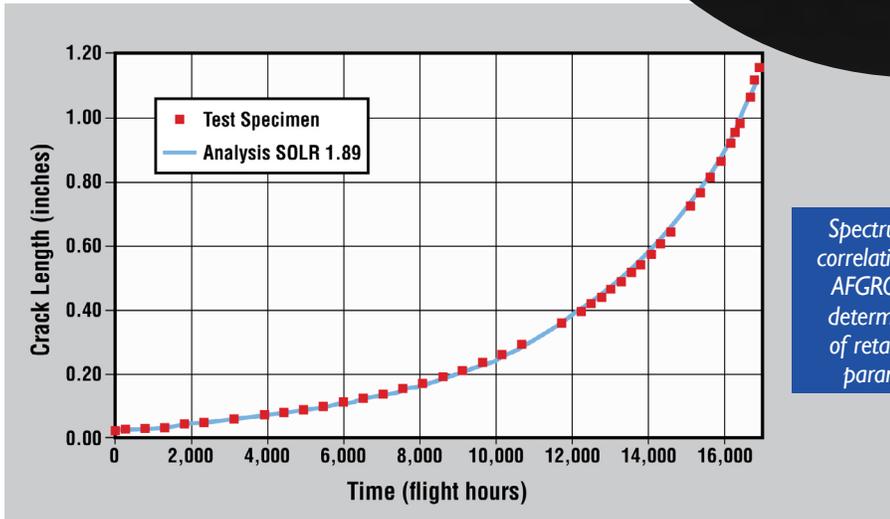
SwRI has performed damage tolerance and fatigue analysis for U.S. military aircraft (A-10, F-5, F-16, T-37, T-38) and for foreign military and commercial clients.

## Facilities and Analysis Tools

SwRI uses state-of-the-art crack growth analysis tools such as NASGRO<sup>®</sup> and AFGROW, as well as finite element modeling tools such as NASTRAN, FEMAP, and StressCheck<sup>®</sup> for the determination of stresses and stress intensities. SwRI has facilities to perform tests on structures ranging from coupons to components to full-scale aircraft.



Aircraft structure with fatigue crack growing from radius to fastener hole



Spectrum test correlation using AFGROW for determination of retardation parameter

**We welcome your inquiries.**  
**For more information, please contact:**

**Luciano G. Smith**  
Principal Engineer  
Aerospace Structures  
210.522.6857  
[luciano.smith@swri.org](mailto:luciano.smith@swri.org)

**David H. Wieland**  
Staff Engineer  
Aerospace Structures  
210.522.3864  
[david.wieland@swri.org](mailto:david.wieland@swri.org)

Structural Engineering Department  
Mechanical Engineering Division

**swri.org**  
**aerospacestructures.swri.org**

## SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world's most challenging scientific and engineering problems. Headquartered in San Antonio, Texas, our client-focused, client-funded organization occupies 1,200 acres, providing more than 2 million square feet of laboratories, test facilities, workshops, and offices for more than 2,700 employees who perform contract work for government and industry clients.

swri.org

SwRI Business Development  
PO Drawer 28510  
San Antonio, Texas 78228-0510 USA

[bd@swri.org](mailto:bd@swri.org) • 210.522.2122



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