

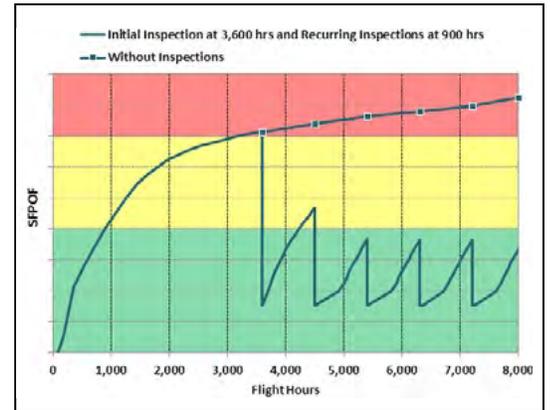
Aircraft Risk Analysis

Southwest Research Institute® (SwRI®) structural engineering specialists use probabilistic methods to perform risk assessments to quantify the safety and useful service life of aircraft structures in terms of probability of failure and hazard rate. These analyses evaluate alternative usage, maintenance and inspection scenarios in terms of safety-of-flight risk and can be used to make planning decisions by balancing safety, cost and readiness of the aircraft system.

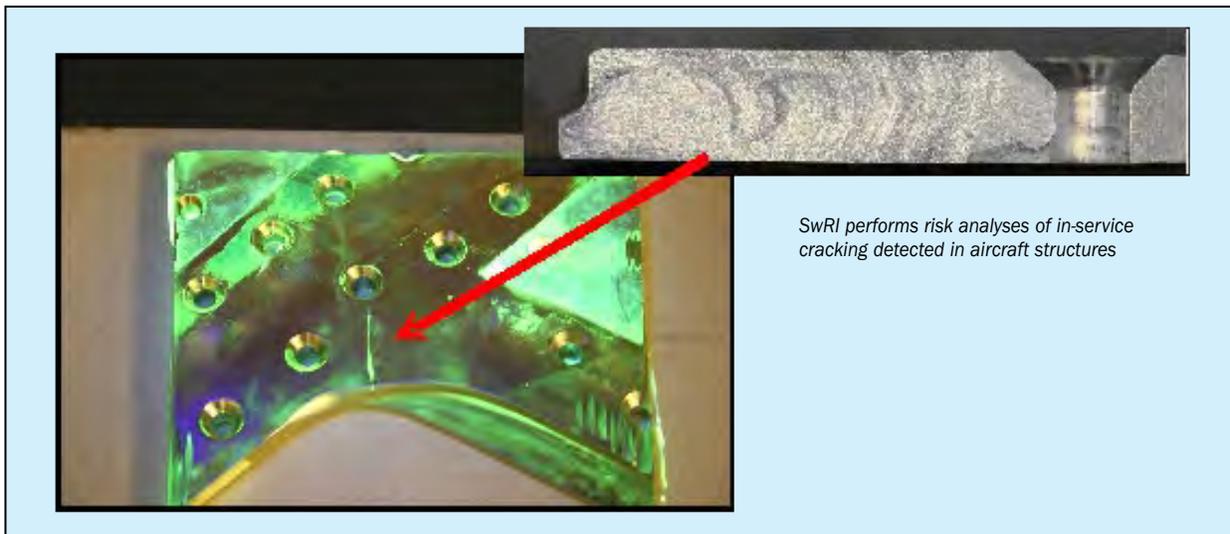
SwRI engineers use analysis tools such as the USAF probability of fracture (PROF) software and other advanced probabilistic methods contained in SwRI's NESSUS® and DARWIN® software to assess the effects of variabilities and uncertainties in loadings, material properties, fatigue and fracture models, flaw sizes, and inspection methods on the risk of structural failure.

Capabilities

- Risk evaluations of in-service cracking
- Evaluation of safety and economic impacts of service life extensions
- Risk-based evaluations of inspection, repair and/or modification plans
- Single aircraft and fleet-wide risk analyses
- Development of random variable probabilistic distributions for risk analyses
- Probabilistic fatigue and fracture analyses
- Equivalent Initial Flaw Size (EIFS) distribution development using in-service cracking and teardown data
- Probability of Detection (POD) curve development for nondestructive inspection method
- Interpretation of risk analysis results in terms of MIL-STD-882D and JSSG-2006
- Economic life evaluations
- Sensitivity studies
- Risk assessment workshops and training



Single-flight probability of failure (SFPOF) results with and without recurring inspections

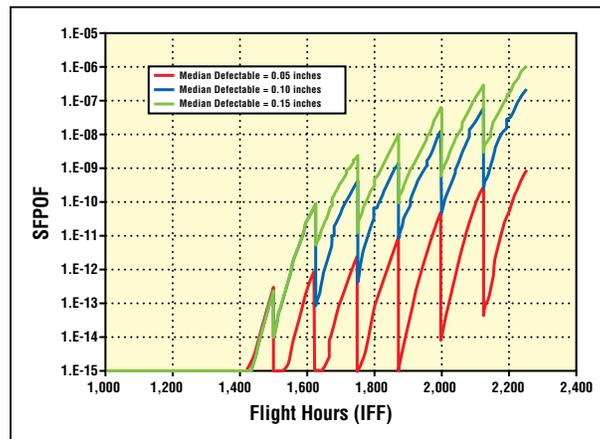


Experience

- Damage Tolerance Risk Assessment of T-38 Fuselage and Wing Cracks
- Risk Assessment of the A-10 Wing Aft Lower Cover at Rear Spar Cap (WS 23)
- Risk Assessment of T-37B Fatigue Critical Locations
- Risk and Economic Implications of DADTA for F-5 Foreign Operators
- Probabilistic Structural Analyses of Fatigue and Fracture
- Advanced Probabilistic Fracture Mechanics and Life Evaluations of Turbine Disks and Blades

Analysis Tools for Risk Assessment

- PROF®
- DARWIN®
- NESSUS®
- Weibull Analyses



SFPOF for recurring inspections and different detectable flaw sizes

We welcome your inquiries.

For additional information, please contact:

Joseph W. Cardinal, P.E., Staff Engineer
Structural Integrity Analysis
(210) 522-3323
joseph.cardinal@swri.org

Laura C. Domyancic, Research Engineer
Structural Integrity Analysis
(210) 522-3469
laura.domyancic@swri.org

Structural Engineering Department
Mechanical Engineering Division

Southwest Research Institute
6220 Culebra Road • PO Drawer 28510
San Antonio, Texas 78228-0510

www.swri.org



structural-engr.swri.org



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 nearly 3,000 employees who perform contract work for industry and government clients.

Find us on



SwRI Business Development • San Antonio, Texas • (210) 522-2122 • bd@swri.org

© 2016 Southwest Research Institute. All rights reserved.

An Equal Opportunity/Affirmative Action Employer • Race/Color/Religion/Sex/Sexual Orientation/Gender Identity/
National Origin/Disabled/Veteran • Committed to Diversity in the Workplace