



ESRD, Inc. is the developer of StressCheck®, the world's premier high definition simulation tool

www.esrd.com

High-Fidelity Aircraft Stress Analysis in Support of DaDT

ESRD's StressCheck® numerical simulation software is used across the aviation, aerospace, and defense industries to attack the most challenging structural analysis problems. The underlying technology enables high-fidelity analysis to be performed that is **Simple, Accurate, Fast, Efficient and Reliable (S.A.F.E.R.)**, especially when compared to legacy-generation FEA methods, software and models.

The Engineering Challenge

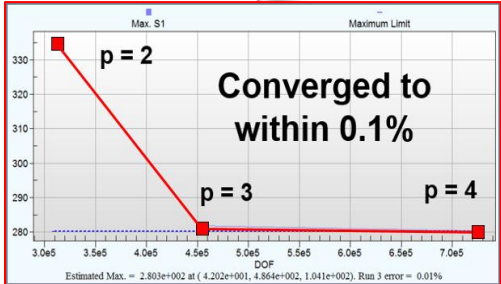
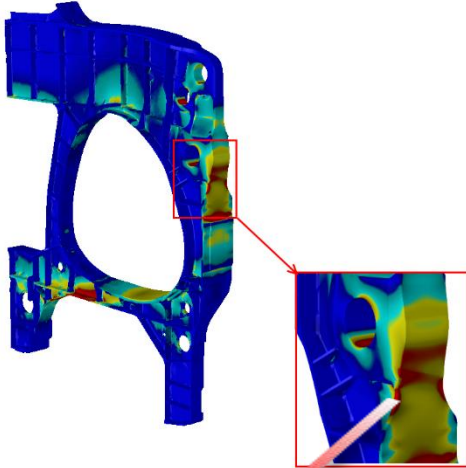
The objective was to compute the max 1st principal stress in the bulkhead wing attachment region to determine the part's susceptibility to fracture failure. The original stress analysis was performed using a traditional FEA software. A single solution run predicted a maximum stress of 335 MPa (50.75 ksi) in the region of interest. How can the max stress result be efficiently and reliably verified as accurate?

The Simulation Solution

The legacy FEA mesh was imported into StressCheck Professional and solved to obtain an automatic sequence of solutions via p-extension, using a fixed mesh of hierarchic spaces, capable of high order resolution. As a result, the prior FEA solution, which computed a peak stress of 335 MPa (50.75 ksi) in the region of interest, was found to be 20% larger than the converged solution value of 280 MPa (40.6 ksi) computed AND verified by StressCheck! By using StressCheck, the reliability of the bulkhead solution was known throughout the entire model without averaging, interpolating, or extrapolating, regardless of the mesh or element type.

The Value

Aircraft are commonly being flown well past their original expected service life, and the value from improving the productivity and reliability of DaDT analysis functions to support the inspection, maintenance, repair, and life-extension of today's aerostructures is substantial. StressCheck's implementation of numerical simulation was designed to support verification and validation in support of the practice of Simulation Governance by encapsulating complexity, improving productivity, containing cost, and ensuring reliability for the expert simulation analyst as well as the non-FEA expert DaDT engineer. That's what we call S.A.F.E.R. Simulation.



Learn more at esrd.com/about/safer-simulation

ESRD, Inc. 111 West Port Plaza, Suite 825. St. Louis, MO 63146. Telephone: (314) 744-5021