

Structural Reliability Partnership

Moving from Cooperative Assessment to Collaborative Research

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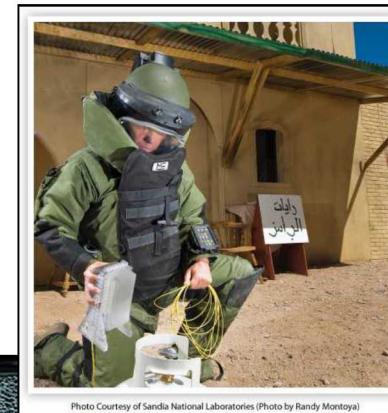
August 29-30, 2017



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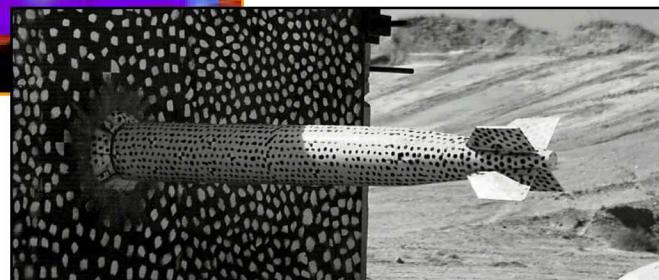
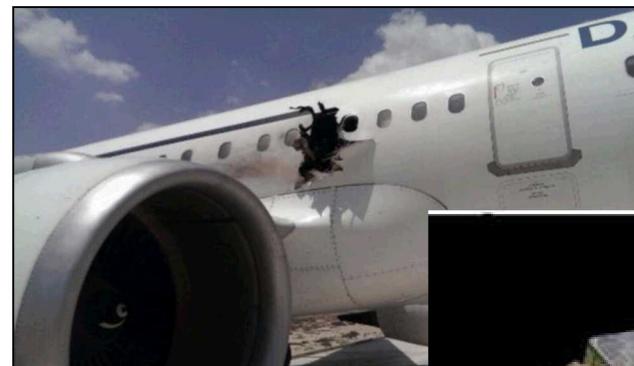
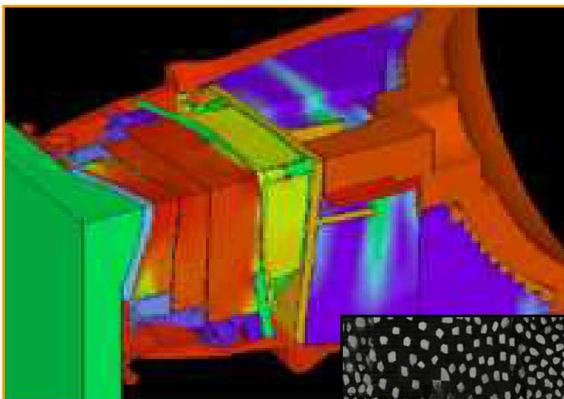
Why model failure?

- Most design problems focus on preventing failure in normal service conditions
- A specialized subset must accommodate failure **as part of the** the performance envelop



Sandia's stewardship mission drives predictive failure capabilities

- Predicting performance in normal environments

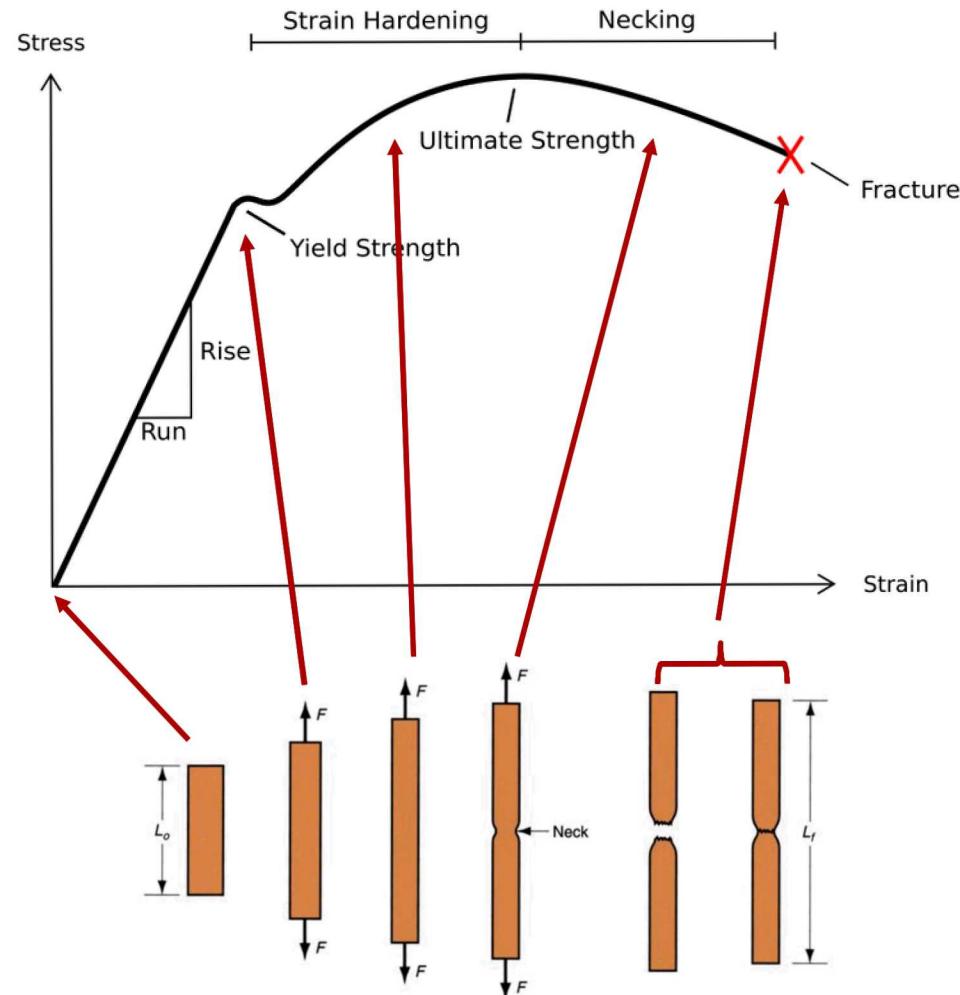


- Assessing safety in accident or adversarial scenarios



Predicting ductile failure requires many elements

- Includes full load history
 - Elasticity
 - Yielding (isotropic or orthotropic)
 - Plasticity
 - Hardening
 - Localization / stress concentration
 - Crack initiation
 - Propagation
 - Strain rate & temperature effects
- Simulation requires
 - Verified simulation code
 - Calibrated material model
 - Appropriate failure criteria (uniaxial vs multiaxial loading)
 - Cracking - arbitrary crack initiation & propagation, crack branching, free surface, convergent result, ...



Moving from collective assessment to collaborative capability advancement



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A Coalition of the Willing!

A partnering model of tiered in-kind support to organize challenges and focus research efforts

