

Damage Tolerance Analysis Training With Application to FAA Certification

Day 1:

- Fundamental Concepts
- Life Prediction Examples
- Stress Intensity Factor
- Relationship Between Stress Intensity Factor and Crack Growth Rate
- Crack Closure Concept
- Linear Elastic Fracture Mechanics
 - Basic Assumptions/Limitations

Day 2:

- AFGROW User Interface Features
- Loading Spectrum
- Spectrum Management Software
- Stress Intensity/Beta Factors
- Classic Cases (User Defined, Application Defined, Weight Functions)
- Beta Correction
- Beta Modification (K-Solution Filters)
- Crack Growth Rate Models
- Example Using Tabular Rate Data (Class Participation)

Day 3:

- Stress State & Failure Criteria
- Retardation Models
- Residual Stresses
- Stress State & Failure Criteria
- Preferences
- Tools
 - View Plots in Excel
 - Cycle Counting
 - Time Dependence
 - Corrosion Effects
- Additional Capabilities
- Advanced Models
- Crack Initiation
- Examples (Class Participation)

Day 4:

- AFGROW Tips and Tricks
- Using Superposition
- Using Advanced Models
- Continuing Damage
- Fracture Mechanics Database
- Automation Capability
- COM Examples (Class Participation)
- Closing Statements
- Q&A Session

Day 5:

- Define fatigue critical location (FCL)
- Determine location of FCL's on aircraft structure
- Identify available and preferred options for dealing with fatigue damage
- Describe the AF approach to managing fatigue damage
- Understand how LEFM is used during the design (or re-design) process.
- Define the USAF's Aircraft Structural Integrity Program (ASIP)
- Overview of FAA Certification
- Structural Substantiation
 - Analysis by Equivalent Strength
 - Analysis by Finite Element
 - Analysis by Industry Classic Methods
- Fatigue and Damage Tolerance Substantiation
 - Direct and indirectly affecting the FDT capabilities of the airframe
 - Methods
 - Simplified once per flight (GAG) stress cycle
 - Flight by flight spectrum