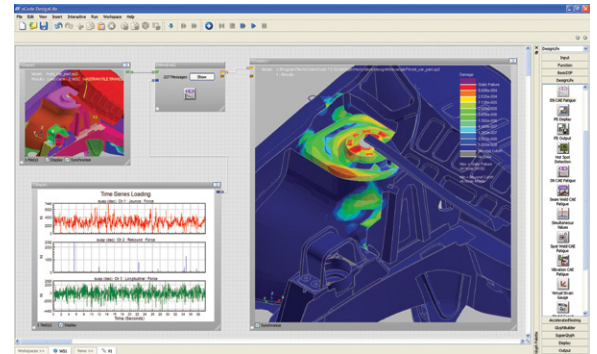


Learn how to perform CAE-based fatigue analysis with nCode DesignLife

nCode DesignLife: Fatigue Analysis using Finite Element (FEA) Results provides an overview of fatigue life prediction techniques and offers hands-on sessions where you will learn how to use nCode DesignLife software to perform fatigue analysis using stresses from computer aided engineering (CAE) tools. An emphasis is placed on hands-on comparisons of different analysis techniques so you'll learn best engineering practices while gaining software proficiency.

The course is aimed at engineers who need to predict fatigue life from FE-derived stresses. It is assumed that attendees are familiar with FE modeling practices and general structural analysis concepts. No prior working knowledge of nCode software is required. This course will briefly cover fatigue theory, but focuses more on using these concepts in software. Attendees looking to learn more about the background of fatigue theory are encouraged to attend our 2-day course called Practical Fatigue Theory.



Learning objectives

- Import geometry and stresses into DesignLife from all major finite element (FE) software like ANSYS, ABAQUS, NASTRAN, LS-Dyna, Altair OptiStruct, etc.
- Define fatigue loading, from simple cycles to measured loading histories to vibration profiles
- Assign material fatigue properties
- Assess fatigue life with methods like stress-life (SN) and strain-life (EN) in both time and frequency domains
- Generate virtual stress and strain histories
- Apply stress superposition and multiple FE load cases
- Explore stress combination methods and plasticity corrections
- Identify and interpret fatigue hotspots
- Create reusable fatigue analysis templates

Topics included - 3 days

- Getting started with nCode software
- Introduction to fatigue and durability
- A comparison of fatigue analysis methods
- Using the stress-life (SN) and strain-life (EN) methods for life prediction
- The importance of material fatigue properties
- Defining fatigue loading
 - Constant amplitude cycles
 - Variable amplitude loading, including how to use measured load histories
 - Superposition of stresses
- Taking advantage of Miner's Rule for damage accumulation
- Fatigue under multiaxial loading
- Accounting for multiaxial stresses
- Elasticity and plasticity in durability analysis
- Introduction to DesignLife's advanced edit interface
- Automated multi-run analysis for efficiently analyzing large models
- Tips and tricks for software proficiency
- Advanced features
- Running DesignLife interactively and in batch
- Virtual Strain Gauge and techniques for correlating with measured strain
- Fatigue of welds, including spot and seam welds
- Load reconstruction
- The role of dynamics in stress and fatigue analysis
- Modal transients and stress superposition
- Applicability of vibration fatigue and harmonic stresses
- Vibration fatigue methods in the frequency domain
- Fatigue of adhesive bonds
- Dang Van multiaxial durability assessment
- Fatigue and failure of composite materials
- The role of temperature in durability, including thermo-mechanical fatigue

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