ENGINEERING TRAINER

Essentials of Metal Fatigue

This metal-fatigue essentials course introduces fatigue mechanisms, material behavior, notch effects, nominal-stress analysis and fatigue-aware design. It is intended for engineers who need a compact technical basis for design or review work before moving to advanced fatigue methods. This self-paced online course includes video lectures, knowledge-check quizzes and a completion certificate with PDH credits.

Buy This Course

Request a Quote or Invoice

ONLINE	SELF-PACED	1-YEAR ACCESS
6 MODULES	4 PDH	3.8 HOURS

TRUSTED BY ENGINEERING TEAMS WORLDWIDE

ENGINEERING TRAINER

Essentials of Metal Fatigue

What you'll learn

Did you know that the number of structural failures due to fatigue is far larger than due to static overload? Managing and preventing problems due to metal fatigue should be considered as a key capability of a structural engineer. Safe operation of your structural asset is important to you; you want to avoid your structure collapsing. This course will teach the essentials of metal fatigue. The first courses explain about the fatigue mechanism, explaining the steps in crack growth before showing the effect of factors such as loading type, mean stress and material. In practice fatigue failure occurs at stress concentrations and the next courses explain these and their effect on component fatigue life. The course concludes by explaining design steps to be taken and practical examples of good and bad design practice. Throughout the course the focus is to teach what is the underlying theory to expand engineers knowledge beyond the S-N curves seen in design codes. The course consists of 3hr 45mins online courses based on video content together with exercises to reinforce your learning. All training content is provided through your EngineeringTrainer account.

Please note, the course "Comprehensive Guide to Fatigue" is also offered in our portfolio. courses 1 to 5 of the "Comprehensive Guide to Fatigue" are the same as the content in this "Essentials of Metal Fatigue" course.

Skills you'll gain

- ✓ have seen in depth the steps in the fatigue mechanism, from crack initiation and crack growth, to fatigue failure.
- ✓ are familiar with an S-N curve, and the impact of different factors such as loading type, component size and material strength on the fatigue life.
- ✓ understand how stress concentrations factors can be calculated and used to determine the effect of notches and other geometric features on the fatigue life.
- ✓ can calculate the fatigue life for a component under different loading conditions and the impact of safety factors.
- ✓ will have seen the underlying experimental tests and theory which forms the basis of the fatigue design S-N curves and stress concentration factors.

ENGINEERING TRAINER

Essentials of Metal Fatigue

About the instructor

Johannes Homan

Johannes Homan is a fatigue and damage-tolerance specialist with an aerospace-engineering background. After working at Fokker Aircraft, he founded Fatec Engineering in 1996 and also worked as a researcher and assistant professor at Delft University of Technology. His courses cover fatigue mechanisms, life analysis, testing and damage-tolerant design.

Who this course is for

- ✓ Stress engineers who need the essentials of metal fatigue
- ✓ Structural designers responsible for fatigue-sensitive components
- ✓ Test engineers involved in fatigue testing
- ✓ Lead engineers reviewing fatigue calculations
- ✓ Engineering managers overseeing fatigue-related design work

ENGINEERING TRAINER

Essentials of Metal Fatigue

Course content

Module 1 - What is Fatigue

- What is fatigue?
- Why is fatigue important?
- Fatigue mechanisms & phenomena

Module 2 - Fatigue of Materials

- Effect of materials
- Effect of mean stresses
- Type of loading.
- Effect of Component Size

Module 3 - Effect of Notches

- Stress concentrations
- Fatigue limit for structures
- S-N curves for structures

Module 4 - Fatigue Analysis - Nominal Stress

- Introduction to fatigue life analysis
- Fatigue predictions using nominal stresses
- Examples
- Safety factors

Module 5 - Fatigue Design Practices

- Fatigue-aware design process
- Accuracy and limits of fatigue analysis
- Practical examples of good and poor fatigue design

Module 6 - Assignment

- Course assignment