



# COURSE

PRACTICAL INTRODUCTION TO  
THE FINITE ELEMENT METHOD



June 10–11–12 2024  
Mechelen (BE)

# PRACTICAL INTRODUCTION TO THE FINITE ELEMENT METHOD

The finite element method (FEM) has become a widely accepted analysis technique in the industry in recent years. The finite element method is a powerful computational technique for obtaining solutions to complex structural and mechanical problems. Technological advances in both software and hardware allow us to analyse complex models today that seemed impossible a few years ago.

## WHY THIS TRAINING?

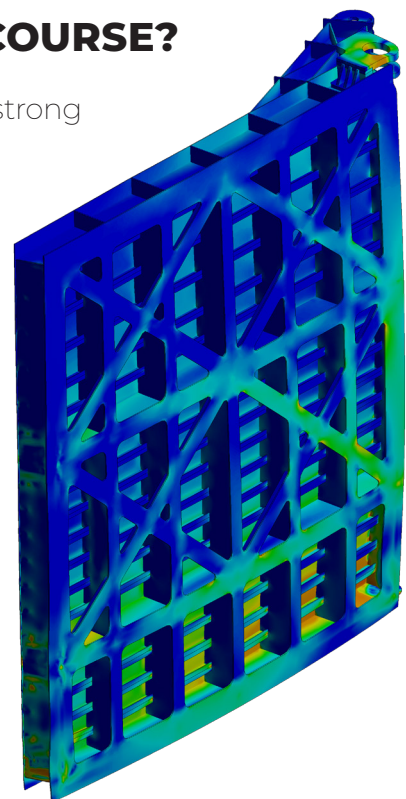
Discover the power of the finite element method and accelerate your learning process with our leading **Practical introduction to the finite element method** training. This training is designed to equip technicians, engineers and designers with the necessary skills and knowledge to use this powerful analysis technique efficiently and with confidence. Our course offers a unique combination of practical experience and theoretical knowledge, allowing you to acquire the competencies of years of experience in a short time.

## WHO IS THIS TRAINING FOR?

This course is intended for anyone who wants to start and delve deeper into the extensive possibilities of the finite element method, regardless of the software used. Whether you want to optimize your products, simulate virtual prototypes, or accelerate the design process, this course offers you many direct benefits.

## WHAT WILL YOUR LEARN DURING THIS COURSE?

- ✔ The basic principles of the finite element method, with a strong focus on practical applications.
- ✔ How to choose from a wide range of element types, solutions, meshing methods and pre- and post-processing options.
- ✔ The correct setup of computational models and the validation of results to ensure reliable and qualified outcomes.
- ✔ The course provides an excellent guide on how to efficiently start an FEM analysis and teaches you to complete the task successfully. You will learn to define a clear objective for each analysis and will be provided with a road map to achieve this objective and the intended insight.



## BENEFITS OF THE TRAINING

### ✓ SOFTWARE INDEPENDENT

You will learn the fundamentals and basic techniques of the FEM independent of the type of commercial software you use.

### ✓ ACCELERATED LEARNING PROCESS AND ACCURATE RESULTS

Shorten the time needed to master the finite element method. You will learn how to perform complex analyses faster and with greater precision, resulting in better design decisions and a more efficient design process.

### ✓ MAKE YOUR INVESTMENT PAY-OFF MORE QUICKLY

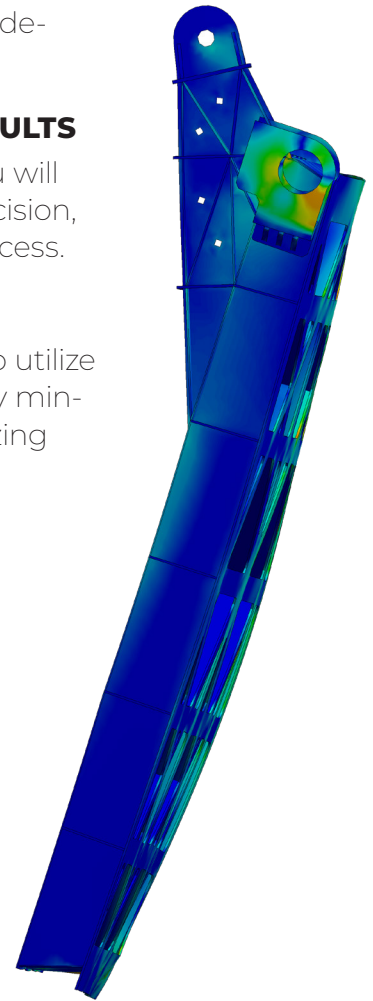
The investment in this training pays off quickly. You will learn how to utilize the capabilities of your software and hardware investments, thereby minimizing the costs associated with the learning process and maximizing productivity.

### ✓ AVOID COSTLY MISTAKES

Through our practical approach, with a large number of practical cases and following a clear step-by-step plan, you will learn to avoid common pitfalls and mistakes when using the FEM. This saves not only time and resources, but also prevents potentially costly design errors.

### ✓ BUILD CONFIDENCE IN YOUR FEM RESULTS

Our course strengthens your ability to correctly interpret and validate the results of FEM analyses. This builds confidence among your team in the reliability and accuracy of your design decisions, which is essential for successful projects.



## TAKE THE NEXT STEP TOWARDS EXCELLENCE IN YOUR FIELD

Don't miss this opportunity to develop your skills and take your career to the next level. Join our **Practical introduction to the finite element method** training and take the first step towards mastering this analysis technique. Enroll today or contact us for more information.

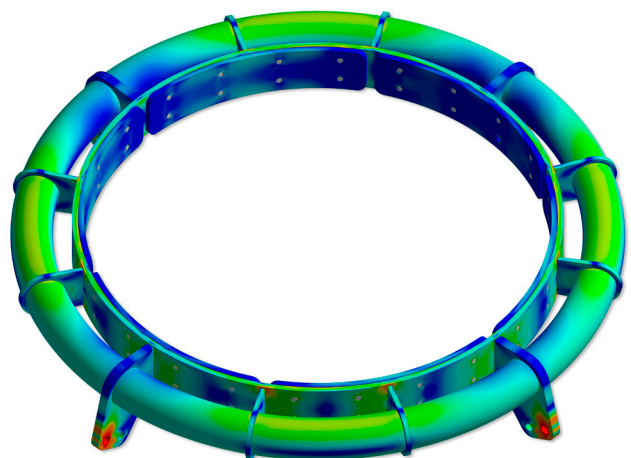
## FLEXIBLE TRAINING OPTIONS

If desired, this training can also be organized **on-site at your company** and **tailored to your team**, so the knowledge gained can be directly applied in your familiar work environment.

Interested? Call or email us.

# COURSE CONTENT

- ✓ History and background of the finite element method
- ✓ Introduction to matrix calculations
- ✓ Brush up of the fundamental concepts in strength of materials and stress analysis
- ✓ The finite element procedure
  - ▷ Force versus displacement method
  - ▷ Description of simple element stiffness matrices
- ✓ Overview of element types and their applications
  - ▷ 0D, 1D, 2D and 3D elements
  - ▷ Shape functions
  - ▷ Linear versus quadratic elements
- ✓ Boundary conditions
  - ▷ Constraints (SPC)
  - ▷ Loads
- ✓ Modelling and meshing
  - ▷ Simplifying the geometry
  - ▷ Symmetry
  - ▷ Meshing
  - ▷ Mid-surfaces
  - ▷ Sub-modelling
- ✓ Assembly modelling
  - ▷ Contact
  - ▷ Multi-Point Constraints (MPC)
  - ▷ R-type connections
  - ▷ Bolted joints
  - ▷ Welded joints
- ✓ Material modelling
  - ▷ Material models
  - ▷ Material properties
  - ▷ Material yielding and plastic deformation
- ✓ Stress check in the post-processor
  - ▷ Stress evaluation
  - ▷ Integration points
  - ▷ Averaged versus unaveraged stresses
  - ▷ Mesh independent stress results
  - ▷ Singularities
- ✓ Failure models
  - ▷ Modes of material failure
  - ▷ Introduction to static failure
  - ▷ Overview of failure theories
  - ▷ Criteria for ductile materials
  - ▷ Criteria for brittle materials
  - ▷ How to use the right failure model?
- ✓ FEA model checks
  - ▷ Road map for FEA results check
- ✓ FEA best practices
- ✓ Introduction to non-linear analysis
- ✓ Introduction to dynamic analysis
- ✓ Introduction to fatigue analysis



## DETAILS



### DATES AND DURATION

3 days

June 10–11–12 2024



### ENROLLMENT

The number of participants is limited and enrollment is closed one week before start of the course.



### LOCATION

Mechelen (BE)



### PRICE

Enroll before 10/05/2024:

**1.525 euro ex VAT**

Enroll after 10/05/2024:

**1.695 euro ex VAT**



### LANGUAGE

Dutch (English on request)

## CANCELLATION POLICY

When cancelling up to two weeks before the start of the training, you will not be charged.

When cancelling from two weeks before the start of the training, 50% of the total costs will be charged.

When cancelling less than five days before the start of the training, you are liable for the full amount.

