

TCA

TRAINING & DEVELOPMENT

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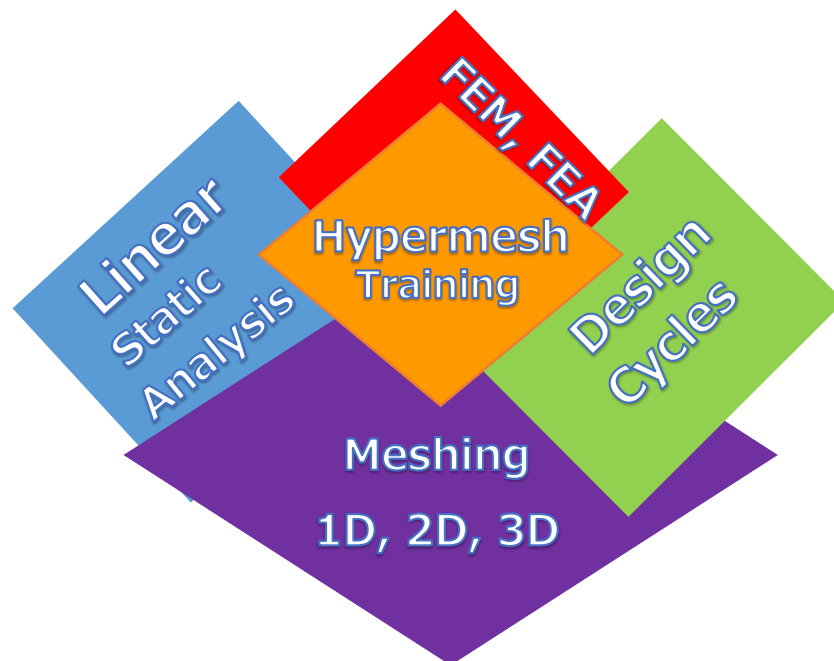
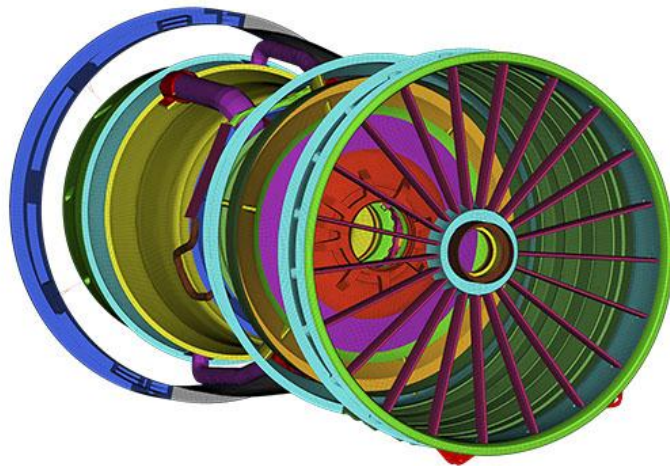
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Introduction to Finite Element Analysis

- Methods to solve Engg. problems
- Brief introduction to numerical methods
- What is Degree of freedom
- Why do we carry out meshing
- What is FEM
- Advantages of FEA
- Design Cycles

Past, Present and Future of FEA

- History of FEM
- Theoretical FEA
- Software based FEM
- Practical Applications of FEA
- Future of FEA

Brief Introduction on types of analysis

- Linear Static Analysis
- Non-Linear Analysis
- Dynamic Analysis
- Linear Buckling Analysis
- Thermal Analysis
- Fatigue Analysis
- Optimization
- Computational Fluid Dynamics
- Crash Analysis
- Case study discussion on analysis types

Introduction to meshing

- Why do we carry out meshing
- Types of elements
- How to decide element type

- Problem solving based on element type
- How to start meshing
- Meshing Techniques
- Meshing in critical areas

1-D meshing

- When to use 1-d elements
- Stiffness matrix derivation
- Stiffness matrix-assembly of two rod elements
- Beam Element and its features
- Mass element
- Rigid elements
- Spring and damper element
- Hands on exercises

2-D Meshing

- When to use 2 d elements
- Family of 2 d elements
- Effect of mesh density in critical region
- Option of shell meshing
- Element quality checks
- How not to mesh
- Hands on exercises

3-D Meshing

- When to use 3D elements
- DOF's for solid elements
- Tetra meshing techniques
- Quality checks for tetra meshing
- Brick meshing
- Brick meshing quality checks
- How not to mesh
- Hands on exercises

Material Properties and Boundary Conditions

- E, G & V
- Material Classification
- Material Properties
- Boundary Conditions
- How to apply constraints

Linear Static Analysis

- Fundamentals of linear static analysis
- Linear static solvers
- h-element vs p-element
- Linear Buckling Analysis
- Hands on exercises

Non-Linear Analysis

- Introduction
- Comparison of linear and non-linear FEA
- Types of non-linearity
- Stress-Strain measure for non-linear analysis
- Convergence issues in non-linear FEA
- General procedure for non-linear FEA
- Hands on exercises

Dynamic Analysis

- Static analysis vs dynamic analysis
- Time domain and frequency domain problems
- Types of loading
- Simple harmonic motion
- Free vibration
- Free-free run
- How to avoid resonance
- Forced Vibration
- Single DOF system-Transient response analysis
- Power spectral density

- Hands on exercises

Crash Analysis

- Fundamentals of crash analysis
- Structural Crash worthiness
- Comparison between explicit and implicit analysis
- Contact impact algorithms
- Impact vs Quasistatic simulations
- Hands on exercise on drop test simulation

Post processing Techniques

- How to validate and check accuracy of results
- How to view results
- Average and unaverage stresses
- Interpretation of results
- CAE reports
- Hands on exercises