MERCURY

CEASAR-II Advanced Training on Piping Dynamics

24 – 28 January 2027
Manama (Bahrain)



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Ref: 16276_1013664 **Date:** 24 – 28 January 2027 **Location:** Manama (Bahrain) **Fees:** 5500 Euro

Introduction:

This CEASAR-II Advanced Training on Piping Dynamics course elevates participants' expertise in advanced piping stress analysis using CEASAR-II software. It addresses both dynamic and static scenarios, guiding learners through real-world engineering challenges in piping systems. The CEASAR-II curriculum supports professional growth by covering seismic, thermal, wind, and vibration load analysis.

Participants will gain hands-on proficiency in detailed modeling, load case setup, and result interpretation. The CEASAR-II Advanced Course on Piping Dynamics emphasizes accuracy, efficiency, and decision-making in piping system simulation. It bridges theoretical knowledge and practical application in dynamic stress analysis training. It ensures that attendees emerge confident in applying CEASAR-II static analysis and advanced piping dynamic analysis techniques.

Targeted Groups:

This CEASAR-II Advanced Training on Piping Dynamics targets professionals seeking specialized knowledge and skills:

- Pipeline engineers are facing complex stress modeling.
- Mechanical designers are working on piping system simulation.
- Stress analysts handle dynamic and static load cases.
- Maintenance planners aim to predict piping fatigue.
- Engineering leads are responsible for software-based analysis.
- Piping system consultants are optimizing system reliability.

Course Objectives:

Participants will achieve the following objectives by completing the CEASAR-II Advanced Course on Piping Dynamics:

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- Master how to build and validate piping models using CEASAR-II.
- Confidently apply static stress analysis techniques under thermal and pressure loads.
- Accurately perform dynamic stress analysis for seismic, wind, and vibration scenarios.
- Efficiently interpret output data to inform design decisions.
- Systematically compare dynamic versus static results to recommend safe modifications.
- Enhance productivity by automating load case generation.
- Prioritize model adjustments based on stress concentration insights.
- Sharpen judgment in model verification to reduce rework.
- Integrate multiple load types into comprehensive simulation workflows.
- Exhibit measurable improvement in simulation accuracy and workflow efficiency.

Targeted Competencies:

Participants will gain the following competencies during the CEASAR-II Advanced Program on Piping Dynamics:

- Ability to construct robust piping models incorporating anchors, guides, and flexible elements.
- Competence in generating and combining static load cases like pressure, weight, and temperature.
- Skill in setting up and executing dynamic load cases, including time history and response spectrum.
- Facility to interpret CEASAR-II output for displacement, stress, and' isostatic load' evaluation.
- Aptitude for troubleshooting model convergence and refining mesh fidelity.
- Capability to document simulation findings in a clear, actionable format.
- Proficiency in optimizing piping designs for fatigue life and operational safety.
- Confidence in leveraging CEASAR-II's advanced features, like non-linear supports and snubber modeling.
- Expertise in balancing Static vs Dynamic stresses for accurate piping stress assessment.
- Assurance in applying best practices for piping system simulation and dynamic stress analysis.

Course Content:

Unit 1: Introduction to CEASAR-II and Piping Stress Fundamentals:

- Overview of CEASAR-II interface and key modules.
- Basics of static vs dynamic piping stress analysis methods.
- Understanding of load types: pressure, weight, thermal expansion.
- Introduction to dynamic loads: seismic ground motion, wind gust effects.
- Model setup principles for accuracy and performance optimization.
- Review of piping system simulation best practices.
- Initial checklist for static stress case formulation.

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Unit 2: Building Advanced Piping Models in CEASAR-II:

- Detailed setup of anchors, guides, and hangers.
- Incorporating snubbers, non-linear supports, and gaps.
- Defining material properties, wall thickness, and insulation.
- Segmenting the piping network for modular analysis.
- Using software tools for the automatic generation of weight and stress loads.
- Techniques for mesh refinement and model validation.
- Ensuring consistency across load case definitions.
- Initializing piping system simulation workflows step-by-step.

Unit 3: Static Stress Analysis Techniques:

- Application of thermal load cases for expansion assessment.
- Calculating stress under internal pressure and sustained weight.
- Combining dead, live, and occasional static loads.
- Evaluating expansion loops and flexibility requirements.
- Using code checks and allowable stress calculations.
- Troubleshooting hot-to-cold condition discrepancies.
- Validating static model accuracy through convergence.
- Documenting results clearly for stakeholder review.
- Preparing static stress analysis for integration into dynamic workflows.

Unit 4: Dynamic Stress Analysis Essentials:

- Defining time-history load cases in piping system simulation.
- Setting up response spectrum analysis for seismic design.
- Modeling wind-induced vibration effects on piping.
- Evaluating fatigue due to cyclic dynamic stresses.
- Understanding damping, mass distribution, and modal behavior.
- Comparing dynamic results with the static base case.
- Using CEASAR-II tools for result filtering and graphical insights.
- Addressing resonance and natural frequency concerns in models.
- Integrating dynamic analysis findings into design improvements.

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Unit 5: Advanced Workflows, Optimization, and Best Practices:

- Automating load generation for combined static and dynamic scenarios.
- Workflow optimization using templates and batch operations.
- Case study: seismic retrofit of existing piping network.
- Best practices for simulation accuracy and QA/QC documentation.
- Interpreting isostatic load output for field installation planning.
- Strategies to reduce simulation cycle time and rework.
- Final model validation and peer-review checklists.
- Ensuring compliance with industry codes and standards.
- Final interactive exercise: full Analysis from static to dynamic review.

Final Insights & Key Takeaways:

This training ensures that participants are fully equipped to apply advanced CEASAR-II static and dynamic analysis in real-world piping projects. Attendees will leave with a deeper understanding of how dynamic stress analysis and static load modeling intersect for optimal design. The course highlights workflow efficiency and accuracy in piping system simulation. Graduates emerge capable of delivering robust, code-compliant analysis with confidence.