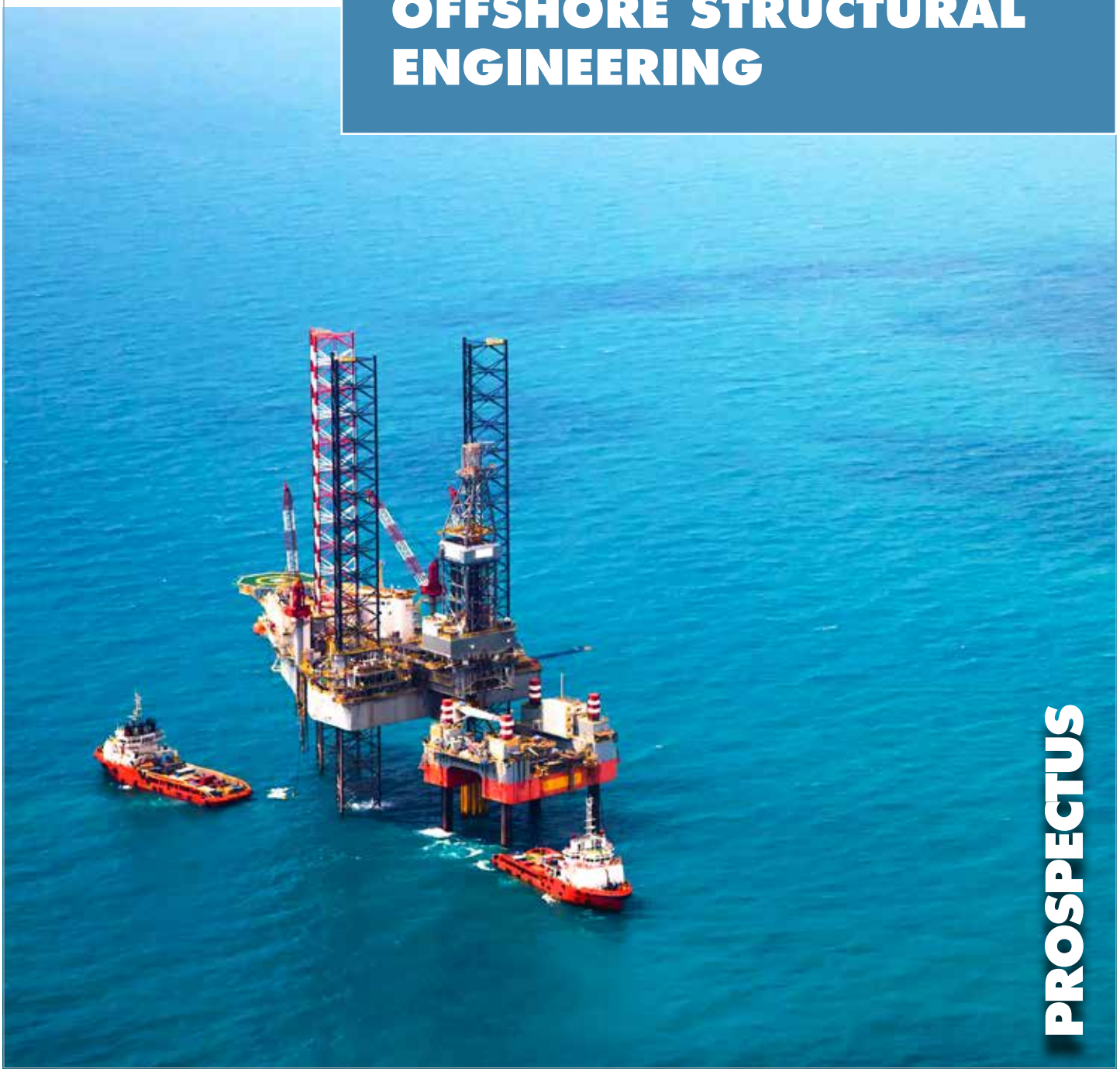
ASTS
GLOBAL EDUCATION
BEYOND MERE EDUCATION

TÜVRheinland CERTIFIED

20 YEARS
OF EXCELLENCE

NAVAL ARCHITECTURE & OFFSHORE STRUCTURAL ENGINEERING



PROSPECTUS

OF EXCELLENCE

5 KEY TAKE AWAYS

1. Discover the knowledge and gain the confidence you need to enter Oil & Gas, Process Engineering Industry with Valid Certifications.
2. Identify Specific opportunity to increase the strategic value offered by ASTS Global Education Courses to your Professional Profile.
3. Learn to apply most modern Design and Analytic technics from the Industry Experts.
4. Provide competitor differentiation in the market and Get a world class stand through ASTS Global Education.
5. Learn how to leverage your Intelligence and Expertise to Oil & Gas corporate sector for making Best in class Results.

WHO SHOULD ATTEND?

- BE/B-Tech/Diploma / Mechanical / Civil / Structural/ Marine Engineering Graduates or Students
- Working executives / Professionals from the similar Industry
- Corporates

ADMISSION PROCEDURES

- Admissions Strictly basis of Online Registration
- Online Registration is available in www.astsglobal.com website.
- Admissions will be confirmed only after verification of the details submitted
- Fees Payments are available after the successful submission of the application

BENEFITS OF ATTENDING

Oil & Gas Piping Engineering Design & Analysis course is the Benchmark of competency in the Oil & Gas, Process engineering Industry and is recognized as the leading credential in corporate treasury worldwide. Whether participants are looking to safeguard their careers or seeking a professional career, promotion, earning this program can open a variety of doors.

Professional Competency : Earn up to 20 % more than your non- certified peers

Improve Marketability : Stand out against other applicants in a tough job market

Boost Relevancy : Stay current in the profession with continuing education requirement

Increasing Job Security : Validates your competency in liquidity, capital and risk management functions

Better career Flexibility : Prepares you for greater on-the-job responsibilities

COURSE OVERVIEW

Naval Architucture & Offshore Engineering Program offering to fresher and experienced Mechanical or Civil Engineers who's Start/Shift their career as a Design Engineer, Offshore Structural Engineer, Project Engineer or Navel Architect Offshore and Navel industry.

ASTS GLOBAL EDUCATION offers ONLINE Naval Architucture & Offshore Engineering to Mechanical, Civil, Structural Engineers. This Training program is based upon latest technologies of Offshore Engineering design and analysis methods with the help of Online platform.

Offshore and Naval Engineering program is 100% Job oriented. After completion of training candidate can start/shift their career as Project Engineer, Offshore Engineer or Offshore Engineering Designer, Stress engineering, Process engineer etc…

PRE COURSE ASSIGNED READING

ASTS GLOBAL EDUCATION will provide pre-reading on-line study materials

POST COURSE READING

- Exam Preparation
- At least 50 hours of personal study recommended from our Online Portal
- Student is responsible for his/her own study time
- ASTS GLOBAL EDUCATION will post practice exams
- There will be other resources online as well.

PROGRAM MODE & TIMINGS

Course Mode	:	100% Online
Timings	:	5 to 7 Hours/week
Duration	:	As per the programme

PROGRAM CERTIFICATION

ASTS GLOBAL EDUCATION will provide Certification for PG Diploma in Oil & Gas Piping Engineering Design & Analysis Course in Association with NACTET (Govt of India Autonomous Body for Technical Education) . All Software Certification and Internship certification from the related company/Industry.

HIGH-IMPACT, ONLINE LEARNING EXPERIENCE

ASTS GLOBAL ONLINE TRAINING PROGRAM:

Develop your Technical Mindset helps you reach your potential as a Design Engineer by combining theory with software knowledge and flexibility with academic rigor to help you develop as a well-rounded engineer.

WHO IS IT FOR?

Whether you want to advance in your current industry, shift roles, or build a new business, ASTS Global Education Online Program: Develop your Engineering Mindset can help you achieve your goals.

THIS PROGRAM IS RIGHT FOR YOU:

LEARNING EXPERIENCE

ASTS Global Education follows a unique online model. This model has ensured that nearly 90 percent of our learners complete their course.

RECORDED VIDEO LECTURES

The recorded video lectures are by faculty from the collaborating ASTS Global Education.

ORIENTATION

The first week is orientation week. During this week you will be introduced all the systems to use online platform.

LIVE WEBINARS

Every few weeks, there are live webinars conducted by ASTS Global Education course leaders. Course leaders are highly-experienced industry practitioners who contextualize the video lectures and assist with questions you may have regarding your assignments.

CLARIFYING DOUBTS

In addition to the live webinars, for some courses, the course leaders conduct Office Hours, which are webinar sessions that are open to all learners. During Office Hours, learners ask questions and course leaders respond.

FOLLOW-UP

The ASTS Global Education Program Support team members will follow up and assist over chat, email and via phone calls.

CONTINUED COURSE ACCESS

You will continue to have access to the course videos and learning material for up to 6 months from the course start date.

ASSIGNMENTS/APPLICATION PROJECTS

Assignments are given on the basis of the lectures or tutorials provided. They need to be completed and submitted as per the deadline for grading purposes. Extensions may be provided based on a request sent to the support team.

CASE STUDIES

These are real world scenario-based assignments involving an up-close, in-depth, and detailed examination of a subject of study, as well as its related contextual conditions.

REAL WORLD APPLICATIONS

These are real world situations/data-sets given to derive the desired result using the available information.

DISCUSSION BOARDS

It is an open forum where participants pin their opinions or thoughts regarding the topic under discussion.

CAPSTONE PROJECTS

Capstone Projects are given out at the end of the course to apply all the strategies taught during the course.

DEVICE SUPPORT

You can access Emeritus courses on tablets, phones and laptops. You will require a high-speed internet connection.

ASTS GLOBAL EDUCATION PROGRAM SUPPORT TEAM

If at any point in the course you need tech, content or academic support, you can email program support and you will typically receive a response within 24 working hours or less.

CASE STUDIES

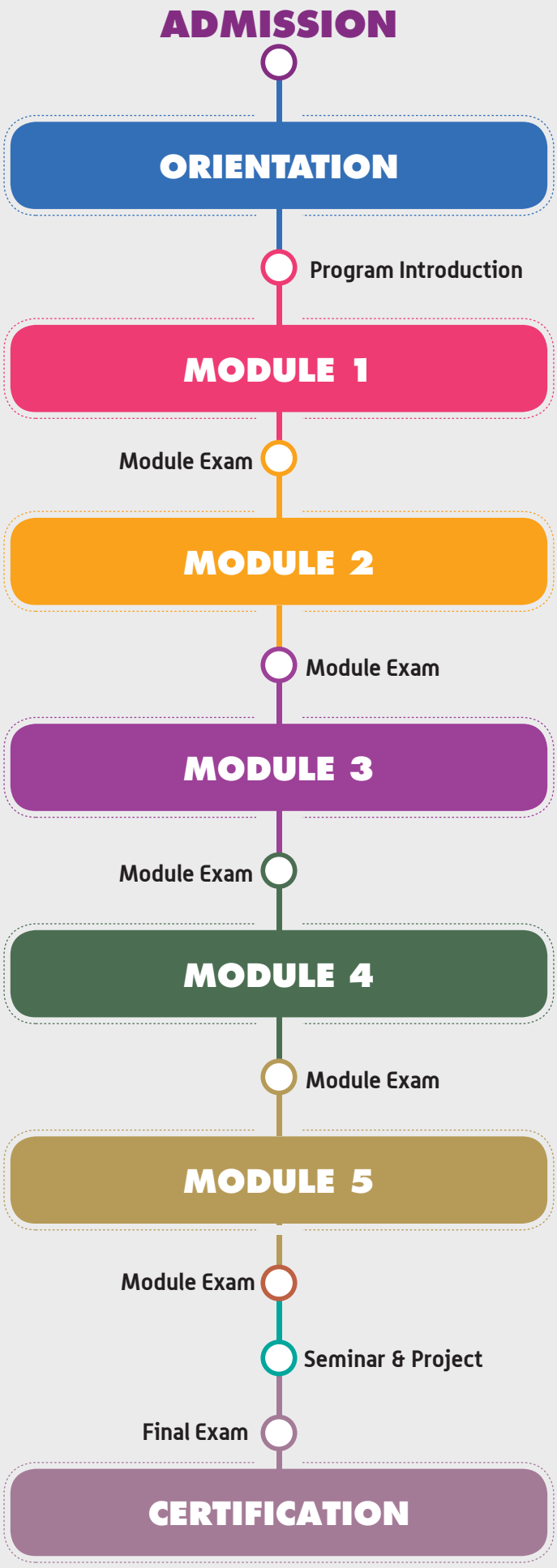
These are real world scenario-based assignments involving an up-close, in-depth, and detailed examination of a subject of study, as well as its related contextual conditions.

ASTS GLOBAL EDUCATION NETWORK

On completing the course you join a global community of 5000+ learners on the ASTS Global Education Network. The Network allows you to connect with Emeritus past participants across the world.

BLOCK CHAIN POWERED CERTIFICATES

Our Course certificates are Digitaly & secured by Block Chain Technology. Its provided immutablity as a service by ptotecting the integrity of the Certificates


ADMISSION
ORIENTATION
Program Introduction
MODULE 1
Module Exam
MODULE 2
Module Exam
MODULE 3
Module Exam
MODULE 4
Module Exam
MODULE 5
Module Exam
Seminar & Project
Final Exam
CERTIFICATION

NAVAL ARCHITECTURE & OFFSHORE STRUCTURAL ENGINEERING

PREPARATORY MODULES

- Introduction to Oil and Gas Business
- Historical Development of Offshore structures
- Ocean Environment and Sea states
- Units and Conversions
- Sections and Properties
- Materials, welding and NDT
- Codes and Classification and Societies

BASICS OF STRCUTURAL ENGINEERING

- Introduction to Structures and Structural Components
- Theory of Elasticity
- Mechanics of solids
- Designs of Beams Columns and Plates
- Software – Sacs

OFFSHORE STRUCTURAL ENGINEERING

- Design methods of Offshore Structures
- Design Analysis of offshore structures
- Foundation of Offshore structures
- Fixed Offshore Platform Design
- Mooring Systems
- Drilling and Production Risers
- Topside Facilities and layout Design
- Load out and Installation of offshore structures
- Offshore construction Engineering
- Software – Sacs

APPLICATION OF NAVAL ARCHITECTURE TO OFFSHORE STRUCTURAL DESIGNS

- Ship design Life cycle
- Types and General Arrangement of ships
- Structural Design of ships
- Hydrostatic Properties
- Ship stability
- Shipyards and Ship Building Technologies

PROJECT AND SEMINAR

- Independent Project Work
- Seminars

MOSES

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MOSES

Hydrostatic and Hydrodynamic Analysis Software for Offshore Installation and Platform Design

MOSES is an advanced suite of hydrostatic and hydrodynamic software that provides for the accurate calculation and simulation of offshore floating systems. Its analysis capabilities and scripting language can be applied in the frequency domain and time domain for both installation problems and in-place analysis of FPSOs and floating platforms. More than 30 years of focus on these specialized requirements have made MOSES the analysis mainstay for most of the world's offshore installation projects. MOSES is available in three suites to suit all design office requirements: MOSES Enterprise, MOSES Advanced, and MOSES.

Integrated Modeling and Documentation Workflows

The CONNECT Edition provides a common environment for comprehensive project delivery and connects users, projects, and your enterprise. With MOSES CONNECT Edition, you now have a personal portal to access learning, communities, and project information. You can also share personal files including i-models and PDFs directly from your desktop with other users, or stage them for easy access from a Bentley mobile app, such as Structural Navigator. With the new project portal, your project teams can review project details and status, and gain visibility into project performance. With the CONNECT Edition, your project team may also wish to take advantage of the new ProjectWise® Connection Services including Project Performance Dashboards, Issues Resolution, and Scenario Services.

MOSES Enterprise:

Stability, Motions, Mooring, Structures, and Launch

The MOSES Enterprise suite provides a complete range of functions, from modeling of hulls and calculation of stability, to prediction of motions, mooring analysis, structural analysis, and jacket launch. This suite can be used for new or existing FPSO and platform studies, as well as for transportation and installation analysis. The software can import SACS models of topsides or cargo structures.

MOSES Advanced:

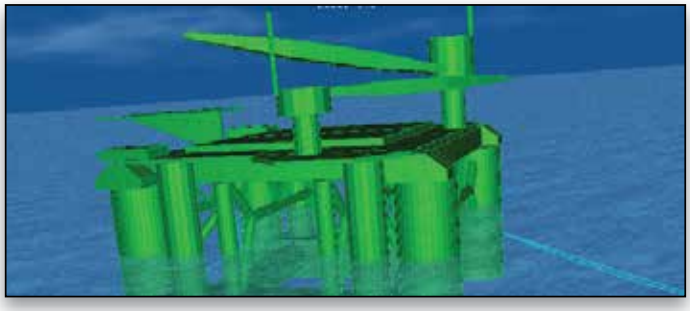
Stability, Motions, Mooring, and Structures

The MOSES Advanced suite provides both frequency domain and time domain prediction of vessel motions. This can be applied using either strip theory or radiation-diffraction panel methods of calculation. Mooring lines can be integrated including large displacement effects of mooring line deformations. The structural solver allows for structural analysis of topside structures or structural cargo.

MOSES:

Stability and Motions

The MOSES suite provides a highly capable and cost-effective package for stability assessment and motions analysis in the frequency domain. Hull and compartment modeling is included along with both strip theory and radiation-diffraction analysis methods.



MOSES can compute motions and stability of any vessel or platform.

MODULES:

MOSES Solver

All three suites include the MOSES Solver and MOSES Language modules – the platform on which all analysis capabilities depend. The unique, generalized solver allows the consideration of all types of forces acting on the floating system including hydrostatic, hydrodynamic, inertial, and mooring forces. The solver supports model inputs including section or panel definition of hull shapes, Morison elements, various kinds of taut or catenary mooring lines as well as beam and plate elements.

Connectors in MOSES are particularly flexible and effective. They provide a generalized way of describing connections between floating bodies, or to the ground, and include catenary mooring lines, tension- and compression-only nonlinear springs, rigid connectors such as pins and launchways, and even true nonlinear rod elements.

MOSES Language

The MOSES scripting language provides a unique, flexible, and powerful way of specifying system behavior and performing a series of analyses to consider different installation or operational conditions. In addition to providing specialized capabilities, the MOSES language is rich in general utilities for interactive reporting, graphing, viewing 3D models, and statistical interpretation.

- Model generation with validity checking
- Run complex analyses with a single command, including reporting
- Database capability with restart options
- Macros, loops, and conditional execution

Strip Theory

Strip theory provides a fast and proven way of predicting the motions of vessels. It is well suited for barge transports and any vessel that is slender in its L/B (length/beam) ratio.

- RAOs (response amplitude operators) at CG (center of gravity) or remote locations
- Standard and user defined spectra
- Statistical multipliers or storm duration definition

Course Details

Course Duration:
4 Weeks

Course Mode:
Regular & Fast Track

Schedule & Timing :
3 hours / day

Certification :
Bentley Systems India Pvt. Ltd.

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Basic Connectors
The Basic Connectors module provides a generalized way of modeling lifting slings, anchor lines, mooring lines, non-linear springs, pins, fenders, and any other item that connects two bodies together or connects a body to the ground. Connectors can be tension-only or compression-only and custom connectors can be defined.

- Lift, lower, or upend with multiple slings and hooks
- Activate or deactivate to simulate breaking or re-rigging
- Move anchors to achieve a specified tension
- Hold hooks at elevation or load while flooding or pumping
- Catenary mooring lines with buoys or clump weights
- Nonlinear springs with tension or compression only
- Gaps, pins, and lines provide constraints to motion

3D Diffraction
Prediction of motions for non-ship shaped hulls and for situations in which surge is important. Adaptive meshing automatically increases panel mesh density as required.

- Hull Modeler automatically generates hydrodynamic meshes
- Non-linear, slowly varying, wave drift forces

Time Domain
The Time Domain module can perform a time history simulation on any single or multi-body system. Starting from the frequency domain results, and taking into account mooring, current and wave forces, the Time Domain module provides fast computation of full system response. Customizable reporting and automatic generation of system response animations allow easy understanding and communication of results.

- Environment of current, irregular waves, and/or wind
- Multiple body motions can be analyzed
- Vortex shedding in wind or water is computed
- Dynamic tank flooding and emptying

Pipe & Rod Elements
When analyzing mooring line dynamics, the Pipe & Rod module allows accurate calculation of mooring line response taking into account large deflections. This allows modeling and analysis of anchor lines, mooring lines, TLP (tension leg platform) tendons, rigid risers, and pipelines.

- Large deflection beam capability
- Handles TLP tendons, rigid risers, and pipelines
- Mooring line dynamics are included
- Combine pipe assemblies with rollers

Structural Solver
The Structural Solver module enables structural analysis and spectral fatigue of topside or cargo structures. It supports beam and plate elements and can import structures from SACS.

- Linear, non-linear and frequency domain analysis
- Modal analysis using subspace iteration
- Modal analysis using subspace iteration
- Code checking to API, AISC, NORSOK, and ISO

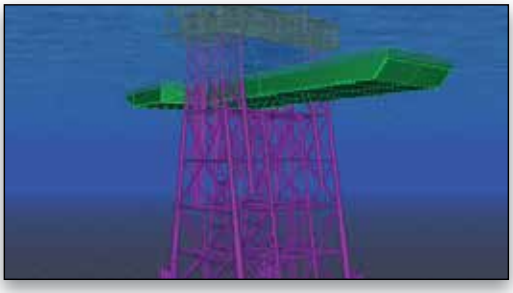
Jacket Launch
The Jacket Launch module can be used to perform a six-degree-of-freedom time domain simulation of a jacket launch from a barge into water.

- Automated ballasting
- Winch and friction definitions
- Optional side launch

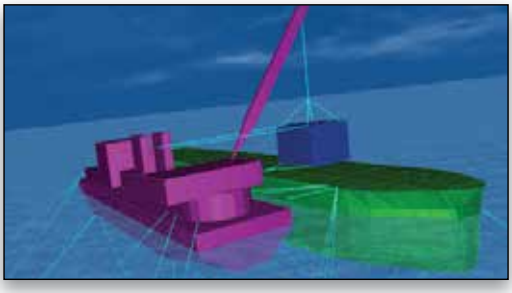
Generalized Degrees of Freedom
The Generalized Degrees of Freedom module is used to consider the effect of structural deformation and flexibility on buoyancy, frequency response, and loadout calculations. It can also be used to consider the hydrodynamic interaction between two vessels.

MOSES Editors
All MOSES suites include the MOSES smart language editor for managing scripts and data files, Hull Modeler for 3D interactive creation of hull shapes, Stability Modeler for compartmentation and load case management, Motions Modeler for environmental and mooring inputs, and Hull Mesher for graphical creation of structural models.

	Suites		
Module	MOSES	MOSES Advanced	MOSES Enterprise
MOSES Editor	✓	✓	✓
Hull Modeler	✓	✓	✓
Stability Modeler	✓	✓	✓
Motions Modeler	✓	✓	✓
Hull Mesher	✓	✓	✓
MOSES Solver	✓	✓	✓
MOSES Language	✓	✓	✓
Strip Theory	✓	✓	✓
Basic Connectors	✓	✓	✓
3D Diffraction	✓	✓	✓
Time Domain		✓	✓
Pipe & Rod		✓	✓
Structural Solver		✓	✓
Jacket Launch			✓
Generalized D.O.F.			✓



Installation Analysis
- *Stability and upending analysis*
- *Floatover*
- *Lifting*
- *Ballasting*
- *Jacket launch*



Multi-body Lifting Simulation
- *Time domain simulation*
- *Multiple moorings and slings*
- *Body-body interaction*
- *Animations for visualization*

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Bentley MOSES

MODULE 1

- Introduction to BENTLEY MOSES
- Introduction to Oil and Gas Business
- Historical Development of Offshore structures
- Ocean Environment and Sea states

MODULE 2

- Introduction to modeling in MOSES
- Command file
- DAT file
- Modeling part1
- Modeling part2
- Modeling part 3
- Modeling part 4
- Modeling part 5
- Modeling part 6
- Modeling part 7

MODULE 3

- Ship design Life cycle
- Types and General Arrangement of ships
- Structural Design of ships
- Hydrostatic Properties
- Hydrostatics table
- BCG and ballast

MODULE 4

- Ship stability
- Shipyards and Ship Building Technologies
- Intact stability & log strength
- Intact stability &log strength II

SACS

Bentley
Advancing Infrastructure

CONNECT Edition

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SACS®

Design and Analysis Software for Offshore Structures

SACS is an integrated finite element structural analysis package of applications that uniquely provides for the design of offshore structures, including oil and gas platforms, wind farms, and topsides of FPSOs and floating platforms. SACS software has been used by offshore engineers around the world for nearly 40 years. Many of the world's energy companies specify SACS software for use by their engineering firms across the lifecycle of offshore platforms. Three options of the SACS software packages are available: Offshore Structure Enterprise for comprehensive capabilities required for typical offshore jackets, wharfs, and dolphin structures; Offshore Structure Advanced for static topside and deck analysis; and Offshore Structure for static structural analysis.

Key Components

Modeling

- Precede Graphical Modeler
- Datagen Intelligent Editor
- Gap Elements
- Superelements

Loads

- Seastate Wave, Wind, Current
- Buoyancy, Mud flow
- Gravity, Inertial
- Skid, Moving

Analysis

- SACS IV Solver
- Large Deflection (LDF)
- PSI Pile/Structure Analysis
- Liquefaction
- Wind Turbine Analysis
- Dynpac Modal Analysis
- Collapse

Design

- Combine Solution Files
- Post Offshore Code Design
- Concrete Design
- Postvue Graphical Redesign
- Joint Can
- Interactive Fatigue
- Dynamic Fatigue
- Wave Fatigue

Offshore Structure Enterprise:

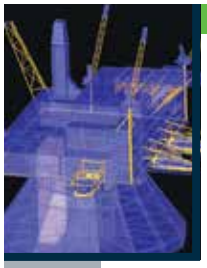
Offshore Structure Enterprise contains capabilities required for typical offshore jackets, wharfs, and dolphin structures. It includes the interactive graphics modeler with advanced 3D capabilities, SACS IV solver and interactive graphics 3D post processor, Seastate, Joint Can, Pile, Combine, Gap, Tow, and LDF large deflection. The package also includes automatic model generation, beam and finite element capability, steel code check and redesign, environmental load generation, tubular connection check, single pile/soil interaction, inertia and moving load generation, tension/compression nonlinear elements with initial gap, load case combination, linear large deflection analysis, and full output report and plotting capabilities. The package also contains the multi-core analysis capability, allowing the user to conduct multiple analyses of the same type in parallel, saving hours of runtime.

Offshore Structure Advanced:

Offshore Structure Advanced contains capabilities required for typical topside and deck analysis. It includes the interactive graphics modeler with advanced 3D capabilities, SACS IV solver and interactive graphics 3D post-processor, topsides wind loading, Combine, Gap, Tow, and LDF large deflection. The package also includes automatic model generation, beam and finite element capability, steel code check and redesign, wind and gravity load generation, inertia and moving load generation, tension/compression nonlinear elements with initial gap, load case combination, linear large deflection analysis, and full output report and plotting capabilities.

Offshore Structure:

Offshore Structure contains capabilities required for static structural analysis. It includes the interactive graphics modeler with advanced 3D capabilities, SACS IV solver and interactive graphics 3D post-processor, Combine, Gap, Tow, and LDF large deflection. The package also includes automatic model generation, beam and finite element capability, steel code check and redesign, inertia and moving load generation, tension/compression nonlinear elements with initial gap, load case combination, linear large deflection analysis, and full output report and plotting capabilities.

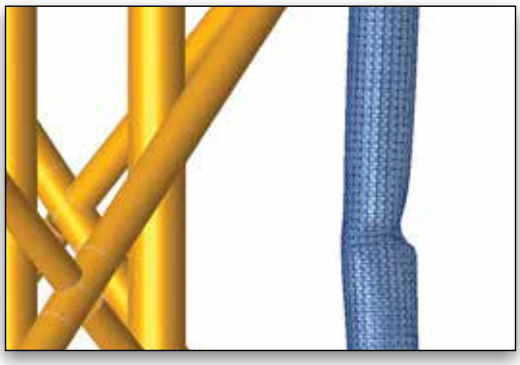


SACS-AutoPIPE Interface

The interface between SACS and AutoPIPE, integrates piping design, pipe stress and structural analysis. It allows users to automatically transfer pipe support loads on to the structural model for analysis, and to the piping model for visualization. Workflows to add pipe loads to offshore structures removes the requirement for manual data entry. The interface between SACS and AutoPIPE provides realistically engineered designs, and saves weeks of design time by avoiding the manual transfer of support loads between the piping and structural models.

SACS-MOSES Intraoperability

SACS structural models can be imported into MOSES for offshore installation analysis. Generating SACS TOW files from MOSES allows automatic generation of inertial based acceleration loading and RAOs. Enhancing collaboration across structural and naval architectural teams improves efficiency, reduces rework and project delays.



Ship impact analysis.

The following add-on modules extend the functionality of any of the three Offshore Structure packages. Some of these add-on modules are combined with the Offshore Structure Enterprise package to provide the Wind Turbine package.

Pile Structure Design:
Soil/Pile/Structure Interaction Analysis

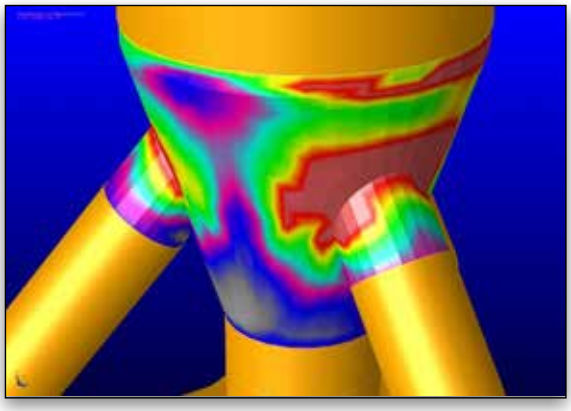
This non-linear add-on package permits non-linear soil/pile/structure interaction analysis of fixed offshore structures with multiple fixed supports using the PSI program modules. It requires the use of the Offshore Structure, Offshore Structure Advanced, or Offshore Structure Enterprise package.

Collapse:
Plastic Non-linear Add-on

This add-on package performs advanced plastic analysis including pushover, ship impact, and blast non-linear analysis. It requires the use of the Offshore Structure, Offshore Structure Advanced, or Offshore Structure Enterprise package.

Fatigue Advanced – Dynamic Response:
Fatigue Package with Dynamic Response

This Advanced Dynamic Fatigue package contains the modules required to determine the wind fatigue damage of a dynamic system. This package contains DYNPAC, Fatigue, Interactive Fatigue, and Dynamic Response. It requires the use of the Offshore Structure, Offshore Structure Advanced, or Offshore Structure Enterprise package.



Parametric study for the fatigue design of a wind turbine transition piece.

Fatigue Advanced – Wave Response:
Fatigue Package with Wave Response

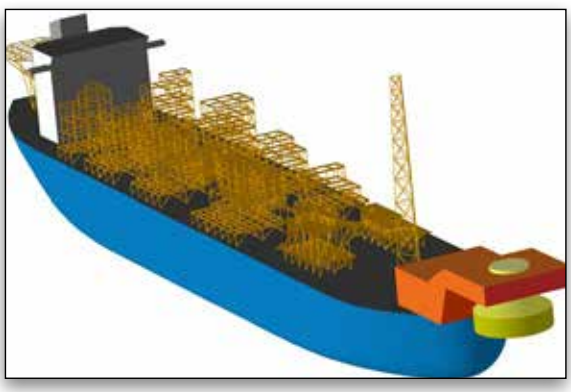
This Advanced Dynamic Fatigue package contains the modules required to determine the fatigue damage of a dynamic system subject to wave loads. This package contains DYNPAC, Fatigue, Interactive Fatigue, and Wave Response. It requires the use of the Offshore Structure, Offshore Structure Advanced, or Offshore Structure Enterprise package.

Fatigue Enterprise:
Fatigue Package with Wave Response and Dynamic Response

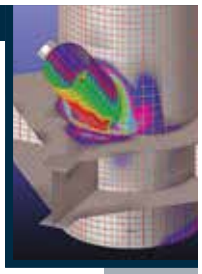
This Advanced Dynamic Fatigue package contains the modules required to perform any dynamic deterministic, time history, or spectral fatigue analysis. This package contains DYNPAC, Fatigue, Interactive Fatigue, Dynamic Response, and Wave Response. It requires the use of the Offshore Structure, Offshore Structure Advanced, or Offshore Structure Enterprise package.

Wind:
Wind Turbine Package

The Wind Turbine package is comprised of the following packages necessary for wind turbine platform design: Offshore Structure Enterprise, Pile Structure Design, Collapse, and Fatigue Enterprise. The package also contains the SACS interfaces to the GH Bladed and FAST wind turbine aero-elastic modules. Full automation including multi-core analysis capability is included for efficient analysis of a large number of time history simulations.



Data interchange with MOSES for FPSO topsides analysis.



The following software modules extend the functionality of any of the three Offshore Structure packages and are either included within those packages or available as add-on modules. Please consult your Bentley representative for product specifics relative to your needs.

SACS Executive:
Common Interface to Program Suite

- Controls and connects all elements of the SACS system
- Launches all SACS interactive programs
- Executes all batch program analyses
- Allows access to all SACS system configuration settings, including system file location and security key settings
- Includes command line help and power buttons for the most commonly executed tasks
- Specifies analysis options without changing data input file
- Generates SQLite database for reporting in Excel and other programs
- Integrated with ProjectWise for sharing of all projects files across multiple sites

Precede:
Interactive Full Screen Graphics Modeler

- Model generation capabilities include geometry, material and section properties, and loading
- Automatic input error detection
- Maintains data backup
- Beam and/or finite element modeling including plate and shell elements
- Automatic offshore jacket and deck generation
- User defined input units
- Cartesian, cylindrical, or spherical mesh generation
- Automatic weight or load generation including gravity, pressure, and skid mounted equipment loads
- Seastate data generation capabilities
- Decommissioning capabilities allowing the user to automatically slice the structure into smaller components of a given weight.
- Interactive GUI for the automatic meshing of stiffened non tubular joints.
- Extensive plotting and reporting capabilities
- Code check parameter generation including K-factors and compression flange unbraced lengths
- Allows SACS model files to be converted into 3D SAT file format compatible with AutoCAD, and other CAD systems
- Physical member support capabilities
- Professional and other ACIS-enabled CAD packages
- Supports full 3D geometry and section properties
- Allows SACS model files to be ported directly to a PDMS macro file, which creates the 3D model in PDMS
- Supports PDMS section libraries in addition to creating PDMS sections for sections defined in the SACS model
- Logging functionality
- ISM Export to ProSteel and other steel detailing systems
- Integrated with ProjectWise for sharing all projects files across multiple sites

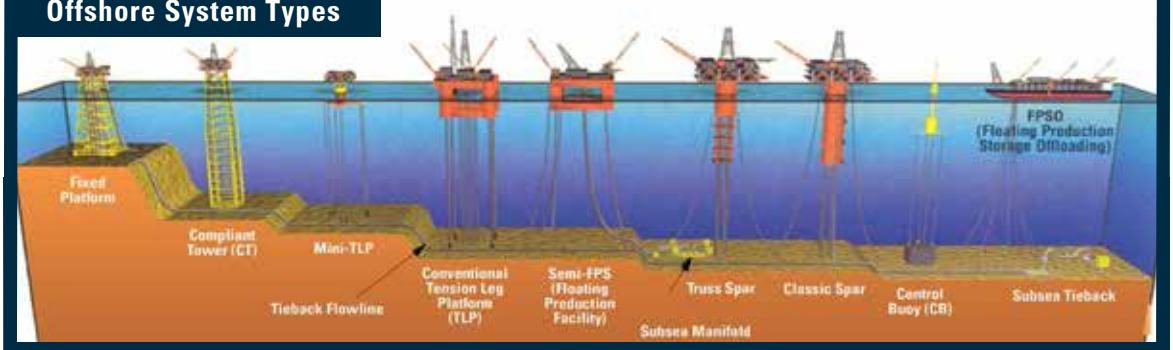
Data Generator:
Interactive Data Generation for all Programs

- Intelligent full screen editor that labels and highlights data fields and provides help for data input
- Form-filling data input available as well as full screen mode
- Automatic data checking
- Integrated with ProjectWise for sharing of all projects files across multiple sites

Seastate:
Environmental Loads Generator

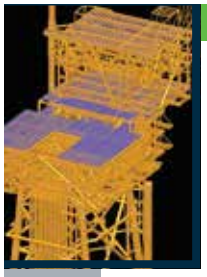
- Ability to view plot files on screen
- Sends viewed plots to printer/plotter
- Supports HP-GL, Postscript, DXF, Windows devices
- Metafile (WMF), and SACS NPF plot file
- Allows plot size, character size, margins, formats, etc.
- Ability to modify chart settings

Offshore System Types

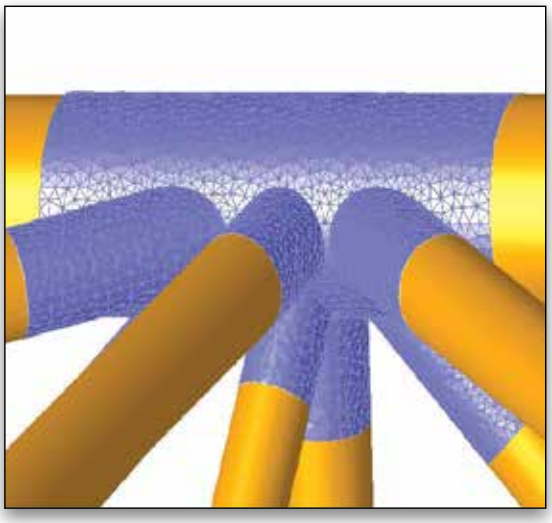


SACS has applications for all types of offshore structures and vessels

1. Fixed platforms
2. Compliant tower
3. Tension leg platforms
4. Semi-submersibles
5. FPSOs



- Full implementation of API 21st edition
- Supports five wave theories
- Current included or excluded
- Generates load due to wind, gravity, buoyancy, and mud flow
- Marine growth, flooded, and non-flooded members
- RAO and acceleration loading including non-structural weights
- Moving loads generation
- Diameter, Reynolds number, and wake encounter effects dependent drag and inertia coefficients
- Weight load cases
- Forces on non-structural bodies
- Deterministic and random wave modeling for dynamic response
- Member hydrodynamic modeling for static and dynamic analysis
- Corrosion modeling



Automatic joint meshing.

SACS IV Solver:
Static Beam and Finite Element Analysis

- Beam elements including tubulars, tees, wide flanges, channels, angles, cones, plate and box girders, stiffened cylinders, and boxes
- Solid and plate elements (isotropic and stiffened)
- Discrete Kirchoff Theory (DKT) thin-plates
- Isoparametric 6-, 8-, and 9-node shell elements
- Library of AISC, U.K., European, German, Chinese, and Japanese cross sections, as well as user-defined libraries
- Member, plate and shell local and global offsets
- Beam and finite element thermal loads
- Elastic supports defined in global or reference joint coordinate system
- Specified support joint displacements
- Unlimited load cases
- P-delta effects
- Master/slave DOF

Post:
Beam and Finite Element Code Check and Redesign

- Beam and plate element code check and redesign
- API (including 21st edition), AISC, LRFD, Norsok, Eurocode 3, Canadian, DNV, British Standards, and Danish DS449 code check
- Plate panel checks in accordance to DNV-RP-C201
- Creates updated model with redesigned elements
- Modify code check parameters
- Load combination capabilities
- Supports codes from 1977 to present
- Detailed and summary reports
- Hydrostatic collapse analysis
- Span (multi-member effects)
- ISO 19902

Joint Can:
Tubular Joint Code Check and Redesign

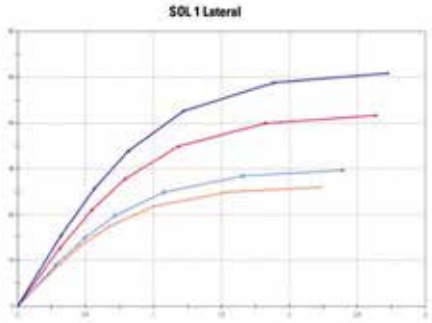
- Present and past codes including latest API 21st edition, supplement 2, and LRFD, Norsok, DS449, and Canadian
- API earthquake and simplified fatigue analysis
- ISO 19902
- Connection strength (50 percent) check
- Overlapping joints analyzed
- Minimum and extreme seismic analysis

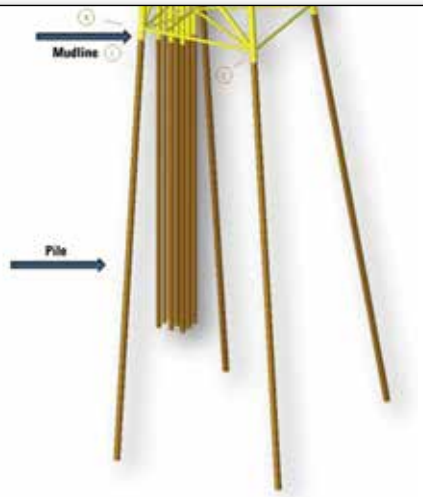
Postvue:
Interactive Graphics Post Processor

- Interactive member and tubular joint code check and redesign, with the option to print code check details for latest AISC, ASD and LRFD, API, ISO 19902 codes
- Display shear and bending moment diagrams
- Display rendered deflected shapes for static and dynamic analyses
- Animate deflected and modal shapes
- Color plate stress contour plots
- Code check and redesign by individual or group of elements

PSI:

- *API P-Y / T-Z Soil*
- *API Adhesion Soil*
- *User Defined P-Y / T-Z Soil*
- *User Defined Adhesion Soil*





- Supports same codes as post module
- Extensive reporting and plotting capabilities
- Color-coded results and unity check plots
- Creates updated input model file for re-analysis
- Labels UC ratio, stresses, and internal forces on elements

Concrete:
Reinforced Concrete Code Check and Redesign

- Rectangular, Circular, Tee, and L cross sections
- Beam, bi-axial beam-column, slab, and wall elements supported
- Multiple reinforcement patterns can be specified
- Code check per ACI 318-89 (Revised 1992)
- Shear reinforcement check and redesign
- Reinforcement development length check
- Deflection and creep calculation
- Second order/P-delta analysis capabilities

Fatigue:
Fatigue Life Evaluation and Redesign

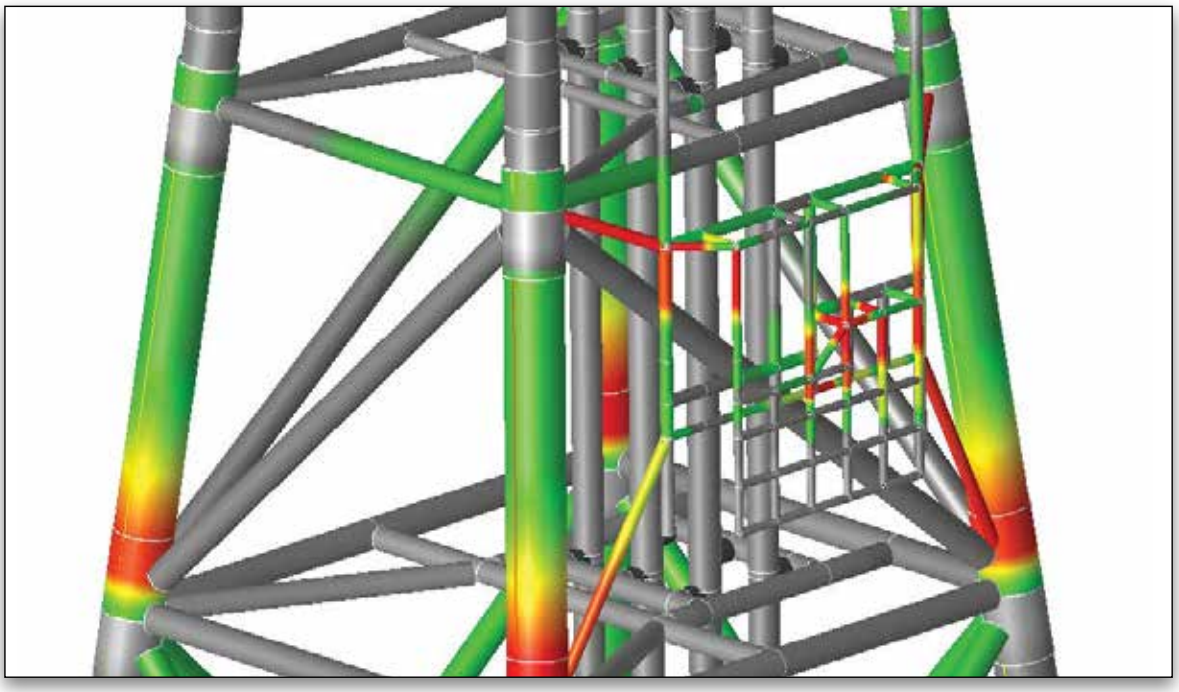
- Spectral, time history, and deterministic fatigue analysis
- Cyclic stress range calculation procedures include wave search, curve fit, and interpolation
- SCF calculations recommended by API (including 21st edition supplements), HSE, DNV, DS449 and Norsok Codes
- Automatic redesign
- API (including 21st edition supplements), AWS, HSE, and Norsok thickness dependent recommended S-N curves
- Multiple run damage accumulation
- Pierson-Moskowitz, JONSWAP, Ochi-Hubble double peak, simplified double peak, and user-defined spectra
- Automated or user-specified connection details
- Pile fatigue analysis
- Creates wave spectra from scatter diagram
- Uses Paris equation to predict crack growth rate due to cyclic stresses
- Load path dependent joint classifications
- Includes wave spreading effects
- Reservoir (rain flow) cycle counting method
- ISO 19902

Interactive Fatigue:
Interactive Fatigue Life Evaluation

- Shows the 3D view of the connection and allows braces to be selected with the mouse
- Reads connection defaults when joint and/or brace is/are selected, thus eliminating the need to calculate and display SCFs before viewing capacity or modifying properties
- Recognizes all SCF and S-N options available in the batch program
- Allows SCF theory to be changed for any type connection, including in-line connections and connections with user defined SCFs
- Reports have been expanded and reworked to make them easier to read
- Reports and plots can be displayed on the screen and/or saved to a file
- Automatic redesign

GAP:
Non-linear Analysis With One-way Elements

- Accurate simulation of load out or transportation analysis using one-way elements
- Tension or compression gap elements with initial gap
- General non-linear elements
- Friction element



Non-linear elasto-plastic deformations.

PSI:
Non-linear Soil, Pile, and Structure Interaction

- Beam column effects included
- Non-uniform piles
- P-Y and T-Z curves, axial adhesion and springs
- API P-Y, T-Z, skin friction and adhesion data generated from soil properties per API
- Full structural analysis and pile code check API, LRFD, Norsok, HSE, DS449, Canadian, and DNV
- Offset P-Y & T-Z curves for mudslides
- Full plotting and graphical representation of soil data and results, including stresses, P-Y, T-Z curves
- Soil liquefaction effects

Pile:
Isolated 3D Pile Analysis

- Beam column and pile batter effects included
- Uses PSI soil data
- Optional pile head springs
- Specify force at or below pile head
- Specify pile head displacements
- Specified pile head forces or displacements
- Automatic generation of linear equivalent pile stubs for dynamic or static analysis
- Soil liquefaction effects
- Same plotting and code check features as PSI

Superelement:
Automated Substructure Creation and Application

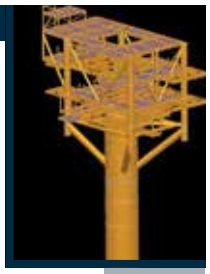
- Unlimited number of superelements
- Up to 1,000 interface joints per superelement
- Translation and rotation of superelements
- User defined stiffness matrices
- Full stress recovery
- Superelements can contain other superelements
- Translation and rotation of superelements

Dynamic Superelement:

- Can be based upon either Guyan or Craig-Bampton methods
- Uses Modal Assurance Criterion to check accuracy
- User defined output format

Combine:
Common Solution File Utility

- Combines dynamic and static results from one or multiple solution files
- Combines results from analyses having different member, plates, etc.
- Superimposes mode shapes
- "Worst-case" combination of dead loads with earthquake response
- Determine extreme wave loads from input spectra



Large Deflection (LDF):
Large Deflection Analysis

- Iterative solution for geometric
- Solves plate membrane problems
- Accounts for P-delta effects nonlinearities

Collapse:
Non-linear Collapse Analysis

- Linear and non-linear material behavior
- Non-linear springs
- Sequential load stacking capability
- Activate and deactivate elements
- Joint flexibility options
- Impact analysis with automatic unloading, built-in DNV ship indentation curves and energy absorption functionality
- Load cases may contain loading and/or specified displacements
- Includes geometric nonlinearities
- Plastic members and finite elements
- Includes piles with non-linear soils and plasticity
- Soil liquefaction effects
- Plastic DKT plates

Dynpac:
Dynamic Characteristics

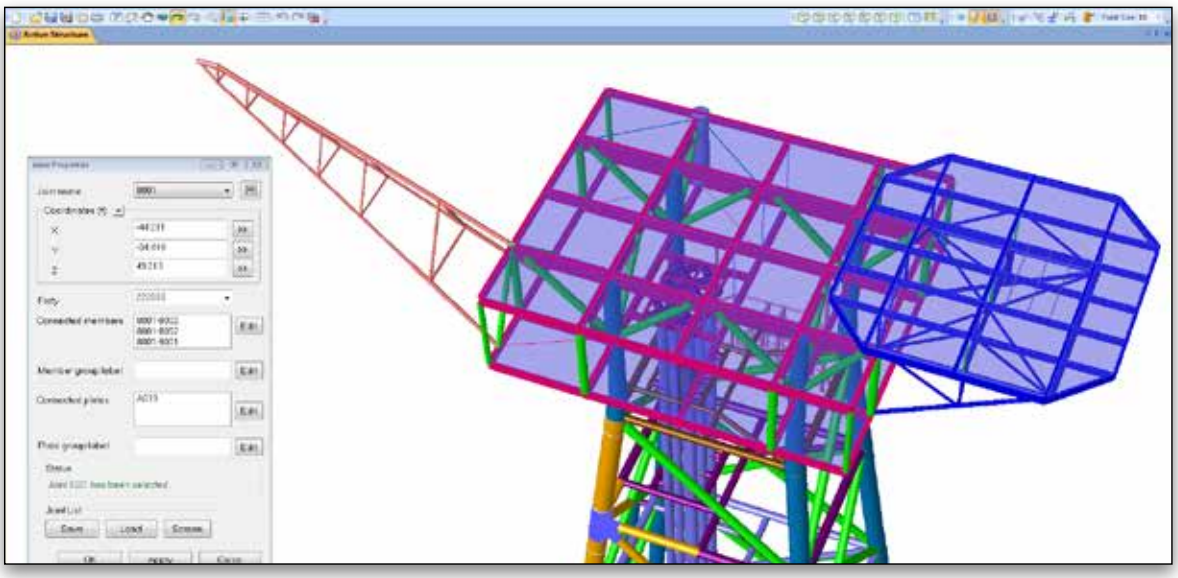
- Householder-Givens solution
- Guyan reduction of non-essential degrees of freedom
- Lumped or consistent structural mass generation
- Automatic virtual mass generation
- Complete seastate hydrodynamic modeling
- User input distributed and concentrated mass
- Non-structural weight modeling
- Full 6 DOF modes available for forced response analysis

Wave Response:
Dynamic Wave Response

- Deterministic and random waves
- Pierson-Moskowitz, Jonswap, Ochi-Hubble, and user wave spectra
- Harris, Von Karmon, and Kaimal wind spectra
- Fluid-structure relative velocity and acceleration accounted for "Modal Acceleration" and non-linear fluid damping
- Closed form steady state response in the frequency domain
- Equivalent static load output for accurate stress recovery
- Zero crossing and RMS responses
- Time history analysis of wave and wind and time history load
- Buoyancy dynamic loads included
- Stress, internal load, base shear, and overturning moment transfer function plots available
- Full coupling with Fatigue program
- Elastic dynamic response of floating structures including stingers
- Input and output Power Spectral Densities with Probability Distributions
- Special features for wind turbine analysis

Dynamic Response:
General Dynamic Response and Earthquake Analysis

- Frequency domain analysis
- Time history, response spectrum or PSD-based driven input
- Time history and harmonic-force driven input
- SRSS, CQC and peak modal combinations



Precede graphical modeler aids modelling of jackets and complex topside.

Course Details

Course Duration:
4 Weeks

Course Mode:
Regular & Fast Track

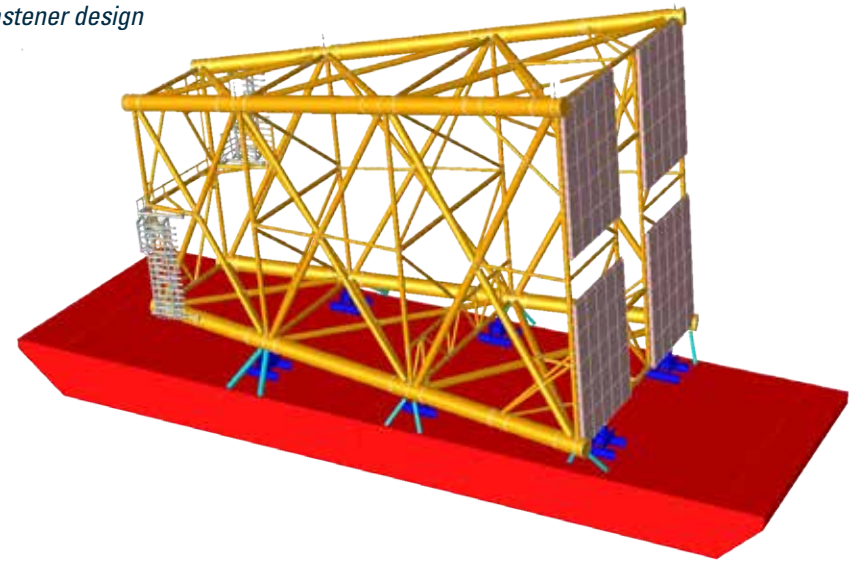
Schedule & Timing :
3 hours / day

Certification :
Bentley Systems India Pvt. Ltd.

ASTS
GLOBAL EDUCATION
BEYOND MERE EDUCATION

Tow Structural Analysis

- *Combine multiple common solution files*
- *Static analysis with non-linear GAP elements*
- *Seafastener design*



- API response spectra library and user input spectra
- Wind spectral loading capability
- Structural and fluid damping
- Vibration analysis with multiple input points with user specified frequencies and phasing
- General periodic forces decomposed by Fourier analysis
- Ice dynamics analysis
- Engine/compressor vibration analysis
- Response spectrum output at any joint
- Equivalent static load and incremental load output resulting from earthquake, ship impact, dropped object and blast analysis. This loading can be used for subsequent linear static analysis or for non-linear collapse analysis
- Ship impact analysis
- Dropped object analysis

Tow:
Transportation Inertia Load Generator

- Input motion for six degrees of freedom
- Output location for selected points
- Automatic weight calculation
- User input member and joint weights
- Generates distributed member and plate loads
- Converts user defined loads into inertias

MTO:
Material Take off, Weight Control, and Cost Estimation

- Member lengths including cuts
- Steel tonnage and CG location
- Material list, cost estimate, and weight control reports
- Weld volume requirements and cost
- Required protective anodes and cost
- Surface area calculations by elevation
- Anode calculation in accordance to NACE SPO176-2007 (formerly RP0176-2003) and DNV-RP-B401

Bentley SACS

MODULE 1: INTRODUCTION TO SACS

- Introduction to SACS
- Global Settings
- Local and Global Coordinate Systems
- Precede
- Adding Joints
- Adding Members
- Defining Members
- Running Structure Wizard
- Sacs modeling part 1
- Sacs modeling part 2
- Sacs modeling part 3
- Sacs modeling part 4

MODULE 2: SETTING UP PROJECT AND SAMPLE ANALYSIS

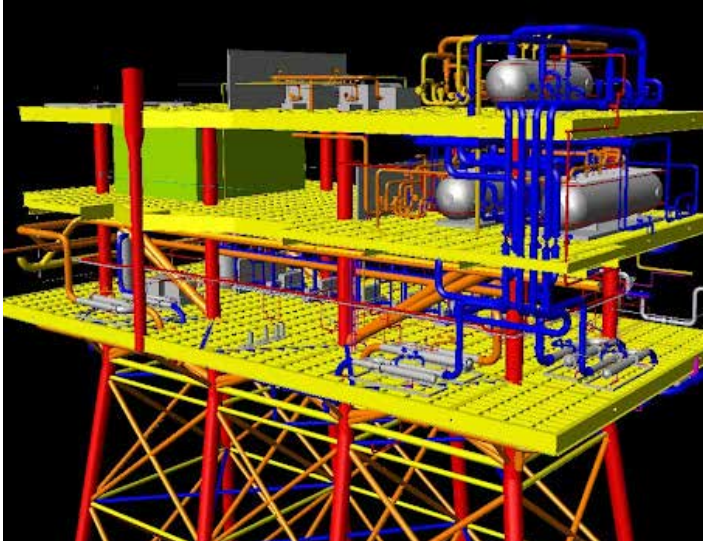
- Setting up Project Using Precede and Structural Wizard
- File Naming Convention and Run Files
- Precede, Data Generator, and Editor
- Sample Loading
- Sample Analysis part 1
- Sample analysis part 2

MODULE 3: SAMPLE ANALYSIS OF TOPSIDE

- Inputting Material Properties
- Plate Groups
- Sample analysis Topside part1
- Sample analysis Topside part2
- Sample analysis Topside part3
- Sample analysis Topside part4
- Sample analysis Topside part5
- Defining Design Parameters
- Joint Connection Design
- Defining Beam Offsets
- Define Member Code Check Properties
- Topside Facilities and Layout Design

MODULE 4: SAMPLE ANALYSIS OF JACKET

- Design Methods of Offshore Structures
- Design Analysis of Offshore Structures
- Foundation of Offshore Structures
- Wishbones
- Main Piles
- Conductor Modeling
- Dead Load
- Applied Loads
- Joint and Member Loads
- Overrides (Member and Group)
- Simulation of Non-Structural Elements
- Loading the Structure
- Sample analysis Jacket part 1
- Sample analysis Jacket part 2
- Sample analysis Jacket part 3



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