Bentley
Advancing Infrastructure

PRODUCT DATA SHEET

MOSES™

Hydrostatic and Hydrodynamic Analysis Software for Offshore Installation and Floating Platform Design

MOSES is advanced simulation software for hydrostatic and hydrodynamic analysis of all types of marine operations and floating platforms. With over 40 years of industry expertise, MOSES streamlines the design, simulation, and installation of ships, platforms, and subsea systems. It combines high-accuracy modeling, automation tools, and customizable workflows in a user-friendly interface—enabling faster, safer, and more cost-effective project delivery. Trusted worldwide by offshore engineers and naval architects, MOSES excels in solving complex offshore engineering challenges with accuracy and unmatched computational power.

MOSES is offered in four options to suit a wide range of engineering needs:

MOSES

Stability and Motions

MOSES provides a powerful, cost-effective toolset for stability assessment and motions analysis in the frequency domain. It includes hull and compartment modeling, with both strip theory and 3D diffraction analysis methods. Static simulations support installation operations like loadout and upending, while transportation can be analyzed in the frequency domain.

MOSES ADVANCED

Stability, Motions, Mooring, and Structures

MOSES Advanced extends MOSES with time domain and structural analysis capabilities. It supports complex installation scenarios like Floatovers and Lifts, along with detailed mooring and riser analysis to evaluate the global performance of any floating system.

MOSES ULTIMATE

Stability, Motions, Mooring, Structures, and Launch

MOSES Ultimate builds on MOSES Advanced with launch analysis and generalized degrees of freedom. It enables structural evaluation during vessel and cargo launches and supports detailed structural studies of new or existing FPSOs, platforms, and barges during transport.

MOSES WIND TURBINE

Stability, Motions, Mooring, Structures, Launch, and Wind Turbine

MOSES Wind Turbine includes all MOSES Ultimate features plus floating wind turbine analysis. It simulates turbine behavior under real-world conditions—wind, waves, and currents—to ensure stability, safety and performance in one unified environment.

PRODUCTIVITY TOOLS

MOSES Executive

All MOSES tiers include MOSES Executive, the central interface for running simulations and managing workflows. Automate tasks with scripting, run simulations step-by-step, in batches, or on a grid, and perform scenario testing and optimization. Built-in tools support graphing, 3D modeling, and statistical reporting for clear result visualization.

MOSES Language

The MOSES solver handles all forces on floating systems—hydrostatic, hydrodynamic, inertial, and mooring—with support for diverse model inputs like hull sections, panels, Morison elements, and structural components. Its flexible connectors model interactions between bodies or with the seabed, including catenary moorings, nonlinear springs, rigid links, launchways, and true nonlinear rods.

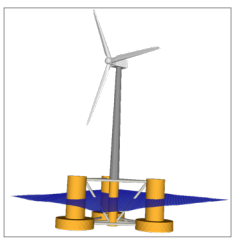
MOSES Solver

The MOSES scripting language offers a powerful, flexible way to define system behavior and run multiple analyses for various installation or operational conditions. It includes utilities for reporting, graphing, 3D visualization, and statistical analysis, along with features like:

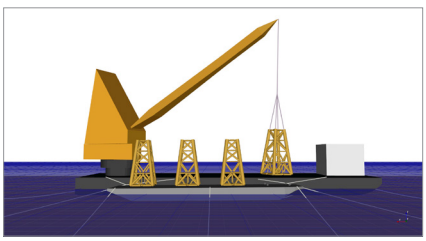
- Model generation with validity checking
- Complex analyses run with a single command
- Database capability with simulation restart options
- Macros, loops, and conditional execution

MOSES Modeler

All MOSES tiers include MOSES Modeler, a 3D interactive tool for building hydrodynamic and structural models. It supports all MOSES geometry types and enables seamless model creation and import for analysis.



Floating wind turbine.



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

SYSTEM REQUIREMENTS

MINIMUM: 4GB RAM. Performance is dependent on model size and resources available.
RECOMMENDED: Win 10, 11. 8GB RAM. 10GB of free disk space. DirectX10 and Open GL.
BROWSER COMPATIBILITY: Edge, Chrome

MOSES At-a-glance

MODELING

MOSES Modeler includes advanced tools for creating and refining geometry.

- Trimmed NURBS surfaces, NURBS curves, tri and quad-meshes, structured and unstructured point data
- Fairing capabilities and surface curvature analysis
- Automated and guided manual fitting of NURBS surfaces and curves to point data
- Parametric transformation to target hydrostatic parameters
- Comparison with target hydrostatics and curve of areas

BASIC CONNECTORS

Connectors in MOSES model interactions between bodies or with the ground, including slings, mooring lines, springs, pins, and fenders. They support tension-only, compression-only, and fully customizable behaviors.

- 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

STRIP THEORY

Strip theory offers a fast, reliable method for predicting vessel motions, ideal for barge transport and any vessel that is slender in its L/B (length/beam) ratio.

- RAOs at center of gravity or remote locations
- Standard and user-defined spectra
- Statistical multipliers or storm duration definition

3D DIFFRACTION

For non-ship-shaped hulls or surge-sensitive scenarios, MOSES uses adaptive meshing to refine panel density as needed.

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

TIME DOMAIN

The Time Domain analysis tools simulate single or multi-body systems using frequency domain results, accounting for mooring, current, and wave forces. It delivers fast, full system response predictions with customizable reports and auto-generated animations for clear result communication.

- 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 AND ROD ELEMENTS

The Pipe & Rod tools accurately model mooring line dynamics with large deflections, enabling detailed analysis of anchor lines, moorings, TLP tendons, risers, and pipelines.

STRUCTURAL SOLVER

Perform strength and fatigue assessments of beam and plate elements in time and frequency domains, following AISC, API, DNV, ISO, and NORSOK standards. Use MOSES-specific versions of SACS Post, Joint Can, and Fatigue for post-processing with results visualized MOSES Postvue.

JACKET LAUNCH

Perform six-degree-of-freedom time domain jacket launch with automated ballasting capability.

GENERALIZED DEGREES OF FREEDOM

Consider the effects of structural deformation on buoyancy, frequency response and loadout calculations.

WIND TURBINE ANALYSIS

Perform floating wind turbine analyses using the integrated OpenFAST solvers, including wind turbine control systems. Capture the impact of wind loads on the floating substructure and mooring system.

	Packages			
Capability	**MOSES**	**MOSES Advanced**	**MOSES Ultimate**	**MOSES Wind Turbine**
MOSES Executive	◆	◆	◆	◆
MOSES Modeler	◆	◆	◆	◆
MOSES Stability	◆	◆	◆	◆
MOSES Motions	◆	◆	◆	◆
MOSES Language	◆	◆	◆	◆
Strip Theory	◆	◆	◆	◆
Basic Connectors	◆	◆	◆	◆
3D Diffraction	◆	◆	◆	◆
Time Domain		◆	◆	◆
Pipe and Rod		◆	◆	◆
Structural Solver		◆	◆	◆
Loadout		◆	◆	◆
Jacket Launch			◆	◆
Generalized D.O.F.			◆	◆
Floating Wind Turbine				◆

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