Bentley
Advancing Infrastructure

PRODUCT DATA SHEET

MOSES

Hydrostatic and Hydrodynamic Analysis Software for Offshore Installation and Platform Design

MOSES is advanced 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 packages to suit all design office requirements: MOSES, MOSES Advanced, and MOSES Ultimate.

MOSES

Stability and Motions

The MOSES package provides a highly capable and cost-effective package for stability assessment and motions analysis in the frequency domain. Hull and compartment modeling are included along with both strip theory and 3D diffraction analysis methods. Installation operations for loadout, frequency domain transportation, and upend can be performed with MOSES.

MOSES ADVANCED

Stability, Motions, Mooring, and Structures

The MOSES Advanced package adds time domain and structural analysis capabilities to the MOSES package, which can be applied using either strip theory or 3D diffraction panel methods of calculation. When coupled with mooring line dynamics and large deflection rod elements, MOSES Advanced can be used to model risers.

MOSES ULTIMATE

Stability, Motions, Mooring, Structures, and Launch

The MOSES Ultimate package provides a complete range of functions, from modeling of hulls and calculation of stability, to prediction of motions, mooring analysis and structural analysis, plus launch analysis, completing the range of installation operations capabilities. Inclusion of generalized degrees of freedom enables studies of new or existing FPSOs and platforms, as well as transportation and installation analysis.

PRODUCTIVITY TOOLS

MOSES Solver

All three packages 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.

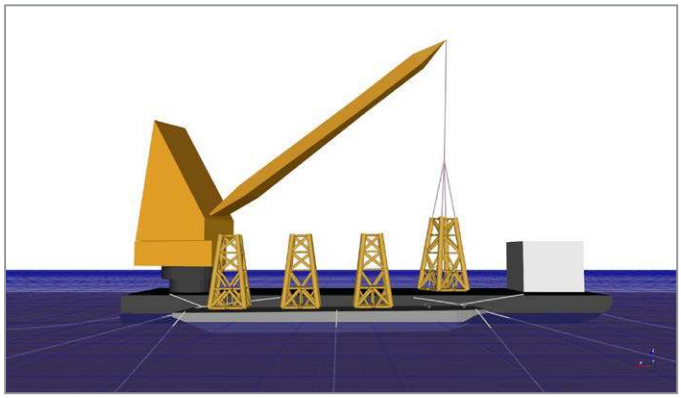
MOSES Language

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

MOSES Editors

All MOSES packages 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.



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

SYSTEM REQUIREMENTS

MINIMUM: 2GHz or faster (x64) 4GB RAM
RECOMMENDED: Win 8, 8.1 and 10 (x64). 8GB RAM. 10GB of free disk space. DirectX10 and Open GL.
BROWSER COMPATIBILITY: IE11, Edge, Chrome

MOSES At-A-Glance

BASIC CONNECTORS

The Basic Connectors module provides a generalized way of modeling lifting slings, anchor lines, mooring lines, nonlinear 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

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

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 AND 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

Strength and fatigue assessment on beam and plate elements as per AISC, API, DNV, ISO, NORSOK.

- Time and frequency domain analysis

JACKET LAUNCH

The Launch module performs a six-degree-of-freedom time domain jacket launch with automated ballasting capability.

GENERALIZED DEGREES OF FREEDOM

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

	Packages		
Capability	**MOSES**	**MOSES Advanced**	**MOSES Ultimate**
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.			◆

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