PRODUCT DATA SHEET

Bentley
Advancing Infrastructure

CONNECT Edition

OpenWindPower™ Floating Platform

Offshore Wind Turbine Platform Analysis and Design

OpenWindPower Floating Platform software provides a comprehensive set of capabilities for the design and analysis of floating offshore wind turbine structures in a single product. Hydrodynamic and structural models can be designed in 3D with advanced modeling capabilities. These models are subjected to wave, current, wind, and turbine mechanical loads to predict motions and compute fatigue on the floating platform.

Parametric Modeling

Complex 3D models of any wind turbine platform are created in minutes, using wizards and interactive sketch features in MOSES Modeler. Model geometry can be imported from a variety of file formats, or powerful mesh modeling and automated curve and surface fitting tools can be used to quickly generate hydrodynamic and structural meshes in a single model for the analysis of new or existing platforms. The application enables you to explore design alternatives with advanced parametric modeling through macros in Microsoft Excel.

Aeroelastic Solver Integration

MOSES computes the hydrodynamic and hydrostatic loads on any floating wind turbine platform and exports this data in the widely accepted WAMIT file format. Aeroelastic wind turbine solvers, for example DNV's Bladed, can apply this data to a turbine simulation, saving the resultant time series load information for later use. Advanced built-in MOSES macros read and apply these loads to the MOSES model during a time domain simulation, which computes sea pressures and inertial loads for detailed structural analysis.

OpenWindPower Job Creator

The design and analysis of a floating offshore wind turbine platform requires the calculation of tens of thousands of simulations with varying wind, wave, and turbine loads. An inbuilt MOSES automation tool allows for the import of multiple load time series produced by the aeroelastic solver in minutes, saving weeks of manual error-prone job creation. The MOSES Executive interface streamlines the management of all the input and result data files.

OpenWindPower-Siemens Femap Interface

The Femap interface allows you to model transition or component pieces and other complex geometries in Femap and import them into SACS and MOSES.

Floating semi-submersible wind turbine platform in MOSES.

LAN Grid Computing

Bentley's grid analysis service allows for the definition of a distributed network of virtual or physical computer nodes over a company's local area network. Multiple MOSES floating wind turbine load simulations can be processed in parallel over the grid, saving months of computation time.

Structural Post Processing API

Industry standard structural code checking and fatigue with built-in SACS components to post process all beam and plate stresses from a common solution file SQLite database (CSFDb). A comprehensive SDK /API is available to automatically extract and post process the structural results for fast solution optimization. Full interactive visualization of the structural results is available to quickly identify high-stressed areas.

Native SQLite Results Database

Exported MOSES results, at all stages of the workflow, are stored in an SQLite Database for fast, efficient data visualization. The MOSES Executive includes advanced tools for querying, filtering, and plotting results for visualization and animation of the floating wind turbine model.

System Requirements

Operating System
Windows 8, Windows 10

Processor
Core 2 or better CPU

Memory
Minimum 4GB recommended

Hard Disk
Minimum 4GB of free hard disk space

Display
Graphics card supporting Open GL or DirectX

512MB RAM or greater video card with 1024x768 or higher video resolution

Find out about Bentley at: www.bentley.com

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OpenWindPower Floating Platform At-A-Glance

MOSES Modeler
- Fast, effective and intuitive modeling of floating wind turbine hydrodynamic and structural geometry
- Trimesh modeling for creating simple box, column and cylinder shapes
- Advanced 3D NURB surfaces for modeling more complex geometries
- Import of existing geometry from file in *.ply, *.gdf, *.3dm, IGES, and DXF formats
- Parametric modeling through Microsoft Excel macros
- Assign MOSES structural classes and elements, pieces, parts, and bodies

MOSES Executive
- Keep track of all analysis and wind turbine model files with MOSES projects
- Simple editing of analysis files with context sensitive help, and command and option highlighting
- Interactive reporting, graphing, and 3D-model visualization

MOSES Language
- Powerful and flexible language for specifying system behavior and performing complex analyses
- Macros, loops, and conditional execution

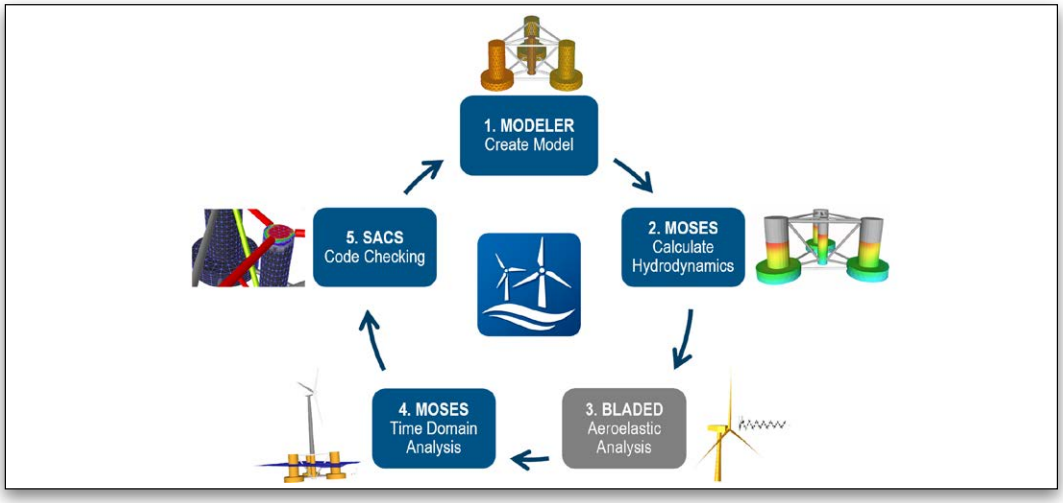
Hydrodynamics
- 3D Diffraction and Morrison's Equation
- Automatic adaptive meshing trims and refines the hydrodynamic mesh at the waterline
- Nonlinear, slowly varying, wave drift forces
- RAOs (response amplitude operators) at center of gravity or remote location
- Frequency domain pressure visualization as per DNV-OS-J103
- Hydrostatic and hydrodynamic data exported in WAMIT file format for aeroelastic wind turbine solver simulations

Connectors
- Catenary mooring lines with buoys or clump weights
- Rod elements for accurate mooring line and power cable dynamics with large deflection beam capabilities
- Lift, lower, or upend with multiple slings and hooks
- Activate or deactivate to simulate breaking or re-rigging
- Nonlinear springs with tension or compression only

Time Domain Analysis
- Fast computation of the full system response
- Automatic import of aeroelastic solver time series loads from DNV's Bladed
- Single or multi-body simulations
- Current, irregular waves, and/or wind
- Multiple body motions can be analyzed
- Dynamic tank flooding and emptying

Structural Code Checking
- Beam and plate element analysis
- Linear, nonlinear, and frequency domain analysis
- Modal analysis using subspace iteration
- Code checking to API, AISC, NORSOK, and ISO codes
- Plate panel checks as per DNV-RP-C201 and DNV-RP-C202
- Interactive results visualization with Postvue

Fatigue Life Evaluation and Redesign
- Spectral, time history, and deterministic fatigue analysis
- SCF calculations recommended by API (including 21st Ed. supplements), HSE, DNV, DS449, and NORSOK codes
- API (including 21st Ed. supplements), AWS, HSE, and NORSOK thickness dependent recommended S-N curves
- Reservoir (rain flow) cycle counting method
- ISO 19902



OpenWindPower Floating Platform workflow.

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