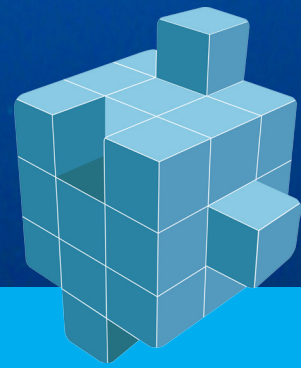


MARINTEK FACT SHEET

SIMA



SIMA - Simulation and Engineering Analysis of Marine Operations and Floating Systems

The SIMA workbench by MARINTEK is a simulation and analysis tool for marine operations and floating systems – from modelling to results, built on software for non-linear time domain analysis. 3D and 2D graphics allow users to quickly and intuitively understand the results.

SIMA software includes simulation and engineering analysis of marine operations, feasibility evaluation, detection of challenging scenarios.

Typical applications of the SIMA workbench

- Lifting of topsides, modules and subsea equipment
- Float-over installation
- Tandem or side-by-side offloading
- Transportation/towing
- Stationkeeping with mooring system and DP
- Global response analysis of risers and umbilicals
- Up-ending of SPAR platforms
- Crane operations
- Offshore wind turbines

Main components of the SIMA workbench

- Modelling environment
- Post-Processor
- Workflow engine
- Report generation

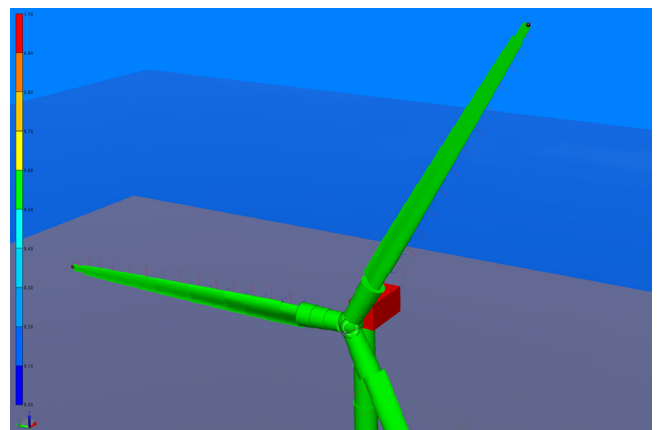
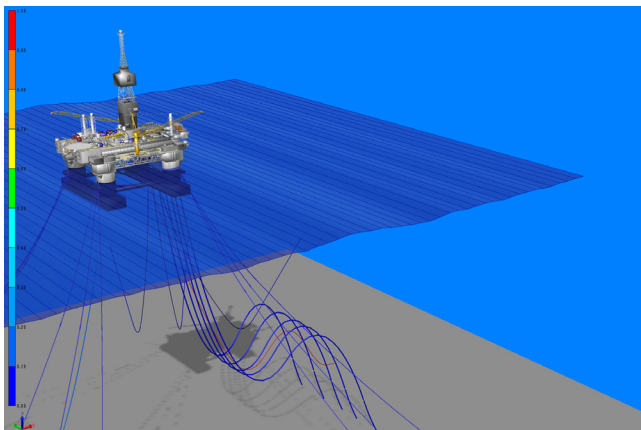
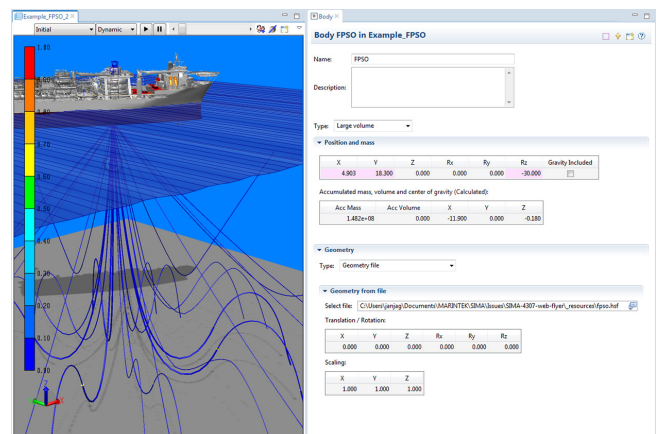
Modelling

The modelling environment of SIMA enables the user to intuitively prepare the simulation. The user can define new models by using graphical editors and it is also possible to import a variety of formats. The calculation parameters of the underlying simulations can be edited and are continuously validated in order to provide direct feedback. While a simulation is being executed, the graphical interface provides detailed information about the progress and estimated remaining time.

Available Modelling Elements

- Multiple vessels, cranes, fenders, winches
- Coupling elements
- Finite element modelling of mooring systems, risers, and umbilicals

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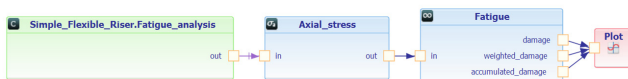
- Loads from wind, waves and current
- Dynamic positioning systems
- Thrusters
- Wind turbines

Supported Analyses

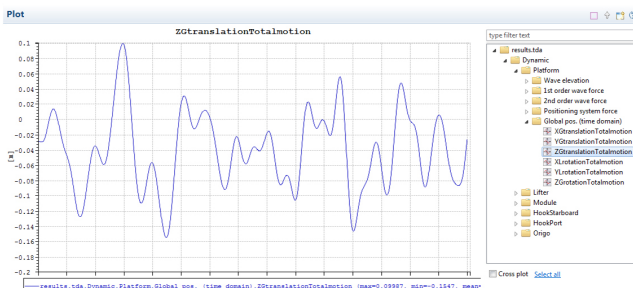
- Static analysis
- Nonlinear time domain analysis
- Fully coupled analysis
- Eigenvalue analysis
- VIV analysis

Post-Processor

The SIMA Post-Processor environment assists the user in making the most out of the data generated by a simulation. Individual data manipulations and filters can be graphically chained together in order to derive the design relevant results. The graphing tool enables visual inspection and comparison of the generated data.

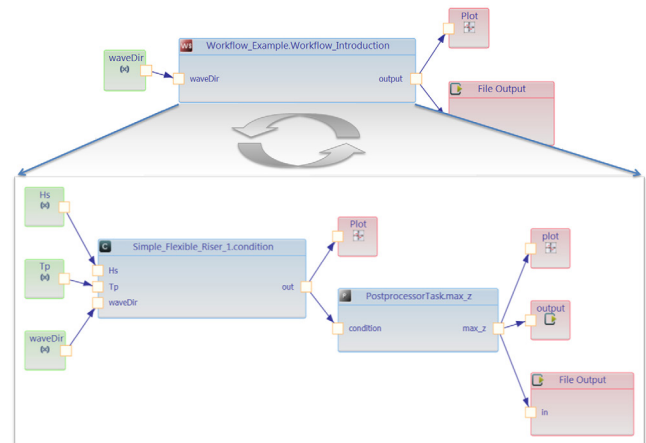


- Post processing with statistics
- Spectral analysis and fatigue analysis
- Visualisation of results



Workflow Engine

More complex setups containing multiple simulations can be realised using the workflow environment. By allowing hierarchical nesting of workflows within workflows, demanding simulation scenarios can be realised. It becomes possible to repeatedly execute a workflow with parametric variations. Similar to the post-processor, the generated data can be inspected and compared using visual tools.



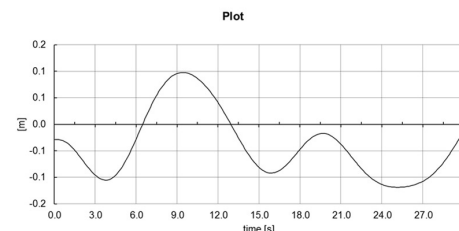
- Modelling of analysis workflow
- Interaction with external programs

Report Generation

The report task allows the user to collect results from multiple analyses and combine them with additional text or mathematical formulas. The gathered results can be presented as tables and plots and are automatically updated when an analysis is re-run with changed parameters. The generated office document can still be edited using standard word processing applications.

Technical Report

Figure 1: Plot



Equation 1: Formula

$$F(x,y) = 0 \sim \text{and} \sim \begin{bmatrix} F''_{xx} & F''_{xy} & F''_{yy} \\ F''_{xy} & F''_{yy} & F''_{xx} \\ F''_{xx} & F''_{xy} & 0 \end{bmatrix} = 0$$

- Text sections
- Mathematical Formulas
- Tables
- Plots based on analysis data