DeepC

For riser design

Fast and reliable design of steel catenary risers

The DeepC program allows for riser design using both the traditional de-coupled methodology and the more accurate coupled methodology. Both options can be used to compute riser motions, stresses and fatigue life as well as performing code check of the risers.

Challenges

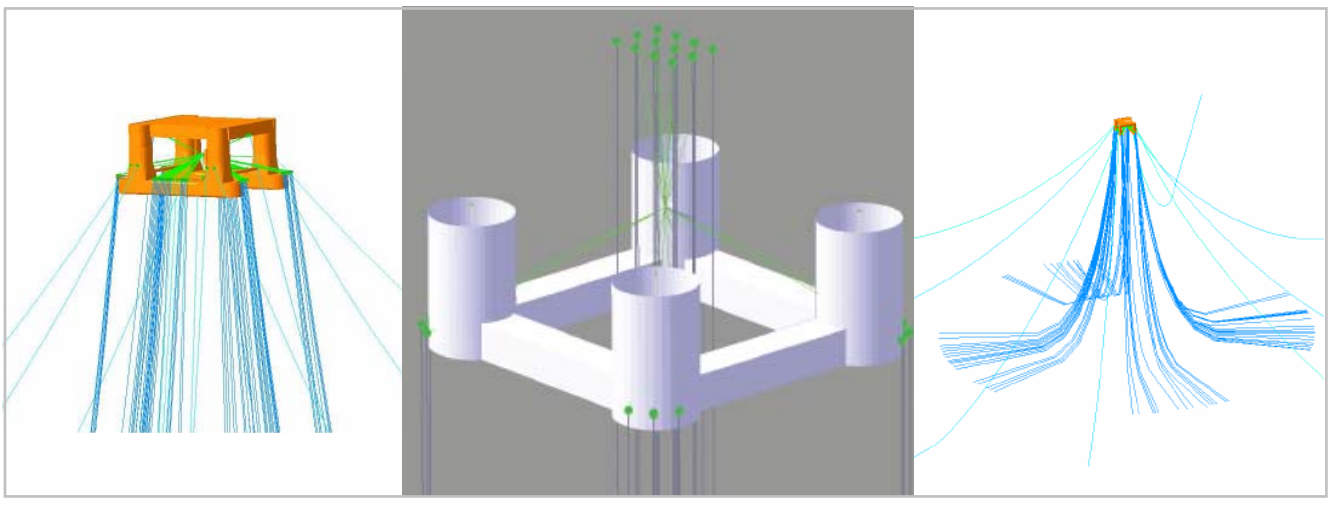
In a riser design, the assessment traditionally adopted by the industry for the attainment of platform motions applied to the top of the riser consists in the use of de-coupled methodologies.

Nowadays, due to shift of oil and gas exploitation to deeper waters, more accurate methodologies have been introduced, based on coupled analysis. The coupled analysis considers the interaction between

- the hydrodynamic behaviour of the hull,
- the structural behaviour of mooring lines.
- and risers submitted to environmental loads.

For deep waters the coupling effects of lines relative to platform motions, can be especially significant. It is expected a reduction of the amplification of platform motions compared to the platform motions obtained from de-coupled analysis.

For the deep and ultra-deep water scenarios, a steel catenary riser design adopting prescribed displacements from coupled analyses will provide more realistic and optimum results as compared to a more traditional de-coupled analysis.



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Based on de-coupled analysis

This methodology assumes that the representative offset (static and low frequency) and platform wave frequencies (wave frequency) are computed in separate programs (typically Mimosa and HydroD). These attainments are treated as input to the top risers in a de-coupled analysis.

The time domain solution is done by Riflex ensuring a robust and very fast execution time. For fatigue analyses, where multiple analysis runs are required, Riflex will prove it's efficiency as the markets fastest solver for riser analysis. The design of the steel catenary risers can now be done by investigating the shape, stresses, code checking results or fatigue life.

DeepC has a configuration for de-coupled analysis using Riflex as the computational tool simulating regular as well as irregular sea-states. All modelling of riser configuration, performing the Riflex analysis as well as relevant post-processing of results is done from the DeepC user interface.

The code checking can be done in accordance with the DNV-OS-F201 and ISO 13628-7 standards or as a standard VonMises Stress check.

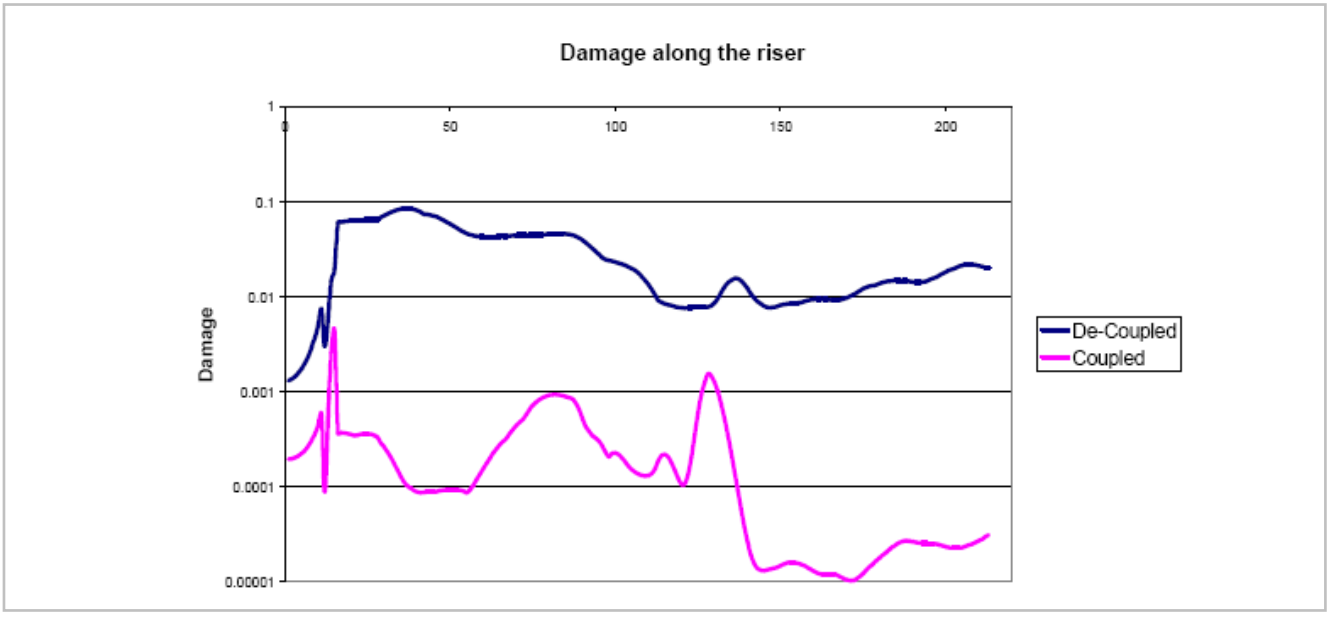
Based on coupled analysis

For deeper waters, the riser design should be performed using the coupled analysis approach. In this case the complete DeepC functionality is used to compute the displacements and stresses used in a code check or fatigue analysis of the risers.

Normally this is done in two steps; first the vessel motions are calculated in the coupled analysis with a coarse model of the risers. Then a new refined riser de-coupled analysis is performed, using the calculated vessel motions as input when running the same time series.

All relevant modelling of the risers, performing the analysis involving Riflex and Simo and post-processing of results is done from DeepC user interface. In addition to the capabilities as mentioned above, it is typical to perform statistical post-processing of time series results.

DeepC (including code checking and fatigue computations) is owned, developed and marketed by DNV Software.
Riflex and Simo are owned and maintained by MARINTEK and marketed by DNV Software.



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MANAGING RISK