

# Riflex

## Riser System Analysis Program

Tailor-made program system for static and dynamic analysis of slender marine structures

RIFLEX is a tailor-made and advanced tool for static and dynamic analysis of slender marine structures. It represents state-of-the-art technology for riser analysis suitable for flexible, metallic or steel catenary riser applications.

RIFLEX is an efficient program system for hydrodynamic and structural analysis of slender marine structures. It is also available as part of SESAM's DeepC package for coupled analysis of mooring and riser systems connected to floating production units in deep water.

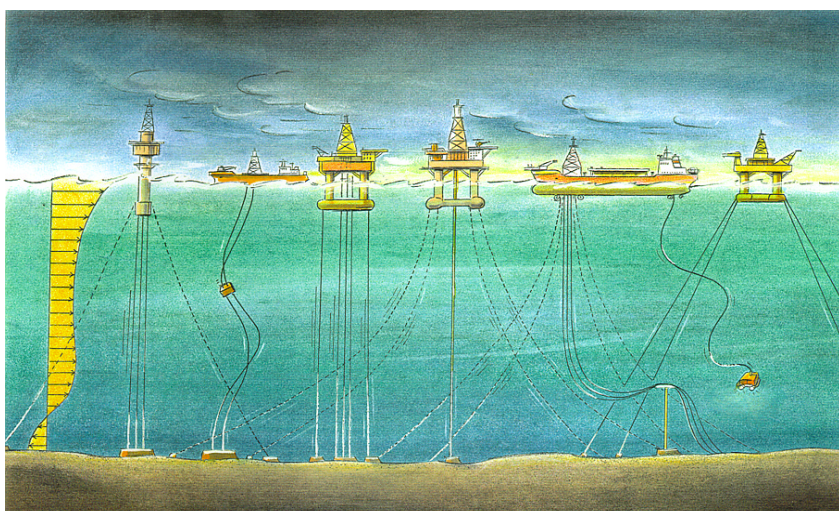
Riflex offers the following important advantages:

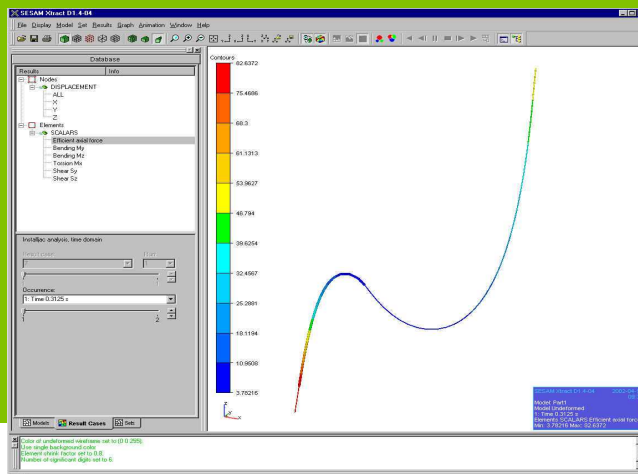
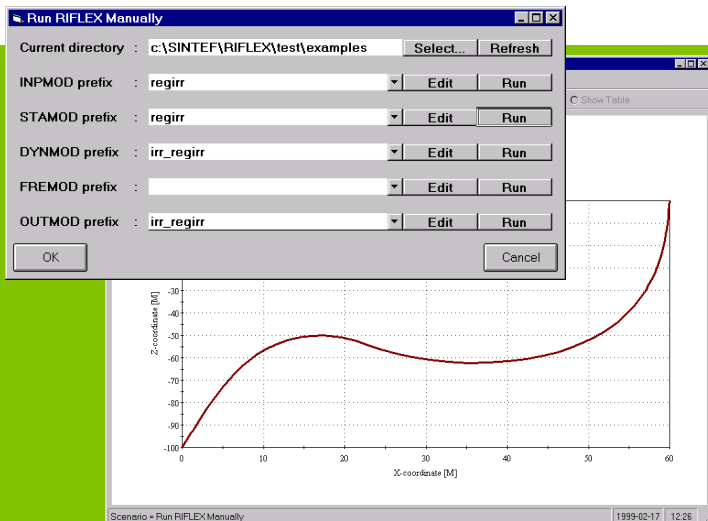
- Extremely efficient and robust non-linear time domain formulation applicable for irregular wave analysis
- High flexibility in modelling, enabling analysis for a wide range of structures
- Continuously verified against model tests and full-scale tests

### Applications:

Any simple or complex marine systems consisting of slender structural members:

- Flexible risers
- Top tensioned risers
- Metallic catenary risers
- Mooring lines
- TLP tendons
- Loading hoses
- Umbilicals
- Towing Lines
- Pipe laying
- Seismic cables
- Fish farming systems





## Main features:

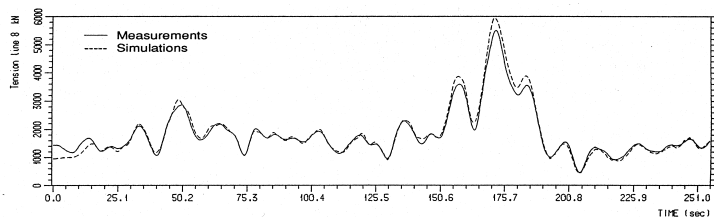
### Environment

- Waves: regular and irregular. Several model spectra or direct input of wave time series
- Arbitrary current profiles: Current speed and direction at a set of water levels. Constant or varying with time

### Load models

- External/internal hydrostatic pressure effects described by the effective tension concept
- Hydrodynamic loading described by the generalised Morison's equation
- System loading caused by motions from one or several support vessels. Vessel motions based on motion transfer functions and/or direct input of time series

### Mooring Line Tension - Validation Against Model Test



- Seafloor contact including 1) Coulomb non-isotropic friction. Horizontal or full 3D seafloor description. 2) CARISIMA seafloor contact description; An advanced model for riser / seafloor interaction incl. trench and suction effects. (To be released spring 2003)
- Linked to the computer program VIVANA which performs frequency domain VIV-analysis also on complex structures
- Loading due to internal slug flow
- Tensioner and roller contact formulations
- Special load model for partly submerged structural members (floating hoses)
- User defined loads, constant or time varying

### Modelling

- Flexible modelling of simple as well as complex systems including branched systems
- Simplified modelling of standard riser configurations e.g. Free Hanging, Steep Wave, Lazy Wave, Steep S and Lazy S
- Beam and bar elements
- Connector elements (ball joints, hinges, swivels)
- Finite element formulation allowing for unlimited displacements and rotations in 3-D space
- Non-linear material properties including hysteretic material description

### Numerical procedures

- Highly robust and flexible loading procedure for non-linear static analysis
- Extremely efficient and robust non-linear dynamic time stepping procedure
- Linearized dynamic analysis
- Eigenvalue analysis

### Input / Output

- Utility program for running RIFLEX modules and viewing key results available for Windows
- Standard post processing and export of time series
- Animation export to DNV SESAM Xtract

RIFLEX is developed and maintained by MARINTEK



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