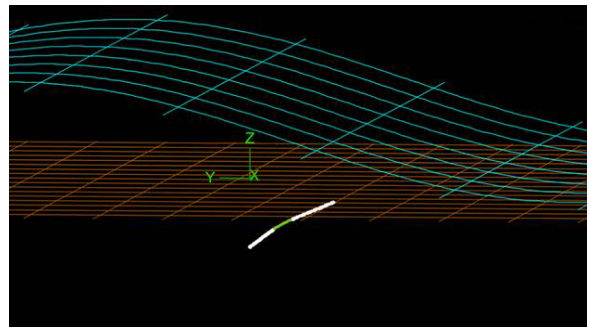
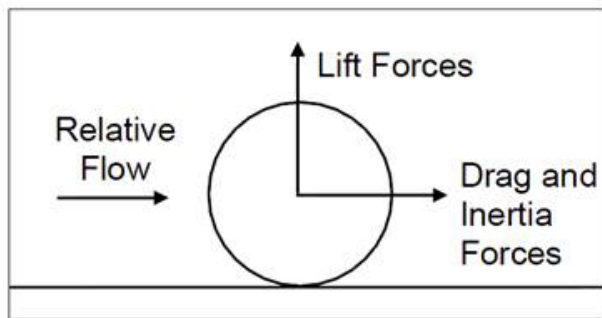




Improving of the cable stability via rock bags

The simulation of seabed stability will be performed by using the Orcaflex v9.8e software.

The simulations will include soil resistance by the Coloumb friction sea bottom model, hydrodynamic forces, boundary conditions and dynamic response. Sensitivity simulations will be performed for some parameters. The figures below illustrate the hydrodynamic forces and dynamic for a cable on a seabed.



Typical input for a cable stability assessment consists of:

- Cable cross-section
 - Mechanical properties
 - Mechanical capacities
- System configuration/lay route
- Environmental conditions
 - Current
 - Waves
 - Soil data

Perform seabed stability analysis for the cable/umbilical as installed at different water depth, according to the outlined methodology below:

- Start first simulation with a given distance between seabed fixation points (rock bags)
 - If movement, axial tension and bending radius are not acceptable, re-run to decrease the distance between fixation points.
 - If movement, axial tension and bending radius are acceptable, evaluate the need to re-run with increased distance between fixation points.



The simulation results will be presented in a Cable Stability Assessment Report including relevant results:

- Cable and tension curvature plots
- Lateral displacement
- Maximal reaction force at fixation points

The figures below shows tension/curvature plot and lateral displacement due to waves and current.

