



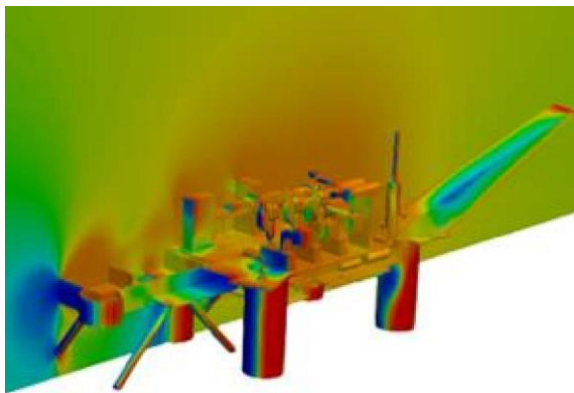
Offshore
aerodynamics

Aerodynamic analysis of an offshore oil platform

Objective

Offshore oil platforms are sometimes subject to extreme climatic conditions. Numerous accidents involving bridge components such as the crane or derrick are regularly reported. Digital simulation of the flows around these installations provides detailed data essential for the designing of a safe structure.

For this project, Zelin evaluated the impact of wind on the structure by analyzing the forces exerted on it. Different configurations (wind direction, speed) are tested in order to identify worst-case scenarios and to optimize the platform design.



Implementation

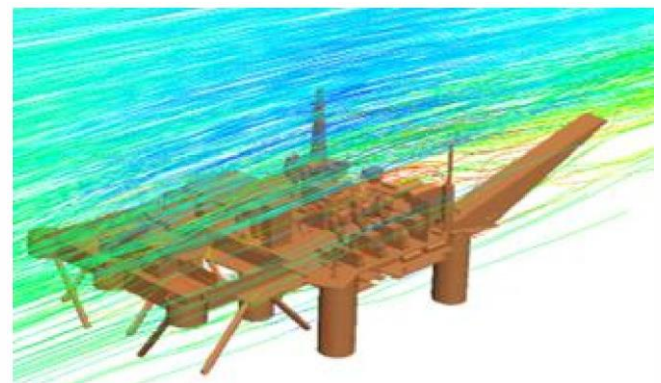
Zelin has set up a calculation process that's dedicated to model this type of flow:

- 3D model of the platform
- Material resources : HPC cluster (200 cores) & Siemens STARCCM+ software
- Some analytic examples :
 - o Detailed flow analysis by advanced post-processing: pressure coefficient, analysis of the atmospheric boundary layer, study on sensitivity to climatic conditions.
 - o Prediction of the forces exerted by the wind on the structure.
 - o Analysis of Fluid-Structure Interaction (FSI)

Result

These virtual tests made it possible to detailly analyze the flow topology around the platform and to evaluate the load on the structure under different climatic conditions.

In addition, the assessment of the structural response to the flow under worst-case scenarios enabled us to identify the most critical areas and thus to propose optimization solutions for the most constrained components.



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