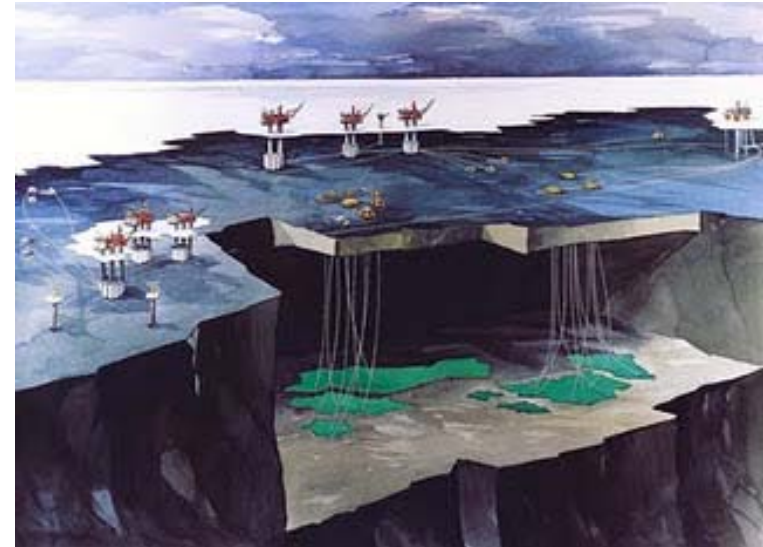


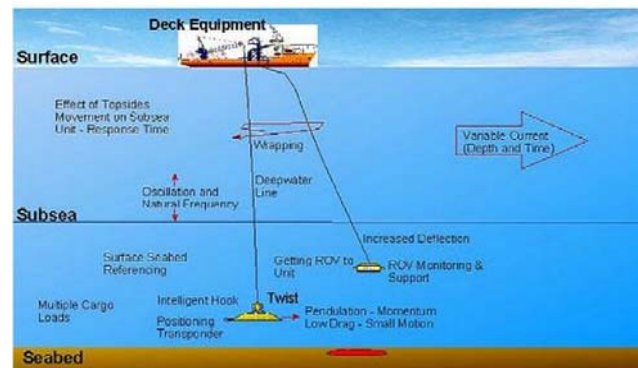
Interaction between soil and structure

- ❖ Settlement of structure, both static and during earthquake loading
- ❖ In-place bearing capacity
- ❖ Robustness during seismic loading
- ❖ Robustness wrt seabed soil scour
- ❖ Landing evaluations; landing velocities and sizing of venting areas/ hatch design
- ❖ Installation calculations, desire to have high probability for self-penetrated structures
- ❖ Desire to use standardized solutions for several structures, regarding the structural solutions to foundation frame and connections to suction cans.



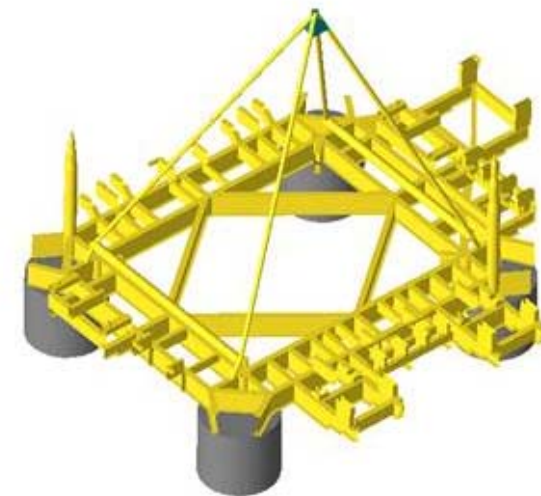
P1.

Assessment of the interaction between structure with sagging deformation and soil in landing phase



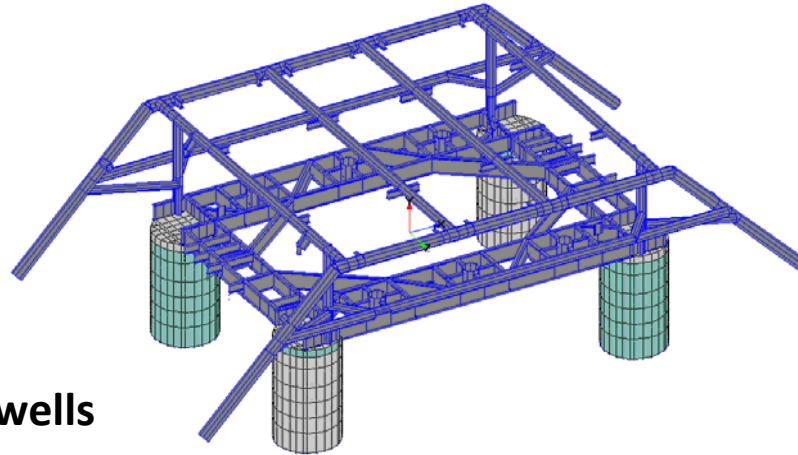
- Determine the deformation of the structure during the landing
- Calculate the force and interaction between soil and structure
- Investigate the responses of the structure for new loads distribution
- Calculate the penetration of the structure into the soil, seabed
- Calculate the position of the structure

Case Study: GMT Manifold



P2.

Assessments of the global structural integrity of a subsea structure subjected to both global twist moments and thermal force



Structure twist

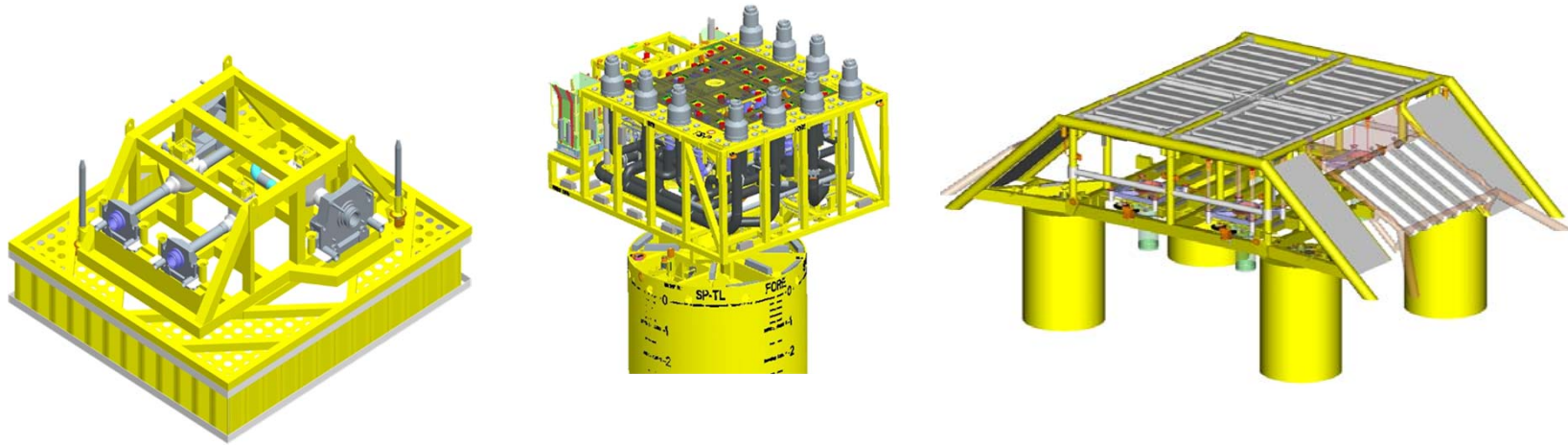
Temperature expansion of wells

- Establish design soil strength profiles for the various types of analyses
- Propose different models for installation profile and non-uniform heat distribution
- Describe of the model, analysis setup, assumptions, analysis philosophy and methodology
- Determine uneven loading and torsion moment due to out of plane installation and calculate the torsion capacity of the foundation
- Determine the thermal loading on the structure and calculate the buckling of the structure due to thermal loading
- Study the combination of the torsion moment and thermal loading
- Improve the design by considering weight reduction and recommendation

Case Study: Template of Skarv or Snøhvit

P3.

The optimal design of foundations for two different manifolds with considering weight, installation and soil properties

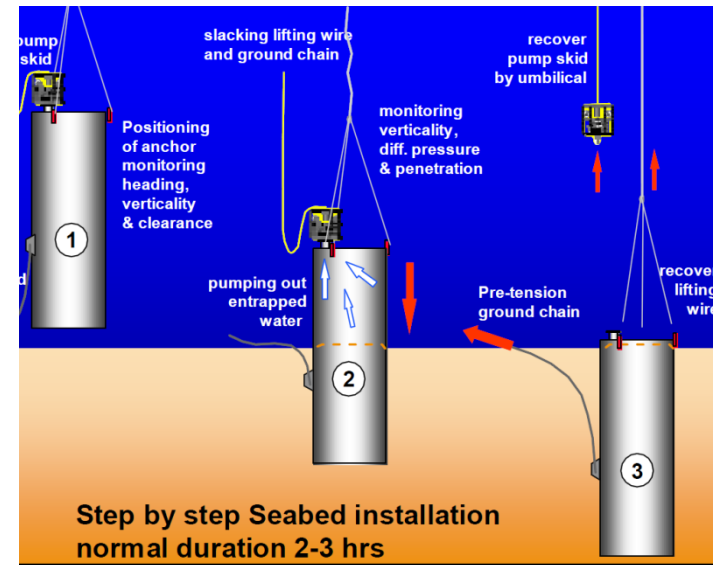
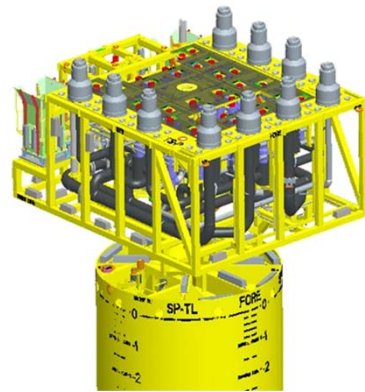


- Collect all of the possible foundation solutions
- Compare them generally and
- Determine the advantages and disadvantages of each foundation with respect to the weight, installation of the Foundation and interaction with the seabed.
- Suggest foundations system for GMT and JMT structures

Case Study: JMT and GMT

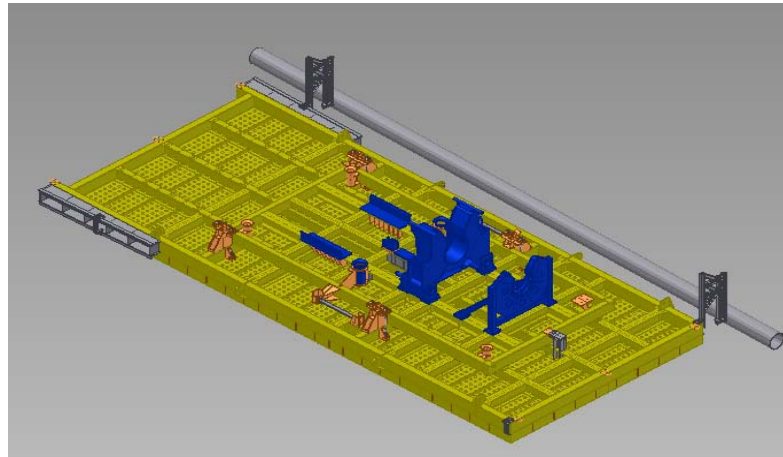
P4.

Buckling behavior of stand alone suction pile



- Check the existing procedure to calculate the buckling behavior of the suction piles
- Finite element analysis to determine the elastic and plastic buckling and post buckling behavior of suction pile in the embedment phase.
- Determine the interaction between soil and structure on the buckling strength of the pile
- Study the combination of axial compression, hydrostatic pressure and bending to study the local buckling during the embedment process.
- Sensitivity study to check the effect of the important items for buckling strength
- Compare the results with the recommendation by codes and rules and suggested a brief design basis for new projects

P5. Dynamic Analysis of PLET Structure Due to wave loads in Installation Phase



investigate the motion of the PLET:

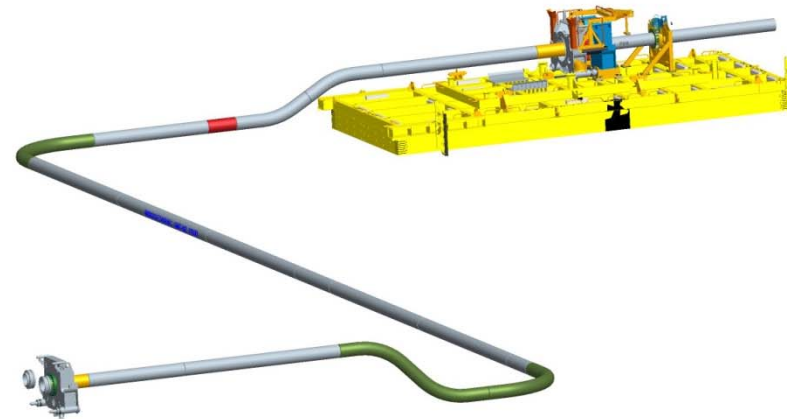
- Motions of the crane vessel.
- Hydrodynamic loads on the crane vessel.
- Motions of the load.
- Hydrodynamic loads on the PLET structure.
- PLET motions due to wave loads

Case Study: PLET

P6.

Numerical Analysis of Pipeline Tie-in Spools

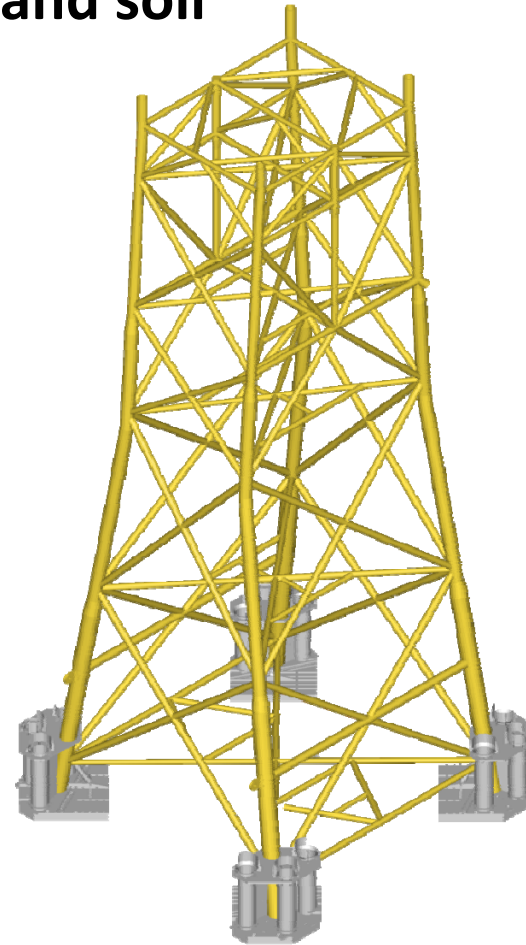
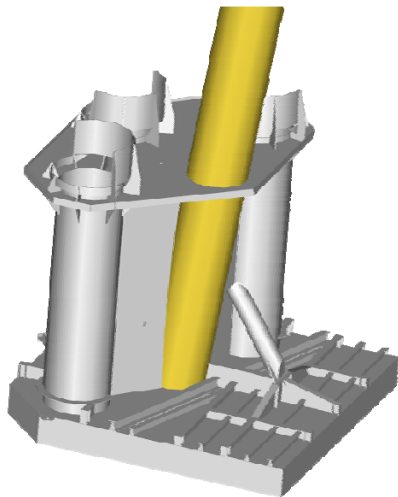
- The objective is analysis pipeline expansion spools, pipelines and subsea structures with Finite Elements modeling



Simp Rep: SPOOL_CONNECT

- 3D FE Ansys models of spool, pipe and PLET.
- Detailed results in Excel spread sheets generated by python xlwt module
- 3D contour plots of stresses and strains
- Code checking will be done according to DNV-OS-F101
- Model and results verification:
- Results verification shall be done using hand calculation and spread sheets available from DNV

- P7.
- Interaction between mudmat, piles and soil



- P8.
- Buckets as mooring supports

