Bolt & Beautiful

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What is the problem?

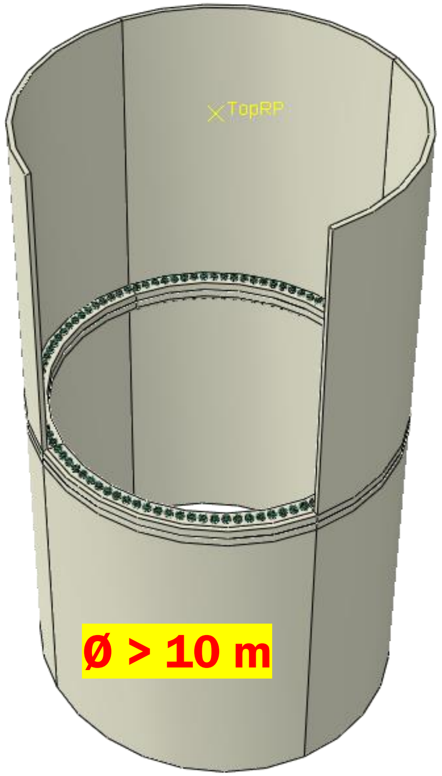
- ❖ Failure of bolts in ring flange connections that endure fluctuating loadings
- ❖ Problems with: loosening of bolts, progressive reduction of preload, fatigue failure and severe corrosion.
- ❖ For efficient installation of offshore wind turbine foundations we are facing practical limits of bolt size (M72).
- ❖ Farther and deeper offshore wind turbine foundations lead to increase in diameter of monopiles → larger ring flanges and increased nr. of bolts.

How to approach?

Optimization required for design and maintenance of joints towards enabling >12 MW turbines

Reduce uncertainties in stress flow and fatigue strength

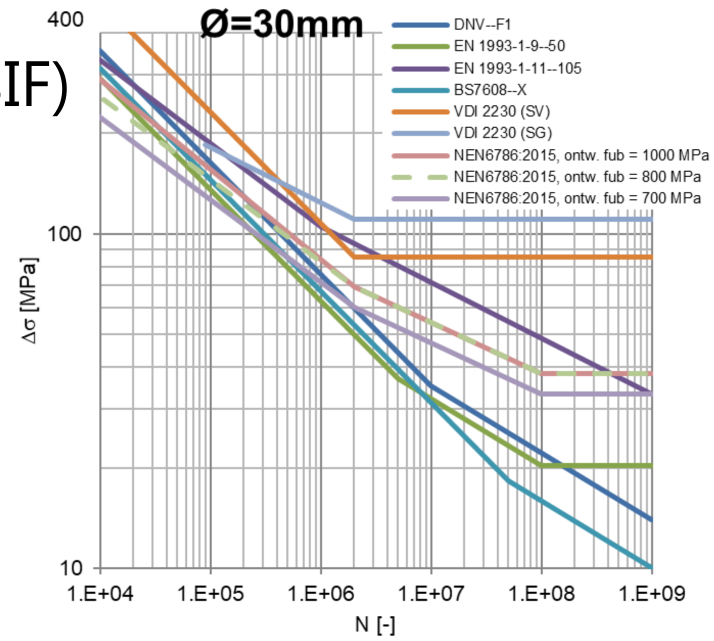
Actions: Model – Calibrate (lab) – Validate (field)



Improved assessment of ring flange connections

Research objectives

- ❖ Improved (pre)stress measurements through ultrasound
- ❖ Include real stress in modelling ring flange
- ❖ Improved fatigue life assessment (size, tolerances, SCF, SIF)
- ❖ Improved mitigation of corrosion



Improved assessment of ring flange connections

Deliverables

- Improved fatigue strength models for new and existing ring flanges
- Improved bolt stress measurement concepts
- Improved ring flange solutions and mitigation methods for dealing with tolerances and environmental conditions

Preliminary setup

- ❖ 1 large JIP or multiple smaller JIP projects covering the research scope
- ❖ Participation fee ~50 kEuro

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