Date selected: 15/09
Location: Zwijnaarde, MRC Building, Technologiepark 48

Abstract:
In this joint event of the FIRMEST and PIT project, advances in fatigue life assessment using structure specific data will be presented. By feeding fatigue life models with data about your specific assets, obtained in as-build state and during the structure's lifetime, the expected lifetime of individual structures can be updated considering their specific condition.

The FIRMEST project focuses on characterizing the influence of the as-built condition on fatigue resistance. This includes the actual weld geometry and the integration of global and local geometrical imperfections, such as misalignments and ovality, which are neglected in idealized design models. In-house algorithms (semi-)automatically convert 3D laser scanning data into high-fidelity finite element models to accurately quantify local stresses in joints with irregular weld profiles. The project also implements a single-sensor virtual sensing strategy to reconstruct accurate strain histories at fatigue-critical details and utilizes a dedicated data architecture to maintain a fatigue digital twin for every turbine in a farm. Advanced characterization of long-term monitoring data is utilized to more accurately account for real-world load interaction effects, along with the integration of a non-linear fatigue damage accumulation algorithm.

The PIT project focusses on the development of methods to characterise the risk and extent of pitting corrosion on offshore structures. From 3D scans of corrosion coupons exposed in or at the structure under consideration the amount and geometry of corrosion pits can be quantified as input for corrosion fatigue models. Techniques for continuous monitoring of pitting corrosion based on electrochemical measurement principles are being developed to complement the periodic coupon inspection.

The event will present the main outcomes of both projects. The aim is to outline how the results can be implemented in an industrial context and to obtain feedback on the routes and roadblocks to adoption of the developed tools.