



SIKA AT WORK

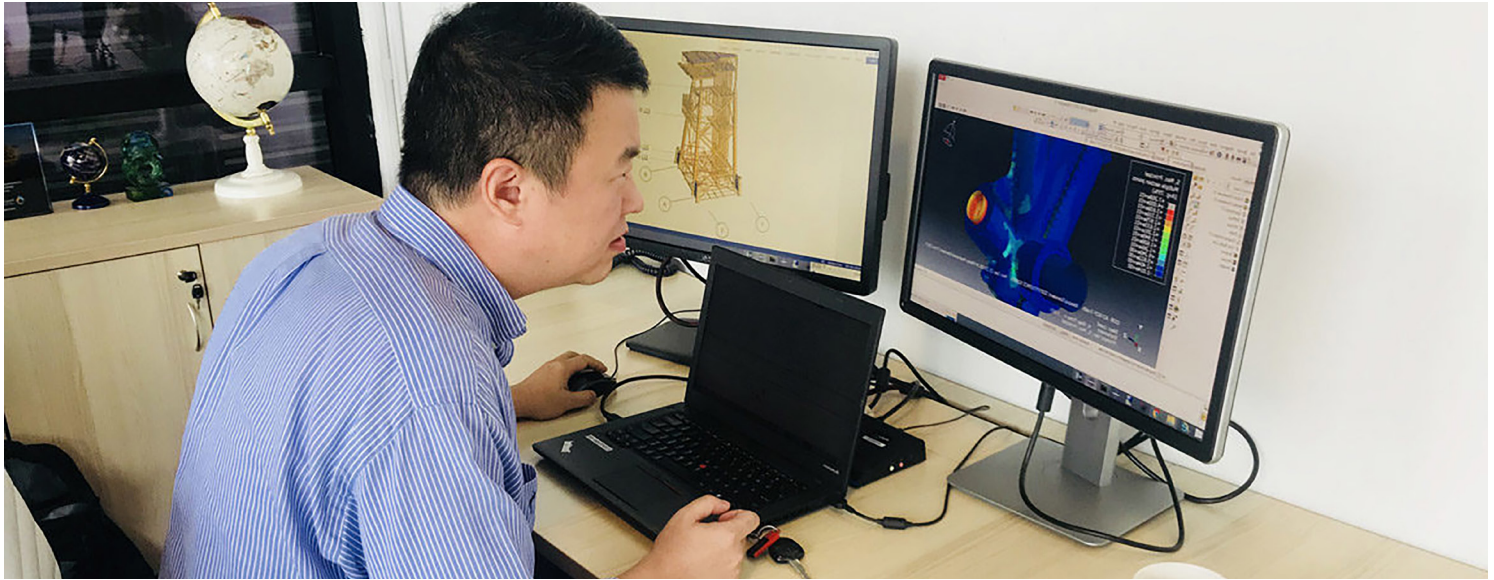
STRUCTURAL STRENGTHENING OF WHPC PLATFORM – DESIGN BASIS

OFFSHORE & MARINE CONSTRUCTION
CONVENTIONAL ENERGY

BUILDING TRUST



STRUCTURAL STRENGTHENING OF WHPC PLATFORM – DESIGN BASIS



PROJECT DESCRIPTION

Wellhead Platform C (WHP-C) in the PL19-3 oilfield is a critical asset designed to accommodate 40 conductors, risers, and associated wellhead infrastructure. Structurally, it is supported by eight main piles and features a four-level topside including living quarters, a helideck, and two cranes. The jacket is installed in 27.6 meters of water and is battered on all four sides.

Project name: Structural Strengthening of WHPC Platform – Design Basis
Location: China
Year: 2019
Application: Repair and maintenance
Product: Engineering Services (Design and Feasibility)

PROJECT REQUIREMENTS

Following an underwater inspection, nine structural cracks were identified, with two major cracks observed at nodes N220 and N214. The connecting member between these nodes was also found to be flooded. The severity of the damage necessitated a structural repair and strengthening solution to ensure long-term platform integrity and safety.

PROJECT PARTICIPANTS

Customer: Geotech, Welltech-China Oilfield Services Limited
End client: ConocoPhillips China, Inc.

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SIKA SOLUTIONS

Sika delivered a full suite of engineering services to support the structural strengthening solution using unstressed grouted clamps. The work began with the development of a comprehensive design basis to define performance expectations and boundary conditions for the clamps. A detailed feasibility evaluation was carried out to determine the most appropriate structural clamp type for the application, taking into account operational constraints and long-term durability. This was supported by in-place static and push-over analyses to confirm structural adequacy under design loads.

To assess the platform's resilience under cyclic loading, a fatigue performance assessment was conducted. The proposed clamp geometry and configuration were then validated through finite element analysis (FEA), allowing the team to identify and mitigate stress concentrations and verify the system's structural behavior. Bolt strength and tension capacity were carefully calculated to ensure mechanical integrity throughout the clamp's service life. Sika also produced a full set of engineering drawings to guide fabrication and installation.

To confirm constructability offshore, an installation feasibility study was undertaken. In parallel, a model test outline was prepared to evaluate performance under simulated field conditions. The solution was further visualized through a detailed 3D model and animated sequence, enabling clear communication of the design and installation process to stakeholders.

CUSTOMER BENEFITS

The grouted clamp solution provided a reliable method for restoring the structural integrity of WHP-C without requiring complete member replacement or hot work. The use of simulation-driven design ensured safety and performance under fatigue and operational loading, while the feasibility studies streamlined future installation planning. The modular design approach also minimized disruption to existing platform operations.

The grouted chords now provide enhanced structural continuity and resilience, extending the service life of the bridge and supporting ongoing operations safely.

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