



PREDICTO – PREDICTING CORROSION EVOLUTION IN OFFSHORE UNITS

Bureau Veritas aims to enhance preventive and planned maintenance strategies for offshore units through its joint industry project (JIP) PREDICTO. This project seeks to combine corrosion kinetics models and structural criticality assessment to **forecast the evolution of corrosion in FPSO ballast tanks and highlight the most sensitive structural zones.**

Supporting the integrity of FPSO ballast tanks is key to the class compliance and long-term structural safety of offshore units. The most common integrity concern that arises during ballast tank inspections is corrosion, whose evolution is challenging to monitor due to a lack of high-quality data points. However, some governing parameters, such as immersion zones, water properties and aeration can easily be identified. Modelling those parameters will give a first indication of how the corrosion in ballast tanks is likely to evolve. PREDICTO will build on this understanding to develop a tool to support engineering-based integrity management and decision-making on repairs. The tool will be an add-on to AGS3D.



[Learn more about AGS3D](#)

OBJECTIVES

PREDICTO aims to:

- **Forecast the evolution of corrosion** in FPSO ballast tanks between inspections.
- **Develop a criticality matrix linking localized corrosion severity to structural criticality** (plasticity, fatigue and buckling) to identify and select the zones that require detailed structural calculations.
- **Implement corrosion criticality and alert thresholds in AGS3D** to support engineering-based integrity management.

SCOPE OF WORK

The proposed scope of work will be structured into five work packages (WPs).

WP I

AGS3D INSPECTION

Two AGS3D inspection campaigns will be performed to collect high-resolution geometry, coating condition and thickness data to ensure data availability and validate the enhanced corrosion and criticality features integrated into the tool. The first campaign will provide the baseline data needed to define corrosion patches and calibrate corrosion evolution models, while the second will demonstrate and validate the updated AGS3D capabilities.

WP II

STATE OF THE ART

This work package will summarize existing corrosion laws that could be applicable to ballast tanks. These laws will be confronted with FPSO ballast tank operating conditions, internal exposure environments and internal atmospheric conditions. The French Corrosion Institute will review the results to support subsequent corrosion propagation modelling and assessment activities.

WP III

CORROSION SCENARIOS, TESTING AND KINETICS MODELLING

The French Corrosion Institute will next define representative corrosion scenarios and a structured test matrix covering the main exposure conditions encountered in FPSO ballast tanks. Corrosion testing will be performed using adapted corrosion sensors and coupons implemented in the ballast tank model to simulate real environments. The observed corrosion rates and coating delamination rates will be analyzed through parametric studies to derive representative corrosion rates and corrosion propagation models for the corrosion patches of the studied ballast tanks.

WP IV

STRUCTURAL CRITICALITY ASSESSMENT AND ACCEPTANCE CRITERIA

WP IV will assess the structural criticality of corroded areas in FPSO ballast tanks. An extended hotspot map will be generated for each unit to help identify which structural aspects require further evaluation by correlating the available corrosion data (WP I) and corrosion propagation predictions (WP II & WP III) with the structural data. To efficiently manage the resulting large dataset, simplified models will be developed to rapidly update strength and fatigue utilization based on local thickness loss, enabling a quick criticality ranking of all corrosion findings/predictions. Finally, a criticality map will be created combining the corrosion extent, hotspot map results, unity check updates and scenario evolution. It will also reflect confidence levels associated with data quality and modeling assumptions.

WP V

DIGITAL IMPLEMENTATION

WP V will integrate the corrosion evolution models and structural criticality assessment into AGS3D. Implementing the corrosion kinetics, utilization scaling factors and criticality ranking from the previous WPs will allow users to anticipate maintenance actions, optimize repair planning and support decisions in agreement with classification rules.

DELIVERABLES

We will deliver reports at the end of the project covering:

- A state-of-the-art review of the corrosion kinetics models in FPSO ballast tanks
- Testing protocols and the resulting proposed kinetic modelling
- An extended hotspot mapping methodology
- A simplified structural assessment methodology for paint degradation and associated corrosion propagation
- Criticality results for each FPSO assessed
- A corrosion criticality framework aligned with the principles of classification

SCHEDULE AND BUDGET

The estimated duration of the project is approximately **three years**. The estimated JIP entry fees are **EUR 55,000** (excluding taxes) per year per participant.

CONTACT

Delphine Rigaud

Mobile: +33 7 88 24 70 73

E-mail: delphine.rigaud@bureauveritas.com

Bureau Veritas
4 rue Duguay Trouin
Bâtiment Oxane
44800 Saint Herblain
France



BUREAU
VERITAS

