

Integrity Assessment and Mitigation for Existing Offshore Platforms

Client – Confidential

Client operates a group of Flow Station Platforms, installed circa 1961 and Client wishes to extend the platform service life for another 20 years and to gain new certification status. ABS Consulting was requested to conduct integrity assessment and make appropriate recommendation for mitigation measures.

These platforms of 30+ years of service history were designed to API RP-2A of earlier editions, based on insufficient knowledge of tubular joints. Recent inspections found local damage in the platforms. In addition, new environmental data indicated under-designed deck inundation event under extreme wave conditions.

ABS Consulting conducted the integrity analysis following the procedure recommended in section 17 in the API RP2A 21st edition for existing platforms. Initial code checking from linear analysis for the existing structure under extreme condition found large number of joint failures in the platforms. To avoid costly mitigation, ABSC has focused on 1) using pushover analysis to utilize the reserve ultimate strength capacity of the platform, deriving from non-linear material property and load redistribution within the redundant structural system after local failure, 2) utilizing latest research results in ultimate joint capacity with or without grouting.

A number of mitigation options have been investigated by considering their engineering practicality and overall cost/benefit. It was concluded that the most appropriate mitigation solution for maintaining platform integrity for the next 20 years was to grout the annulus of the pile and the jacket leg for all four platforms legs.

Pushover analysis for Y-3 platform

