TLP Drilling and Production Riser Interference Analysis - A Case Study

Tong Gang*, Xie Renju, Wu Yi, Li Chaowei
Drilling & Production Research Institute, CNOOC Research Institute Ltd.
Beijing, China

Yang Jin, Yin Qishuai, Song Yu
China University of Petroleum, Beijing
Beijing, China

ABSTRACT

An oil field X in South China Sea was considering using TLP, which was the first time in China. The interference of TLP drilling and production risers may result in fatigue damage and even diffusion. Based on local conditions, an optimized finite element method was used to analyse the riser minimum clearances. The sensitivity analysis were further conducted, parameters including water depth, top tension and platform offset. The results showed that the most dangerous condition is the combination that the upstream is production riser and the downstream is drilling riser. The sensitivity analysis revealed that water depth has little effect on interference, and the minimum clearance is more sensitive to top tension and platform offset. Larger top tension tends to reduce the vibration amplitude and plays a positive role in avoiding the interference.

KEY WORDS: TLP; riser; interference analysis; optimization design; case study.

INTRODUCTION

X oilfield in the South China Sea plans to use TLP (Tension Leg Platform) for the first time. TLP is an important platform for deep-water oil and gas development. The advantages of TLP include good athletic performance, strong resistance to adverse environment and good economic performance. Drilling riser and production riser are important auxiliary equipment of TLP. When waves and currents flow through drilling risers or production risers, different degrees of fluid-induced vibration will occur in the pipe body due to the periodically changing fluid force.