RESPONSE OF TRIANGULAR TENSION LEG PLATFORMS TO HYDRODYNAMIC FORCES

A. M. ABOU-RAYAN & AMR R. EL-GAMAL

Department of Civil Engineering Technology, Benha University, Al Qalyubiyah, Egypt

ABSTRACT

Tension leg platforms (TLP's) are highly nonlinear due to large structural displacements and fluid motion-structure interaction. Therefore, the nonlinear dynamic response of TLP's under hydrodynamic wave loading is necessary to determine their deformations and dynamic characteristics. In this paper, a numerical study using modified Morison Equation was carried out in the time domain to investigate the influence of nonlinearities due to hydrodynamic forces and the coupling effect between all degrees of freedom on the dynamic behavior of a TLP. The stiffness of the TLP was derived from a combination of hydrostatic restoring forces and restoring forces due to cables and the nonlinear equations of motion were solved utilizing Newmark's beta integration scheme. The effect of wave characteristics was considered.

KEYWORDS: Response, Influence, Hydrodynamic Forces, Parametric, Study of TLP