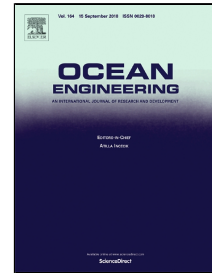


Accepted Manuscript

Dynamic Response of Platform-Riser Coupling System with Hydro-pneumatic Tensioner

Teng Wang, Yujie Liu



PII: S0029-8018(18)30712-1
DOI: 10.1016/j.oceaneng.2018.08.004
Reference: OE 5409
To appear in: *Ocean Engineering*
Received Date: 04 May 2018
Accepted Date: 06 August 2018

Please cite this article as: Teng Wang, Yujie Liu, Dynamic Response of Platform-Riser Coupling System with Hydro-pneumatic Tensioner, *Ocean Engineering* (2018), doi: 10.1016/j.oceaneng.2018.08.004

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Dynamic Response of Platform-Riser Coupling System with Hydro-pneumatic Tensioner

Teng Wang, Yujie Liu

School of petroleum Engineering, China University of Petroleum (East China),

Qingdao 266580, P.R. China

ABSTRACT

A mathematical model of direct-acting tensioner system was developed to analyze the effect of internal friction of tensioner cylinder on the tensioner performance. The platform-tensioner-riser coupling system was established by implementing the tensioner model into ANSYS-AQWA through user subroutines written in PYTHON scripts. The overall coupling dynamic response under different wave conditions was investigated. The results from current analyses considering the effect of internal friction of hydraulic cylinder show that the relationship between tension and piston stroke of tensioner under the cyclic displacement is not simple nonlinear relationship but hysteretic loop relationship. Based on the results of the dynamic response under same wave conditions, it found that the variation of vertical relative displacement between platform and riser obtained with the hysteretic tensioner model is similar to that with the nonlinear tensioner model. Whereas the tension obtained with the hysteretic tensioner model has greater scope when compared to that with the nonlinear tensioner model. Moreover, the tension from the hysteretic tensioner model would change suddenly several times in relatively short period under irregular waves, due to the existence of high-frequency component, which resultantly exerts great impact on the fatigue life of the riser and tensioner.

Keywords: tensioner system, riser, hysteretic tensioner model, tension variations, complete coupled analysis

0 INTRODUCTION

As the exploration of oil and gas in the ocean moves towards deep waters, the riser string which connected the drilling unit and the wellhead, becomes longer and heavier. To prevent buckling of the riser string due to its own weight and external environment load, the top-tensioned risers(TTRs) is usually applied to deep-water operations. As TTRs is equipped with the riser tensioners to maintain a nearly constant tension at the top of the riser, and to compensate for the relative movements between the Semi-submersible platform and riser [1][2].

Download English Version:

<https://daneshyari.com/en/article/8061726>

Download Persian Version:

<https://daneshyari.com/article/8061726>

[Daneshyari.com](https://daneshyari.com)