

# Dynamic analysis of Jack-up platform structure in environment loads

Hung Chien Do<sup>#1</sup>, Jianh-Horng Chen<sup>\*2</sup>, Phan Van Quan<sup>#3</sup>

<sup>#</sup>Faculty of Naval Architecture, Ho Chi Minh city University of Transport, 2D3, ward 25, Binh Thanh district, Ho Chi Minh city 700000, Vietnam

<sup>1</sup>chien\_kttt@hcmutrans.edu.vn

<sup>3</sup>quan\_mt@hcmutrans.edu.vn

<sup>\*</sup> Systems Engineering and Naval Architecture, National Taiwan Ocean University, 2 Pei-Ning Road, Keelung 202, Taiwan

<sup>2</sup>b0105@mail.ntou.edu.tw

## I. KEYWORDS

Jack-up, response, dynamic analysis, wave load, structural capacity.

## II. ABSTRACT

A jack-up platform is subjected to complicated loads such as wave, wind and currents. The aim of present paper is to study the effect of environment conditions on jack-up platform structures. A simple finite element model under both regular and irregular wave loads is analysed. The obtained results describe dynamic response of structures and structural capacity when operating at different depths.

## REFERENCES

- [1] W. H. Kang, C. Zhang, and J. X. Yu, "Stochastic extreme motion analysis of jack-up responses during wet towing," *Ocean Eng.*, vol. 111, pp. 56–66, 2016..
- [2] Z. Wang, K. Liu, C. Ji, D. Chen, G. Wang, and C. G. Soares, "Experimental and numerical investigations on the T joint of jack-up platform laterally punched by a knife edge indenter," *Ocean Eng.*, vol. 127, no. October, pp. 212–225, 2016..
- [3] S. T. Quek, X. M. Li, and C. G. Koh, "Stochastic response of jack-up platform by the method of statistical quadratization," *Appl. Ocean Res.*, vol. 16, no. 2, pp. 113–122, 1994..
- [4] C. P. Ellinas, "Mechanics of ship/jack-up collisions," *J. Constr. Steel Res.*, vol. 33, no. 3, pp. 283–305, Jan. 1995.
- [5] J. Jia, "The effect of gravity on the dynamic characteristics and fatigue life assessment of offshore structures," *J. Constr. Steel Res.*, vol. 118, pp. 1–21, 2016.
- [6] W. Maktouf, K. Ammar, I. Ben Naceur, and K. Sai, "Multiaxial high-cycle fatigue criteria and life prediction: Application to gas turbine blade," *Int. J. Fatigue*, vol. 92, pp. 25–35, 2016. /
- [7] T. Li, S. T. Lie, and Y. B. Shao, "Fatigue and fracture strength of a multi-planar circular hollow section TT-joint," *J. Constr. Steel Res.*, vol. 129, pp. 101–110, 2017.
- [8] S. Kainuma, M. Yang, Y. S. Jeong, S. Inokuchi, A. Kawabata, and D. Uchida, "Experiment on fatigue behavior of rib-to-deck weld root in orthotropic steel decks," *J. Constr. Steel Res.*, vol. 119, pp. 113–122, 2016.
- [9] N. Shabakhty, "System failure probability of offshore jack-up platforms in the combination of fatigue and fracture," *Eng. Fail. Anal.*, vol. 18, no. 1, pp. 223–243, 2011.
- [10] C. Erny, D. Thevenet, J.-Y. Cognard, and M. Körner, "Fatigue life prediction of welded ship details," *Mar. Struct.*, vol. 25, no. 1, pp. 13–32, Jan. 2012.
- [11] N. Osawa, K. Hashimoto, J. Sawamura, T. Nakai, and S. Suzuki, "Study on shell-solid coupling FE analysis for fatigue assessment of ship structure," *Mar. Struct.*, vol. 20, no. 3, pp. 143–163, 2007.