Faculty of Engineering

Structural Engineering Department

PERFORMANCE OF OFFSHORE PLATFORMS IN HURRICANES

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A Thesis

Submitted in Partial Fulfillment for the Requirements of the Degree of

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Structural Engineering.

The work included in this thesis has been carried out by the author in the Department of Structural Engineering, Ain Shams University, from December 2005 to September 2011.

No part in this thesis has been submitted for a degree or a qualification at any other University or Institution.

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ABSTRACT

Fixed offshore platforms are widely used structures in the field of oil and gas production. The high costs of fabricating, constructing , installing and maintaining of these structures and the high environmental and economic costs due to damage of these structures under extreme environmental conditions obligates us to enhance their performance under these conditions.

The main aim of this research is to study the performance of offshore platforms under hurricanes simulated in extreme wind and wave forces, trying to enhance their performance under these conditions by modifying the structural system of the platform and also providing a means or retrofitting existing structures to improve their response to hurricane induced loading.

For this purpose, the finite element computer package (SAP2000 V 14.1.0) is used to model the fixed offshore platform. A finite element model is presented and evaluated under the hurricane induced loads prior to modification. Other finite element models are proposed including different cable arrangements added to the datum structure. The results of these models have been compared with the results of the datum model to check the alteration in structural capacity over a wide parametric study.

Key words: Fixed Offshore Platforms, Hurricanes, Wind Load, Wave Load.

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