Effects of mooring configuration on the dynamic behavior of a TLP with tendon failure

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A B S T R A C T

In this paper, the dynamic behavior of a tension leg platform (TLP) in different mooring configurations with tendon failure was studied. After four different mooring configurations were determined, a fully coupled dynamic analysis program ANSYS/AQWA was used to develop a nonlinear hull-tendon numerical model. An effective method to simulate tendon failure was proposed, and six different failure conditions were identified. Under the regular wave, the influence of mooring configuration on the dynamic response and motion response spectrum of the platform under damaged mooring condition was investigated. The results show that the behavior of the platform in different mooring configurations are almost the same under intact mooring condition. However, under damaged mooring condition, the mooring configuration will cause the performance changes of the platform. In a certain mooring configuration, the dynamic response of the platform changes significantly with tendon failure. Therefore, the influence of tendon failure on the platform motion should be checked in advance to look for an optimal mooring configuration.

Keywords: Tension leg platform; Tendon failure; Mooring configuration; Dynamic behavior; Fully coupled dynamic analysis

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