

With its deep pit of 30 metres, the Offshore Basin offers the possibility of testing TLPs with their full-tendon length, even in ultra-deep waters. This allows reliable testing, including important effects such as set-down and the related airgap in large waves. These benefits attracted BHP Billiton, MODEC and SEA Engineering to select MARIN for Shenzi TLP model testing. Report explains.

Deep pit attracts full-tendon Shenzi TLP

Olaf Waals &
Arjan Voogt
O.Waals@marin.nl

The Shenzi TLP will be located in the Gulf of Mexico in 1,333 m water depth. At a scale of 1:50, this resulted in a water depth and tendon length of almost 27 m. In fact, standing above it in the basin and looking down into the pit even became quite difficult for people with a ‘fear of depth’!

The objective of this model test program was to assess the TLP’s behaviour in survival conditions and fatigue sea states. In addition, the behaviour of the TLP in loop current conditions was investigated.

To assess the Vortex Induced Motion (VIM) response of the platform, additional tests were carried out in a towing tank. A new type of test set-up, using air bearings was developed to be able to model the vertical pretension of the tendons. These bearings provide a vertical downward force that compensates for the difference between mass and displacement. The model was equipped with ultra low friction air bearings that



The Shenzi TLP in a 100 Year Hurricane Condition.

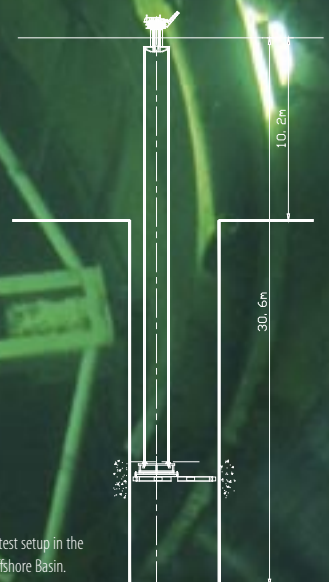
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slide along a horizontal plate mounted on the carriage. The horizontal restoring of the tendons and risers is represented by soft springs. With this set-up, it was possible to model all the required parameters correctly. This technique is considered the state-of-the-art in the TLP VIM Towing Tests.

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Looking down into the 30 m deep pit of the Offshore Basin.



Shenzi TLP test setup in the pit of the offshore Basin.