

Flexible solution

Taking subsea tree installation off the critical path

An advanced system designed to safely and economically lower subsea equipment continues to prove that complex installation procedures can be taken off the critical path and performed from small, easily available vessels instead of costly drilling rigs and construction vessels.

The compensated anchor-handler subsea installation method, or CASIM, was developed by deepwater mooring systems specialist InterMoor. It can be used to install equipment such as suction-embedded plate anchors, suction piles, subsea trees and manifolds.

Equipment such as suction piles can weigh anything up to 200t, while subsea trees can typically weigh between 40 and 80t (although InterMoor is also in discussions with clients regarding the deployment of trees that weigh around 110t with the running tool). To date, subsea trees sized up to 3m x 3m x 4.5m (and weighing between 45 and 57 t) and suction piles up to 23.7m long by 5.5m diameter (and weighing up to 182t dry weight and 152t wet weight) have been successfully deployed using CASIM, in water depths between 450 and 1706m.

By way of a specific example, it was CASIM's flexibility that was key during a recent project for US-based Newfield Exploration Company, an independent oil and gas exploration and production company. In November 2006, Newfield was bringing a well into production in the Gulf of Mexico's Mississippi Canyon and had already chartered a vessel to run the well's umbilical. This provided an opportunity to transport the 57-t horizontal production tree to the location. However, although the *Intrepid* (a dynamically positioned crane barge) had a 400-t crane, it did not have any heave compensation to facilitate accurate placement of the tree on the seabed.

Brent Boyce, project manager, InterMoor, explains that InterMoor was able to lower the tree from the *Intrepid* using its crane by deploying the CASIM heave-compensation system. "We used CASIM to safely set the tree down on the wellhead. However, this was only to wet store it, and we did not lock the tree because the plugs still needed to be drilled out," he says.

"When the rig arrived a month later, we went back with our compensation system," Boyce continues. "We picked the tree up off the wellhead, suspended it from a winch off the side of a rig and then moved off location for 12 days while Newfield landed the blowout preventer stack, drilled those plugs out and ran a liner. Then we moved back over the wellhead and put the tree back. We then locked it and tested it, ready for Newfield to run the completion."

Newfield has since commissioned InterMoor to install another similarly sized tree at its Fastball development, also in the Gulf of Mexico, this time using an anchor-handling boat.

Boyce comments that CASIM was key to the delivery of a highly cost-effective solution for both of these projects, as it enabled the work to be carried out offline using a vessel rather than online – and on the critical path – using a rig. "Conventionally, companies would use a rig for this kind of work," he says. "But at Mississippi Canyon, they already had a vessel chartered. So basically we used about four and a half hours of vessel time – rather than two days of rig time."

About CASIM

CASIM is an all-inclusive installation service package that covers detailed engineering work, dynamic lowering analysis, operational procedures, tools, equipment and offshore personnel.

The service includes a heave-compensation device: a single-unit cylinder that acts as a shock absorber. This reduces motion and line tension by acting as a soft, dampened spring applied in series with the much stiffer lowering system. The cylinder is charged with nitrogen gas to a specified pre-tension level before launch and is positioned in-line above the object to be lowered. As part of the CASIM process, the heave compensator is tuned to the object's load and mass, the water depth, the sea conditions and the desired acceleration at depth.

