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J.P. Chia, Engineering Manager, Trelleborg Singapore



Lowering the bill FOR PLATFORM INSTALLATION

The world depends for much of its energy supply on oil and gas extracted from beneath the seabed. New technology from Trelleborg for installing production platforms offshore provides a welcome reduction in costs.

TEXT: NICK TERDRE PHOTO & ILLUSTRATION: TRELLEBORG

trelleborg's products – leg mating units (LMUs), deck support units, sway and surge fenders – make a valuable contribution to the float-over method of installing the topsides of offshore oil and gas platforms from a barge.

Traditionally the topsides are lifted

onto the support structure or jacket by a floating crane. But the hire rates for such cranes are high, sometimes running into several hundred thousand dollars a day. The float-over process provides a much less costly solution. But the crucial challenge, according to J.P. Chia, Engineering Manager at Trelleborg Singapore, is

transferring the load from the barge to the jacket. This must be done in a controlled manner without causing damage to either structure, even though waves, currents or winds are causing the barge to move.

“The LMUs – steel structures incorporating rubber elements – make this possible by dampening the

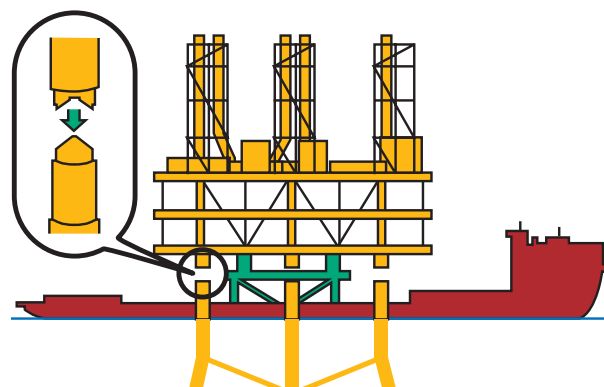


Using LMUs during a float-over process, the loads can be transferred from the barge to the base structure in a controlled manner. LMUs consist of a steel structure incorporating rubber elements to achieve a specified spring rate, depending on the expected loads and movements.

Qatar. The company performed full custom design, engineering, fabrication and testing. Each of the LMUs for the 13,000-ton BG topsides weighed 24 tons, was 2 meters in diameter and stood 3.7 meters high.

Trelleborg worked with technical service provider GL Noble Denton.

“In this project, Trelleborg supplied 12 LMUs, which showed good performance and reliability during the topside float-over installation,” says GL Noble Denton Project Engineering Manager Andy Wang. “This should be attributed to the sound engineering work and comprehensive manufacturing and testing procedures of Trelleborg, which we have observed both during this project and in our visits to the Trelleborg yard.”



forces created as the topside’s load is transferred to the jacket,” Chia explains. “Using data provided by the client, the rubber elements are engineered to have the correct spring stiffness for this task.”

The LMUs are placed inside steel cans known as transition pieces, which are installed on top of the jacket legs.

Meanwhile, surge and sway fenders absorb the impact of the barge on the jacket as it moves forward or sideways during the mating operation.

Once the topsides have been safely transferred onto the jacket, the two structures are welded together.

Deck support units, or DSUs, come into play in the fabrication yard. The topsides are transferred onto the barge on a deck support frame. DSUs positioned on the deck support frame absorb the weight of the topsides as they are placed on the frame.

Trelleborg Singapore participated in two float-over projects last year, including the installation of the BE and BG topsides for Maersk Oil

One of the key benefits of the float-over solution is that nearly all the work on the topsides can be done in the fabrication yard, where labor costs are much lower.

A floating crane would have had to make several lifts to install the BG topsides, after which extra work would have been required to hook up and commission the various modules.

“Following last year’s successful projects, Trelleborg Singapore has received several invitations to tender for further float-over operations,” Chia says.

Chia explains that all the float-over products have to be fully tested before use. The load deformation behavior of the LMU pads has to be verified, for example.

“We have invested in a high-capacity test press to meet the increased demand,” says Chia. ■

HOW IT WORKS

- In float-over operations, the topsides of a production platform, which may vary in size from less than 1,000 tons to more than 40,000 tons, are installed from a barge. The barge is towed to the field and positioned between the legs of the supporting structure or jacket.

The barge is then ballasted down until the topsides make contact with the jacket legs. When their entire weight has been transferred to the jacket, the barge is towed away.

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EASY SKIDDING

- In addition to LMUs, DSUs and fenders, Trelleborg also supplies Orkot® bearings to ease the skidding process of the topside onto the transport barge.

Runners beneath the deck frame fit into grooves along which the topside is pushed using very strong strand jacks. The Orkot bearings are placed in the grooves. With their high load capacity and low friction coefficient, they reduce the force that has to be applied to move the topsides, which may weigh tens of thousands of tons.

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