Exit cranes... LEG MATING UNITS enter the scene!
How do you install the topside of an offshore oil or gas platform to a substructure out at sea? Weather and wave conditions are the obvious obstacles to this maneuver. In the past, you needed a heavy and very expensive lift crane vessel. This is no longer necessary. Leg Mating Units from Trelleborg play a key role in the float-over method.

The new way of installing an offshore platform topside to its substructure is called float-over. Trelleborg’s knowledge and Leg Mating Units (LMUs) play an important role in the float-over process. This is how it works:

The topside structure is transported to the offshore site on a barge. After the barge is positioned to align with the substructure, the barge is slowly submerged. During this process, the load needs to be transferred from the barge to the substructure in a controlled manner. For this, the LMUs are the key elements. The LMU assemblies are installed either on the jacket substructure or underneath the topside, and they are the contact point between the two elements.

LMUs consist of a steel structure incorporating elastomer elements. The elastomer pads are normally complemented with side pads to cater for this.

After the installation is completed, the topside structure is welded to the substructure.

“The float-over technique is an installation method that allows offshore platform topsides to be installed as single, integrated packages. The result is a significant reduction in overall platform cost through a shorter offshore commissioning phase and hook-up without using expensive, heavy lift crane vessels,” says J P Chia, Engineering Manager, Trelleborg Singapore.

**IMPORTANT MILESTONE**

The year 2009 was an important milestone in Trelleborg’s history. For SDE Maersk Qatar’s two topsides named BE and BG the float-over process was successfully completed. Trelleborg’s performed full custom design, engineering, fabrication and testing for whole complete unit float-over hardware. Mating, mooring analysis and installation services were performed by GL Noble Denton. Andy Wang, Project Engineering Manager with GL Noble Denton, comments:

“In this project, Trelleborg supplied 12 Leg Mating Units (LMUs), which showed good performance and reliability during the topside deck float-over installations. This can be attributed to the sound engineering work, and comprehensive manufacturing and testing procedures that we have observed, both during this project and in our visits to the Trelleborg yard.”

**HIGH-LEVEL COMPETENCE**

Trelleborg’s has established a high level of competence in areas such as structural design calculations, Finite Element Analysis (FEA), design methodology and general engineering skills. “Our expectations with regard to the number of incoming projects have been exceeded by far, so our engineering department is growing fast. This was one of our strategic milestones,” says Julian Wee, Managing Director, Trelleborg Singapore.

All LMU pads are tested to verify their load deformation behavior before site installation. “We have the necessary testing facilities to run the full range of tests to qualify the LMU elements,” Julian ‘Wee says. Trelleborg Singapore is in the midst of fabricating a 18,300 MT test press to meet specification demand. The test press is scheduled to be completed in September 2010.

**DECK SUPPORT UNITS (DSU): THE SPECIFIED SPRING RATE DEPENDS ON THE EXPECTED LOADS AND BARGE MOVEMENTS OBTAINED BY A NONLINEAR TIME-DOMAIN SIMULATION.**

Facts about float-over:

Float-over topside installation is a very attractive option in areas where platform topside weight exceeds available crane capacity. It has now become an increasingly popular solution for many offshore consultants, yards and owners. The future of float-over looks very promising where sea conditions are suitable in Asia Pacific, Central Asia and West Africa.

The designs of platform topsides are getting heavier all the time. The highest weight registered so far is 35,000MT in one single unit.