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LNG Transfer in Harsh Environments - Introduction of a New Concept

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Abstract

One of the most challenging questions with regard to the technical part of the LNG (Liquefied Natural Gas) supply chain has not been answered satisfactorily yet: How can LNG be safely and reliably transferred between a floating terminal platform (Floating Production, Storage and Offloading – FPSO or Floating Storage and Re-gasification Units – FSRU or comparable) and a shuttle tanker in harsh environmental conditions?

The problem consists of two main technical issues: The first is the vessel mooring configuration (e.g. side-by-side (SbS), tandem); the second is the type and appropriate handling of the transfer lines for the cryogenic liquid. As both problems are interacting, no convincing solution has been developed until now.

The innovative offshore LNG loading system "Maritime Pipe Loading System 20" (MPLS20) is proposed by the project partners Nexans and Brugg, leading manufacturers of vacuum insulated, flexible cryogenic transfer pipes, IMPaC, an innovative engineering company that has been involved in many projects for the international oil and gas industry for 25 years and the Technical University Berlin, Department of Land- and Sea Transportation Systems, with great expertise in numerical analyses and model tests.

The new concept is based on a unique tandem mooring configuration (see Fig. 1). In comparison to standard operations used in the oil business for about 40 years, the concept introduces a mooring bay for the shuttle tanker. Extensive numerical simulations are conducted to determine the envelope of motions and mooring forces.

As the Nexans/Brugg corrugated metal pipes provide a double containment system all relevant safety issues are well addressed, as required by EN1474-2/-3. Thus, LNG transfer can take place even under severe environmental conditions which makes this new concept superior to other approaches such as side-by-side configurations using composite hoses.

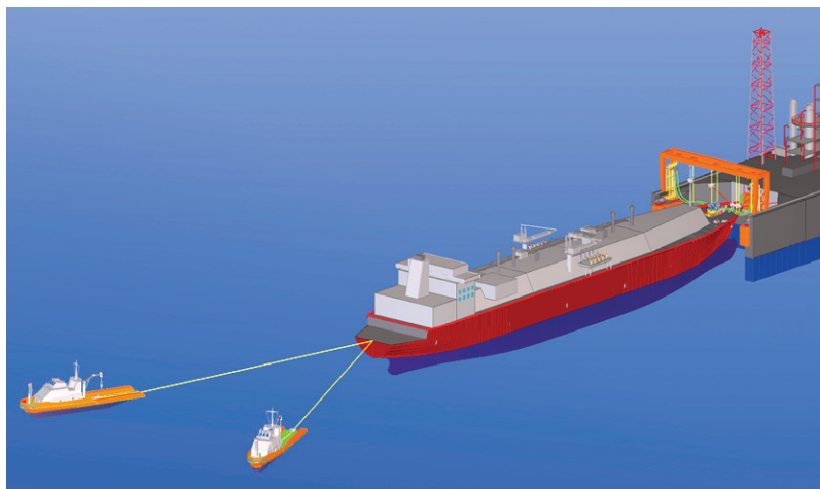


Fig. 1: Impression of the new offshore LNG transfer system with a LNGC moored to the LNG terminal for loading