

**The development of reliable offshore LNG terminals in shallow water requires fresh insight into the related problems. MARIN explores the issues raised by this new development and dips its toes into shallow water issues.**



## Deep thoughts about shallow water as more than 70 people attend seminar

Increasing demand for LNG and the associated safety requirements has resulted in a large number of offshore LNG terminal developments and most of these are located near-shore, in relatively shallow water. In shallow water the contribution to the low frequency excitation of the wave set-down increases and this is enhanced by the fact that streamlined LNG carrier hulls have a very low damping against low frequency motions. The combination of excitation and low damping can result in significant resonant motions and related mooring loads.

### **'Shallow water hydrodynamics' seminar**

Already in the early days of offshore engineering shallow water hydrodynamics played an important role in the design of jetty systems and the design of the vertical dimensions of harbours and waterways. Shallow water hydrodynamics is the subject of renewed attention because new design concepts for LNG offloading possess a very low damping compared to the mooring systems in earlier years. There is also better insight into the actual low frequency content of waves in near-shore areas. To raise these issues, MARIN and SBM, decided to organise the 'Shallow water hydrodynamics' seminar, which was held in February. Interest from the offshore industry was overwhelming with more than 70 people attending this technical seminar.

Well-known specialists in the field of offshore hydrodynamics and coastal engineering were invited to give keynote addresses, technical reviews and presentations. These 'deep thoughts about shallow water' raised a lot of interesting discussions. The interaction of hydrodynamic people, with their focus on the ship and the coastal engineering specialists, with their attention to the waves, was particularly stimulating. It was evident that these debates and discussions are really needed to study and solve the shallow water problems of the future.

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### **New wave generator in upgraded Shallow Water Basin**

The seminar was concluded with a workshop in the upgraded Shallow Water Basin. MARIN recently replaced the original wave-maker of this basin with a real, shallow water wave-maker. The new wave-maker can generate realistic shallow water waves over a wide range of frequencies and wave heights. All participants were even equipped with dedicated shallow water boots so that they were able to personally experience the waves!

As a follow-up, MARIN is presently starting up the 'sHallow WAter Initiative'. For more information please contact Radboud van Dijk (R.R.T.van.Dijk@marin.nl). 