

# Complete Berth Management System for new Teesport LNG Terminal

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In February 2007 the first LNG shipment arrived at the newly constructed Teeside receiving terminal in Teesport, UK. Originally an unused jetty that had been built to accommodate crude carriers making deliveries to a nearby refinery, the complete upgrading of the facility means that the terminal can now accommodate LNG carriers that have regasified facilities onboard. This is a milestone in the LNG industry as it is the world's first regasification plant, which means that the LNG can be vaporised on-ship and fed at high pressure directly into the national grid network. In order to minimise the possibility of an environmental incident, the refurbished jetty has been fitted with a number of systems that ensure the safe berthing and mooring of a vessel. These Strainstall designed and developed systems and components utilise the latest technology combined with known durability.

## Speed of approach

Strainstall's DockAlert system provides protection of the jetty infrastructure by calculating the vessel approach speed to ensure that it is kept within the allowable limits for the jetty's safe operation. The system uses two eye safe laser units installed on either side of the jetty head and aimed perpendicular to the berthing line. These measure the distance of the bow and stern relative to the jetty, while also providing speed and relative angle of the vessel to the berth. The data from these lasers is fed into a central control system, where it is displayed in the jetty control room and relayed to a large digit display mounted on the jetty and to PDAs onboard the vessel (see Figure 2). The large digit display is visible from over 200m and provides the pilot and vessel master with information on the speed of approach and distance from the jetty. Incorporated in the display are arrows indicating whether the vessel's speed is increasing or decreasing and simple traffic light indicators to warn against excessive speed. The units can be set against safe parameters to ensure a smooth and gentle berth.

## Mooring load monitoring

Strainstall's MoorAlert system obtains tension inputs on each mooring line from 16 load measuring pins that are designed and installed into quick release hooks. This provides constant real time monitoring of the loads that they are being subjected to. Strainstall has been designing and manufacturing these load measuring pins for over 40 years and the design utilises the almost unique experience gained over this period to provide a reliable and totally environmentally sealed unit that will perform unhindered over the life of the installation. The signals from the load pins, together with the hook status sensors (open or closed), are consolidated by a network interface unit mounted in the hook motor starter enclosure, situated to the rear of the hook base. This unit allows the digital signals from all the hooks (in this case two doubles and four triples, making a total of 16 hooks) to be transmitted over a simple two-wire loop system back to the jetty control room.

## Quick release hooks

To ensure secure mooring of the vessel, Strainstall provided in-house designed and manufactured quick release hooks (see Figure 4).



Figure 1. The new Teesport LNG Terminal.



Figure 2. BerthManager PDA display.

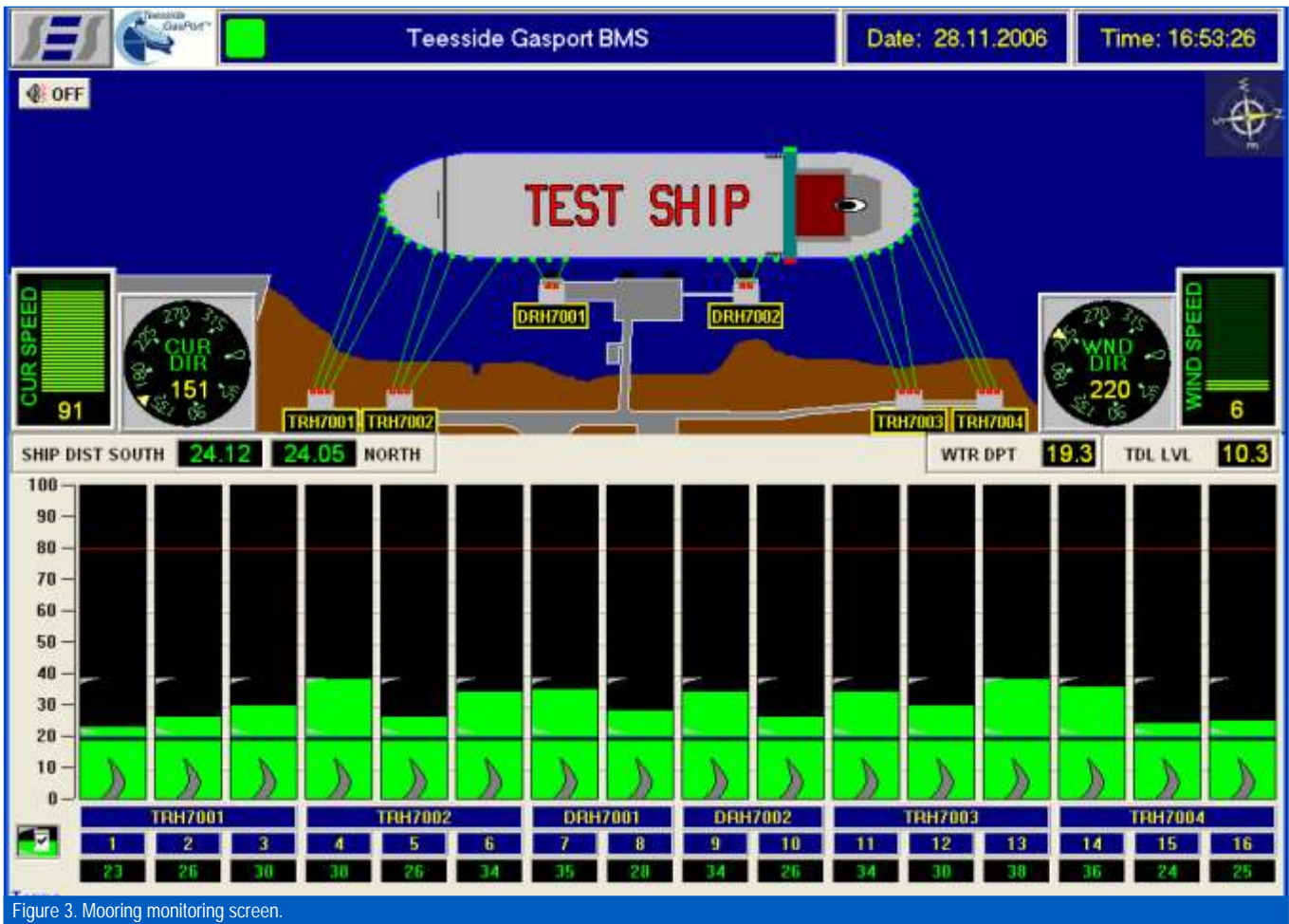


Figure 3. Mooring monitoring screen.

The hooks have been tested and supplied to a large number of customers, both on and offshore, over the past 35 years. These units give the customer a reliable and secure safe mooring point, and as part of the quick release hook equipment, a remote release system was provided that is completely integrated into the hook assembly. They can then be released by a control panel on the motor start enclosure or manually in case of power failure. In addition they can also be operated remotely from the jetty control room using Strainstall's software, or from two additional independent emergency release control panels located on the gangway and approach road. The release is key coded to ensure accidental release is avoided. The hooks have no protruding parts (such as cables that can be damaged by the mooring lines), are fitted with non-contact sensors, and there is

a direct connection between the hook release mechanism and the release activation device. Each hook was proof tested to 150 per cent of its rated SWL, and the release mechanism was tested to full load at the company's test facility, where it was witnessed by a third party inspectorate.

### Integrated jetty management

With reliable sensors gathering data on and around the jetty, a user-friendly interface was installed to provide the operators with clear displays, an alarm facility and data recording. This comprised a desktop or rack mounted PC running Strainstall's BerthManager

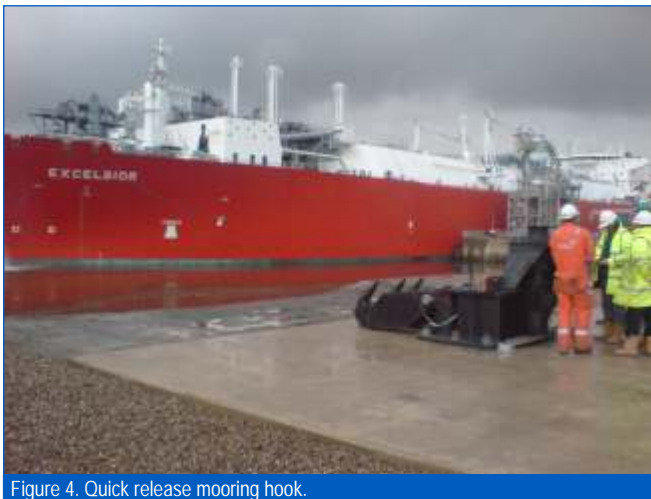


Figure 4. Quick release mooring hook.



Figure 2. BerthManager PDA display.

software located in the facility control room. The software takes the data from all of the systems mentioned above to provide a fully integrated berth management system. This allows the user to review any berthing or mooring sequence to ensure that optimal usage of the berth is maintained. In the event of heavy berthing or an unexpected ESD departure, the operator can replay the sequence of events leading up to and during the event, allowing the cause to be determined. By consolidating the modular system data, Strainstall is able to relay this information via telemetry to a PDA. This ability to transfer real time data to operators who are not located in the central control room allows additional flexibility and monitoring during a vessel's approach, mooring and departure. These telemetry systems provide passive data displays that alert the operator/handler to specific warnings. Included as part of these displays are environmental monitoring that incorporates local meteorological conditions, wave/tide height and sea current.

## Conclusion

Strainstall provided the client with a complete solution, and were specifically chosen due to their ability to supply and install a working system within a very short timescale. The combined ability to design and manufacture both a quick release system and instrumentation was another significant factor in the customer's decision making process. Strainstall has to date installed over 70 BerthManager systems to LNG terminals worldwide, 40 of which are in LNG facilities in Japan, where Strainstall is, to date, the only supplier of such systems. Strainstall continues to develop its systems through continual feedback from owners, operators and design institutes, to ensure that its products remain at the forefront of technology.

### ABOUT THE AUTHOR

**Sandy Thomas** is Marine Director at Strainstall UK Ltd. An Engineer by profession, with a qualification in Mechanical and Production Engineering, Sandy has been involved in the design and implementation of advanced Berth Manager systems for over 20 years.

### ABOUT THE COMPANY

**Strainstall UK Ltd** originally formed in 1966, is a specialist designer and manufacturer of load monitoring systems and quick release mooring hooks as well as supplying systems for Tendon and Riser Tension Monitoring for offshore oil and gas structures, Crane & Winch Load Monitoring and Silo Content Monitoring for both On and Offshore use, and the StressAlert II Hull Stress Monitoring system for vessel monitoring. Strainstall is registered to ISO 9001:2001

### ENQUIRIES

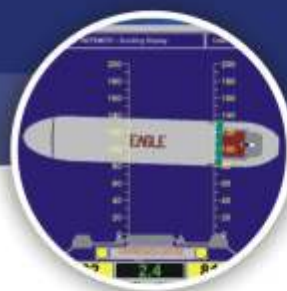
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