

BERTH MONITORING AND MANAGEMENT

HELEN CORNISH,
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DESCRIBES A MODULAR
APPROACH TO JETTY
MONITORING AND
MANAGEMENT.

With the number of new LNG transfer terminals (both export and receiving), and the significant increase in the LNG vessel size and traffic, safety is of an even greater concern than previously. Over the past eight years the design and functionality of jetty mooring equipment has been influenced predominantly by the increased safety standards introduced by the Society of International Gas Tanker and Terminal Operators (SIGTTO), and the increased demands being put on the terminal to be able to quickly turnaround vessels from berthing, discharge/loading to departing. Strainstall have been at the forefront of this technology that now has to meet a greater scope, and the demand from the industry to deliver systems that can be integrated into existing facilities or bespoke systems for new terminals.

Vessels that are berthing and interfacing with shore terminals require dedicated facilities to facilitate mooring and to monitor the vessel during the unloading of its product. In order to achieve this safely, Strainstall has designed and developed several systems and components that provide the latest technology with known durability. These systems are designed to be modular, so that all, or just one, can be taken in any order to provide a 'plug and play' capability. This gives customers the ability to tailor a system to their own individual requirements, and also allows easy access for system upgrading at a later date. The following article describes how the systems can be set out.





Figure 1. BerthManager PDA display.



Figure 2. Large digit display.



Figure 3. Laser unit.

Vessel approach monitoring

DockAlert provides protection of the jetty infrastructure by calculating the vessel's approach speed. This is to ensure that the approach speed is kept within 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 berthing line, 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 can be displayed in the jetty control room and relayed to either hand held telemetry units (i.e. pagers and PDA), or a large digit display mounted on the jetty. The unit is visible from over 200 m and provides the pilot and vessel captain 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. This system is backed up with traffic light indicators to warn against excessive speeds, and can be set against safe parameters to ensure a smooth and gentle berth.

Mooring load monitoring

MoorAlert is a load measuring system that uses load measuring pins installed into the quick release hooks to provide constant real time monitoring of the loads on the hooks that are directly due to the tensions in the mooring lines. Strainstall has been designing and manufacturing 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, positioned to the rear of the hook base. This unit allows the digital signals from all the hooks (in the case of base units with two or more hooks) to be transmitted over a simple two wire loop system back to the jetty control room. In the case of excessive distances on the jetty, a consolidation unit would be mounted on the jetty and the signals sent via fibre optics to the jetty control room to ensure continuity and stability of load and status data from the hooks

Quick release mooring hooks

Quick release hooks ensure secure mooring of the vessel, and the hooks Strainstall provide are designed and manufactured in-house. These hooks have been tested and supplied to an extensive array of customers, both on and offshore, over the past 35 years. Strainstall is able to provide a vast range of hooks, from 30 - 180 t, to ensure that all mooring patterns and systems can be accommodated in today's facilities, and to give the clients a reliable and secure safe mooring point. These systems have no protruding parts, such as cables, that can be damaged by the mooring lines and in addition there is a direct connection between the hook release mechanism and the release activation device. The hooks are fitted with non contact sensors to monitor the status of the hook as mentioned above. Each hook is proof tested to 150% of its rated SWL, and the release mechanism is tested to full load at Strainstall's own test

facility, and either witnessed by the client or by a third party inspectorate.

Each hook base can be released by a control panel on the motor start enclosure or manually, in case of power failure to the facility. As part of the QRH equipment, a remote release system can also be provided that is completely integrated into the hook assembly, and which allows the hooks to be operated remotely from the jetty control room via a centrally controlled unit in the form of either a physical panel or virtual computer panel. The release is key coded to ensure accidental release is avoided.

Total jetty management

The BerthManager system offers the terminal an integrated jetty management package. While Strainstall can provide reliable sensors that gather data on and around the jetty, such as Metocean sensors and environmental stations, the BerthManager system provides a user friendly interface for the operators with clear displays of data from the range of systems mentioned above. An alarm facility and data recording provides a full backup system that allows the user to review any berthing or mooring sequence to ensure that optimal usage of the berth is maintained. In the event of a heavy berthing or an unexpected ESD departure, the system allows the operator to replay the sequence of events leading up to and during the unexpected event, pinpointing the true cause.

By consolidating the modular system data from the berthing, mooring and environmental systems, Strainstall is able to relay this information via telemetry to pager, PDA or laptop PCs. 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 can either provide passive data displays that alert the operator/handler to specific warnings, or allow full functionality of all systems via the laptop PC.

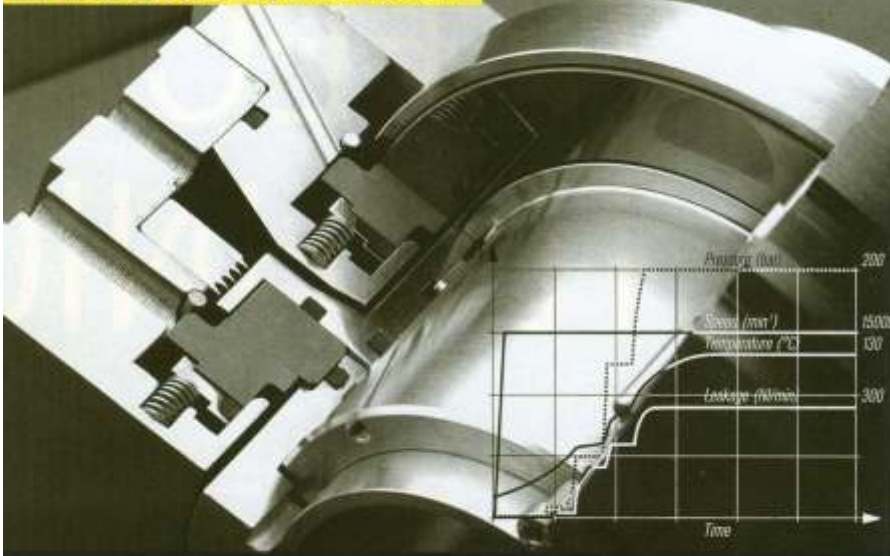
Conclusion

Strainstall is in a unique position to offer a complete solution with a proven track record to jetty owners/operators and to vessel owners/operators. The combined ability to design and manufacture both a quick release system and instrumentation both on and offshore has been a significant factor for the success of Strainstall over the past 20 years. As an example of this success, Strainstall has installed over 35 BerthManager systems in the past eight years. In addition to this, Strainstall has also instrumented all terminals in Japan since 1980, as well as over 25 systems to LNG terminals throughout the rest of the world.



Figure 4. tanker berthing.

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