



Harbour & Marine Engineering

safe mooring • smart monitoring

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Mooring Line Monitoring System

The vessel Mooring Line Monitoring system (MLM), also known as Mooring Line Tension Monitoring, provides real time monitoring of all mooring lines and warns of excessive or out-of-range loads. Changing weather conditions or current loading can cause unequal load sharing within the mooring system. This can lead to potential failure of mooring lines and damage to jetty equipment or structure. MLM systems enable the operator and the vessel Master to maintain safe and effective mooring line tension whilst the vessel is alongside by displaying this information graphically against preset limits and alarms.

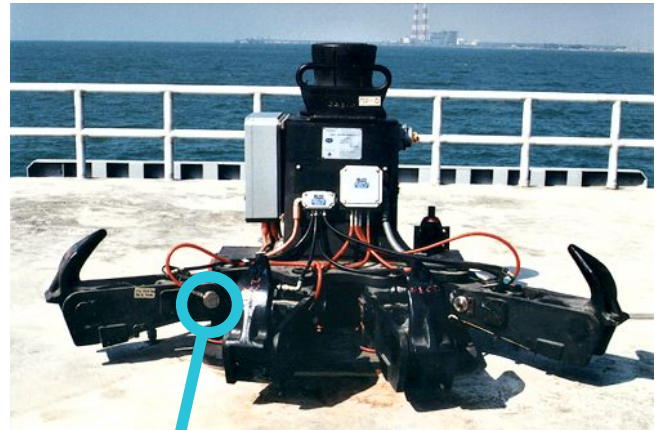
In addition to factory fitting to new Harbour & Marine hooks, **load cells** can be retrofitted to most existing mooring hooks at site making it possible to upgrade older jetty facilities cost effectively. The system is suitable for quick release hooks from 30T to 250T in Class I Zone I hazardous or non-hazardous jetties.

Harbour & Marine has also taken load monitoring one step further with the introduction of **SmartHook®** which provides the advantages of a MLM system in a self-contained, low cost unit at the hook itself.

Vessel MLM systems may be integrated with vessel drift warning and **environmental monitoring** for even more informed monitoring and, for the ultimate in safe approach and mooring data, integrated with a Docking Aid System for example **SmartDock®**.

Mooring Line Monitoring System features

- **Data Interface** A typical MLM system provides remote display, control and data logging of mooring line information for all hooks on computer display, usually at the jetty control room. As historical mooring information is stored, this also offers a useful tool for training or simulation and for analysis in the event of an incident. Standard graphical displays may be customised to operator requirements if required. The



Load Cell in Hook

Benefits of the MLM System

- Allows mooring lines to be pre-tensioned when the vessel first docks, improving safety by removing guesswork.
- Allows tensions to be monitored and enables the correct tensions to be maintained on mooring, breasting and spring lines.
- Assists in maintaining the optimum vessel position during loading or discharging.
- Provides early warning to both the jetty and shipboard personnel of impending high mooring tensions, allowing time for corrective action to be taken.

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system generates reports defined by date, time, alarm status and load magnitude.

Load Pins Harbour & Marine's **SmartCell**[®], which replaces the standard quick release hook swivel pin, is instrumented to enable mooring line tensions to be measured. The pin is designed and manufactured to fit the majority of hooks including those of competitors. **Load pins** are certified for hazardous locations and are manufactured to suit extreme marine and offshore environments with thirty years proven performance. Redundant instrumentation allows up to two load monitoring gauges in a single pin.

Transmission of Load Data & other information

Line tension monitoring, as well as drift-off and environmental information, is collected and relayed to the Jetty control room (or other remote location) either by fibre optic or multi-core cabling, radio telemetry, internet or intranet. Radio communication is also used to transfer the data to the vessel. A wireless, hand-held monitor automatically displays required data and is typically preferred by pilots for use whilst on board the vessel. Control room instrumentation is housed in custom-built racks.

Vessel Drift Warning and Environmental Sensors

Harbour & Marine's docking system **SmartDock**[®], operating in vessel drift-warning mode can operate concurrently with the MLM system. Environmental sensors measuring wind, wave, tide and current information can also be integrated with the MLM system allowing display of information on the MLM screens.

Software Software for the MLM system is developed in house and is designed for future expansion and integration, for example the client server architecture provides concurrent multi-user operation. Standard system software includes the following comprehensive features.

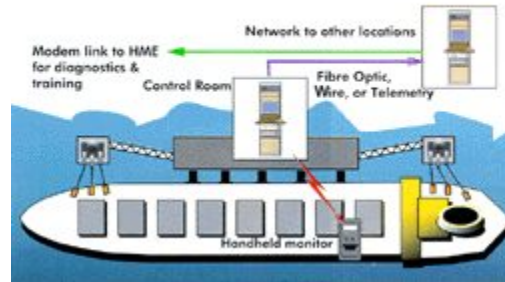
Clear graphics display each connected mooring line

Mooring lines coded to show line tension: Red - Alarm, Yellow - Near Alarm, Green - OK.

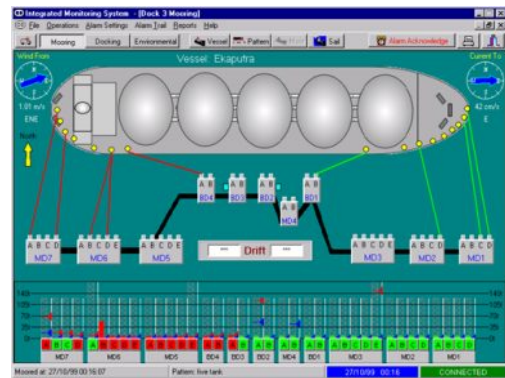
Mimic panel view of Jetty Layout

Histogram displays each hook load

Wind & current data clearly displayed



The Mooring Line Tension Monitoring System



Mooring Line Monitoring Screen



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Mooring Line Monitoring System

Simple User Interface provides easy operations

Unlimited number of mooring patterns may be designed, edited, saved and applied to suit vessel classes and vessel orientation.

Unlimited number of vessel classes & vessel images can be created and stored in the database.

Comprehensive vessel history tables maintained in the database provide easy access to vessel oriented reports.

Powerful SQL Database Server provides comprehensive reporting capabilities.

Comprehensive search criteria provide meaningful reports on current and historic data



Instrumentation Rack

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