



ShoreConnection

DECK MOTION MONITOR

True waves - New vision

DMM



DECK MOTION MONITOR

- Accurate wave input for the Safe Load Indicator
- Less Waiting On Weather
- Video of blind zones on deck
- Better timing and control of heavy lift
- Optimised planning of back load
- Enhanced personal safety
- Easy installation, suitable for retrofitting

The full Picture

Real time video & Significant Wave Height

Our revolutionary DMM system displays the Effective Significant Wave Height, real time waves and live video feed from the supply deck. The Crane Operator can now use accurate wave data from the supply vessel's DMM as a superior replacement to the simplified Significant Wave Height method used today. Real Time Video from the supply vessel's DMM camera gives the Crane Operator another angle view and can cover blind zones on deck in a totally new way.

Using the DMM will significantly increase safety as well as operational availability to offshore lifting operations.

Significant Wave Height (H_{1/3}) Compatible

Offshore cranes have to be operated within its safe Load Chart range for the different Significant Wave Heights (H_{1/3}) during a Sea Lift.

DMM measures the vertical deck velocity (m/s) at multiple locations on the supply vessel deck, and transforms the measurements to Effective Significant Wave Height (Eff. H_{1/3})

Keeping the concept Significant Wave Height ensures compatibility with the established wave height / sea state selector used by majority of today's Safe Load Indicators (SLI) for offshore cranes.

Video and Waves – The full picture

Video from the supply vessel deck camera gives the Crane Operator an additional view angle which covers blind zones on deck and vessel motions as seen from the navigation bridge. Real time wave data from the selected deck area may be displayed beside the video display. This video may be recorded on board the supply vessel.

Timing of the heave

In different weather conditions, it is difficult for the Crane Operator to determine how the vessel deck area is moving, making it difficult to time the heave.





The real time wave curve from the selected deck area is displayed in the DMM crane and makes it easier for the Crane Operator to time the heave.

Avoid the uncertainty factor

There are a number of 'uncertain factors' connected with today's simplified method:

The offshore crane standard EN 13852-1, Annex B Chapter B1 and Table B.1 describes the simplified relation between the (oceanographic) Significant Wave Height and the vertical velocity (m/s) of the load supporting deck.

The vertical velocity of the load's supporting deck V_D in this standard is solely dependent of the significant wave height $H_{1/3}$, which measured by a nearby wave rider buoy or wave radar.

This means that no further consideration is taken to the following:

- The variation in wave type and period
- The variation in downward velocity at different deck positions

- The variation in shape, stability and loading condition of the vessel
- The variation in direction of the waves in relation to the vessel heading
- The variation in sea state, from the position where the wave height is measured to the position of the vessel (close to a platform)

All the above mentioned 'uncertain factors' are eradicated by using our revolutionary DMM. Now, the vessel officer and Crane Operator can make decisions based on facts!

Increase the availability of Sea Lift

The current $H_{1/3}$ Sea Lift method is normally too conservative. DMM ($H_{1/3}$ Eff.) has proven its potential in the North Sea to increase the availability of lifting operations, compared to use of the $H_{1/3}$ method. This benefits all types of supply vessels. Waiting On Weather time may be reduced up to 50%, which benefits the supply logistic and reduces the fuel consumption.

DMM ashore for better planning of back load

Images and data from the cargo deck can be E-mailed ashore to the logistic department for better planning of back load.

It is important to note that back load is difficult to make plans for. Containers, risers, etc. may be located quite different than first planned along the supply vessels' route.

With updated deck images and DMM overlay ashore, it is much easier for the shore based logistic department to make plans for the back load.

Optimal vessel heading

The heading has influence on vessel motion since a slight change in degrees for vessel heading may considerably change the deck motion.

DMM makes it easy for the Dynamic Positioning Operator to find the optimal heading of the vessel, to ensure minimum heave motion at the actual deck area where the Load/Cargo is located.

Heavy Lift and back-catching

During heavy lift operation, the risk is bigger and margins for error are much smaller.

With the load moving slowly upwards, there is a significant risk that the deck back-catches resulting in slack crane wire. This will almost definitely result in a powerful downward jerk when the vessel moves downwards again.

Situations like these may exceed the crane's safe load limit.

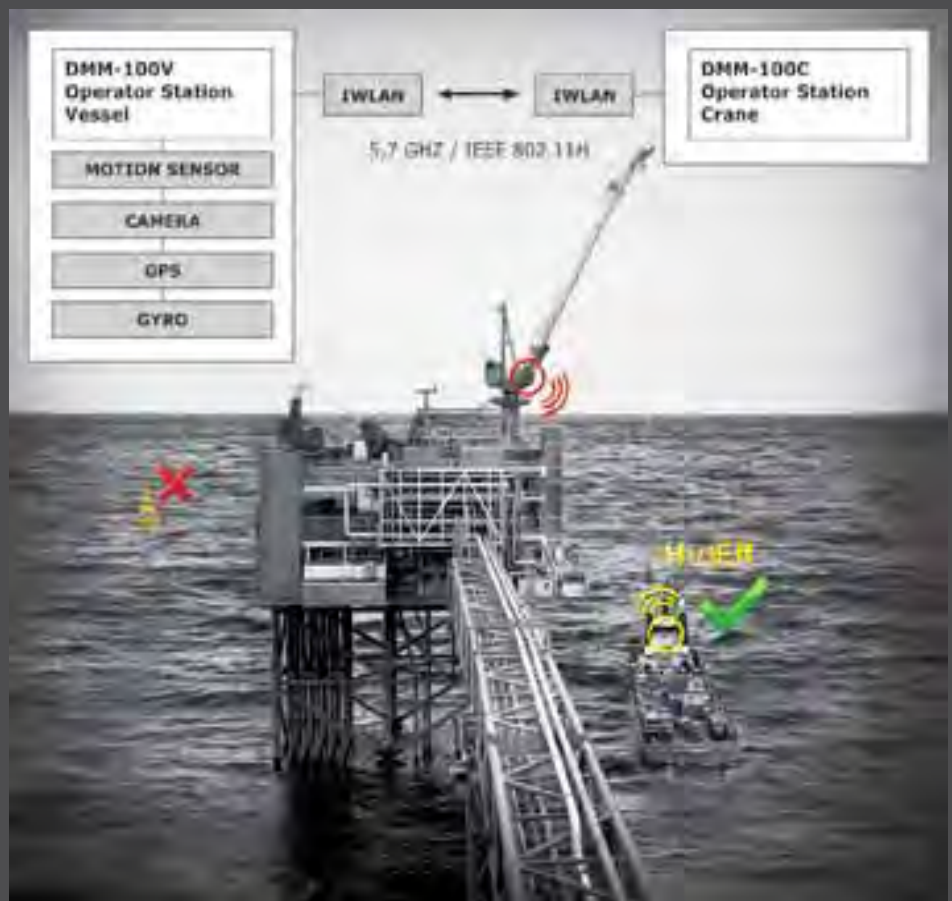
With DMM, we make your decision to carry out or delay the heavy lift, much easier!

Personnel Safety – Work on deck

Personnel safety is undoubtedly a priority.

When working on deck, the risk for injuries and falling over board increases with the ship's motions and waves.

Combined with Captain's overall assessment, DMM may be used to set operational limits for working on deck.



Launch and recovery of equipment over board

Most marine equipment and operations has got wave height limits to prevent damage or loss of equipment during launch, operation and recovery. When the Sea State increases or decreases, the DMM can be used as a tool to decide whether to start, delay or stop the operation.

Layout

The DMM-100V system is located onboard the vessel and consists of an Operator Station, Motion Sensor, Deck Camera, Interface Cabinet and a Radio Module.

The DMM-100C slave unit is located in the crane cabin and consists of a touch screen Operator Station, Interface Cabinet and a Radio Module. Real time data and video from the vessel is transmitted to the crane through a 5.7 GHz / IEEE 802.11h IWLAN.

Product range

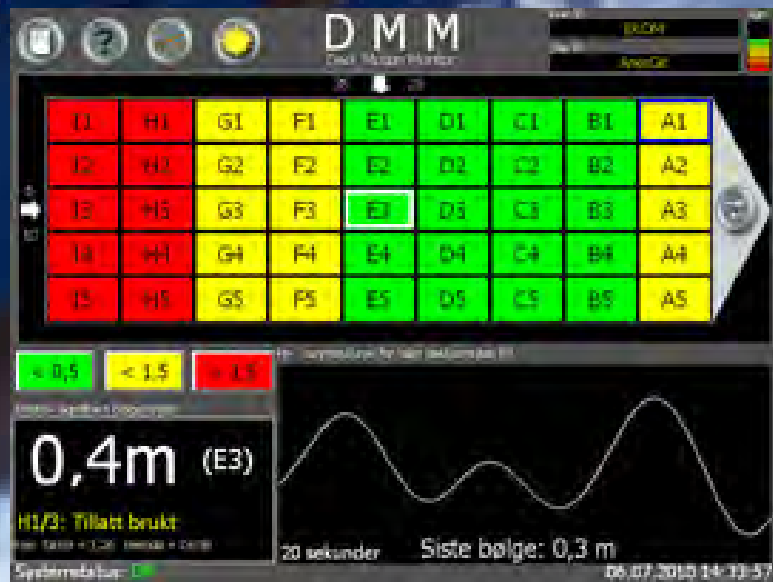
Type:	Application:	User:
DMM-100V	Vessel	Vessel Operators
DMM-100C	Crane	Crane Operators
DMM-100PTU	Portable Test Unit	Maintenance personnel offshore
DMM-100MCU	Mobile Crane Unit	Crane - short term work - for hire
DMM-100MVU	Mobile Vessel Unit	Vessel - short term work - for hire

The DMM-100V may be delivered without the Deck Camera. Mobile solutions and system for hire is available upon request.

EMC / SAFETY / ENVIRONMENTAL
EN 55022, EN 55024, EN 61601-6-2,
EN 301 489-1, IEC 60945 /50-1, IEC 61508

THE DMM DISPLAY

- Eff. H_{1/3} at selected deck area
- Select crane H_{1/3} limitation
- Real time heave curve or 20 minutes Eff. H_{1/3} trend
- Multiple language options
- Radio signal status, Vessel ID, Crane ID
- System status, alarms
- Camera display



INTEGRATED DECK CAMERA



Top left:
DMM/Camera seen from crane cabin

Top right:
Crane Operator Station DMM -100C

Bottom:
Deck camera with or without DMM grid overlay

