

FUGRO

VESSEL MOTION FORECASTING

Vessel motion forecasts (VMF) provide valuable information on how the energy of the sea translates into the motion of the vessel and how changes in the vessel heading and/or the state of the sea can change those motions.

The energy of the sea imparts motions on all vessels ranging from semi-submersibles, survey ships, anchor handling tugs (AHTs) and heavy lift construction vessels in the oil and gas industry, to cruise ships and transporters in commercial shipping.

Standard metocean forecasts provide an overview of the state of the weather and sea, marine personnel then estimate the resultant motion of a vessel. Fugro's service removes the guesswork and forecasts the actual motion of the vessel, in terms of heave, roll, pitch, surge, yaw and sway.

This knowledge leads to a better decision process, avoiding unnecessary downtime and maintaining a safe operating environment.

SOLUTION

Fugro combines its in-house model data and the vessel's response amplitude operators (RAOs) to provide a complete understanding of the vessels motion response to the environment in both forecast and nowcast mode.

BENEFITS

- High forecast confidence through integrated verification from measurements
- Supports decision making to increase safety of offshore activities
- Allows full use of weather windows to undertake operational planning



Forecasting the actual motion of the vessel supports operational decision making.

HOW THE SERVICE WORKS

Wave spectral information is required to calculate the motions of the vessel.

Fugro has a range of in-house weather and wave models that can be extended worldwide to provide the full spectrum of frequency and direction of waves.

To give improved forecasting performance, higher resolution models are set up to capture the local bathymetry and its effects on the wave models. This is particularly important in high use areas, such as the North Sea.

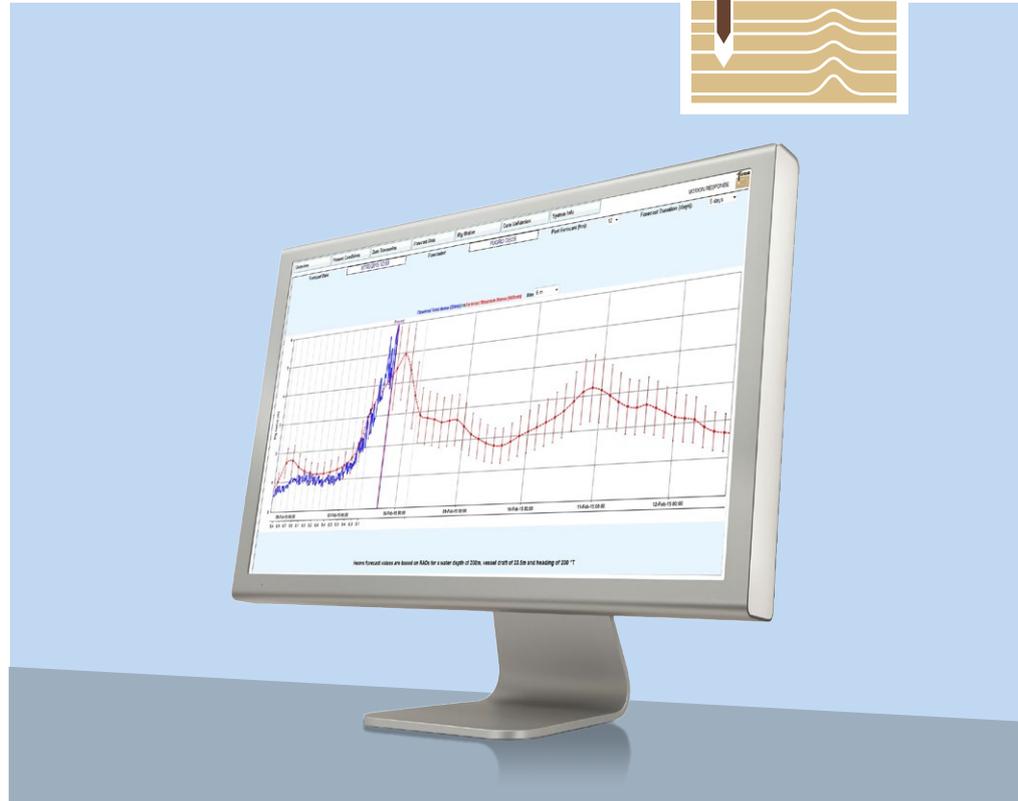
The spectral wave energy data is extracted for the site of interest and is then sampled with the RAOs for the vessel. To ensure the consistency and accuracy of the forecast the client is required to provide the RAOs and details of the loading condition of the vessel.

The output from the forecast is a time series of motions. These motions can be represented as single time steps on a radial diagram or as a time line of the various parameters through the forecast period.

The VMF forecast can be combined with an overlay of real-time heave, or other measurements, providing additional confidence for operational decision making.

FEATURES

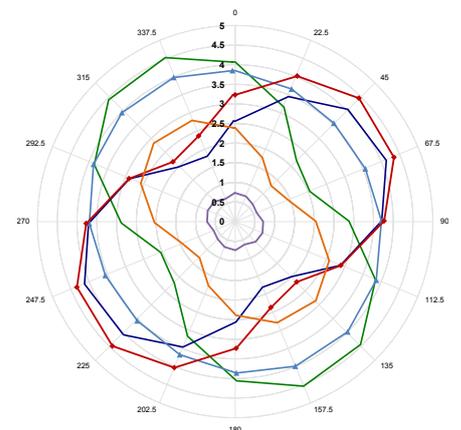
- Optional integration of vessel motion measurements display for verification
- Delivered and presented securely online
- Six hourly forecast up to five days ahead
- Verification of the previous two days forecast
- Site specific to the vessel, once RAOs are in place the forecast can be provided globally



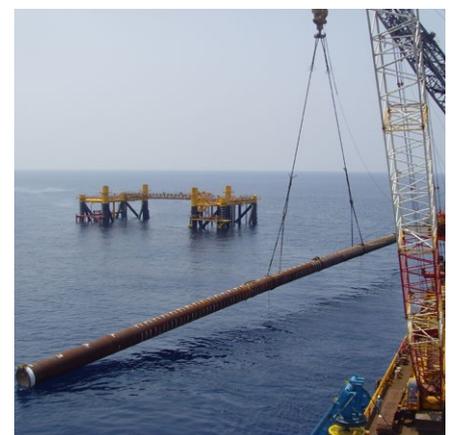
To provide confidence in motion forecasts they can be verified against measured data.

APPLICATIONS

- Semi-submersible rigs - maximum allowance of vertical lift on the marine riser
- Crane operations, especially during heavy lifts
- FPSO and FSU operations
- Shuttle tanker operations
- Helicopter operations
- Dive support and supply vessels
- Emergency rescue and recovery
- Jack-up rigs in transit



Vessel motion forecast radial diagram showing heave, roll, pitch, surge, yaw and sway.



Motion forecasts allow operators to take full advantage of weather windows.