COASTAL FLOOD FORECASTING: OFFSHORE PLANNING

For many years, we have used our ground-breaking ForeCoast® Flood system to develop coastal flood forecasting for large stretches of the UK's coastline. When introduced in 2013, ForeCoast® Flood was a significant development in the world of coastal flood forecasting. This, for the first time, provided a means to develop, validate and refine the performance of a forecasting system, before putting it into operation. This significantly improved accuracy and confidence in the approach. Since its implementation, the ForeCoast® Flood system has provided valuable flood warning and risk assessment data to clients including the Environment Agency, the Scottish Environmental Protection Agency and Network Rail.

In recent years, we have wanted to expand into the growing offshore marine energy sector. Building on our coastal forecasting work, we came up with the idea of ForeCoast® Marine, a sophisticated metocean planning and forecasting tool for the marine and coastal sector.

The solution

ForeCoast® Marine lets marine operators manage their metocean risks throughout a marine or coastal construction project, from pricing weather into tenders, helping them to design detailed construction and maintenance strategies, and managing live weather risks.

Real world applications

For example, Rampion Offshore Wind Farm has used the ForeCoast® Marine Gamer Mode in the planning stage to create the best possible installation plan that accounts for weather, vessel and equipment abilities and environmental restrictions (Figure 1). The model, which is used to simulate building the wind farm in a virtual world, has also been used every week during construction to adjust the installation schedule based on the progress made to date. This has allowed the project team to keep monitoring progress, anticipate any programme delays well in advance and apply any mitigation strategies that are needed.

The real time operational forecasting that the ForeCoast® Marine Mission Planner provides has been used for various offshore wind, wave and tidal projects. The system uses the most recent forecast data to help planners decide whether to proceed by predicting if the mission is likely to succeed in light of the weather, the best timing for important activities and any required stoppage periods. The Mission Planner combines the latest probabilistic forecasting techniques and a range of tools to support operational decisions (Figure 2).

"FORECOAST® MARINE LETS MARINE OPERATORS MANAGE THEIR METOCEAN RISKS THROUGHOUT A MARINE OR COASTAL CONSTRUCTION PROJECT."

Dr Susannah Brown
Business Innovation Strategist
JBA Consulting

The future

Because ForeCoast® Marine is so flexible, it has many uses. The software is being continuously updated and refined to meet client needs. For example, we are currently working on ForeCoast® Shipping, a system that will be used by a major Australian terminal operator next year. ■

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Mark Franklin, State of the Nation NaFRA Project Executive, Environment Agency: "The system allows us to better understand how our forecasting models would have performed if they had been in operation historically, enabling us to quantify their uncertainty and optimise their performance. The application of ForeCoast® Flood has been instrumental in improving the way we do coastal forecasting at the Environment Agency."

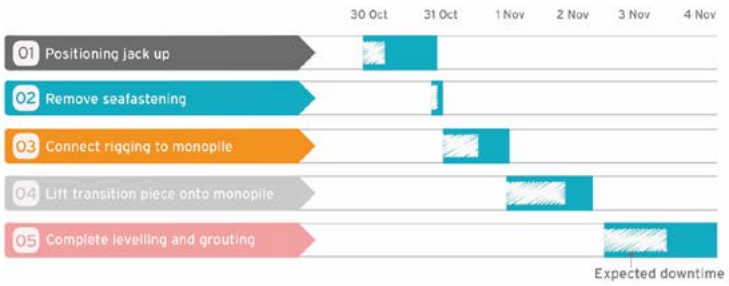

Figure 1: This illustrates how an operation is expected to "play out" as a function of the forecasted weather. Shown on the plots are expected operation (blue cells) and periods of expected downtime (hashed white).

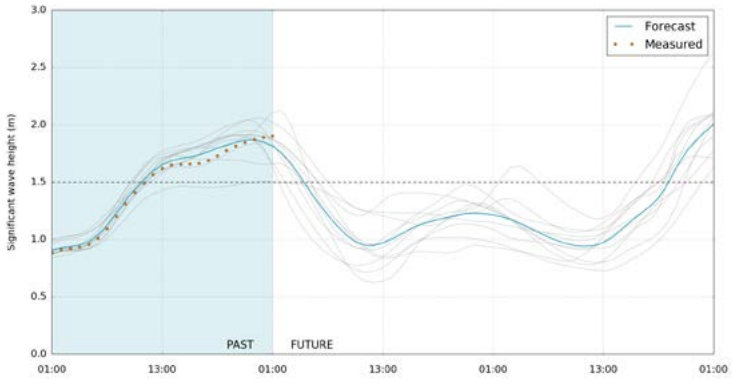

Figure 2: This illustrates how an operation is expected to "play out" as a function of the forecasted weather, including predicted weather downtime.