

Offshore

i n d u s t r y



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Well-Oiled Logistics

Tool for Offshore Wind

Dutch-based engineering firm KCI developed a smart logistics tool for the offshore wind market. Called TILT – Transport and Installation Logistics Tool – it is aimed at project owners and EPIC contractors. By Marika van Pol.

KCI developed TILT as they saw a void of suitable and verifiable models for the complex logistics involved in building offshore wind farms. Pascal Ferier, managing director of KCI, sensed the need for this tool. “Cost savings in the logistics chain have been the subject of numerous speeches during offshore wind seminars and conferences.

It is widely recognised that the costs of transport and installation are a major portion of the total investments in offshore wind farms.”

Insight

Ferier continues: “TILT can be used to visualise the logistic process by showing the changing positions of vessels, buffer sizes and the changing weather conditions. Moreover it enables the statistical analysis of project durations and costs to optimise performance of vessels, transfer rates, buffer sizes, ports, use of a near field storage buffer, etc.”

TILT gives offshore wind developers and EPIC contractors in-depth insight in the logistical process and its most stringent bottlenecks. Subsequently, it delivers hard data on expected project duration and costs. The ultimate goal of

TILT is to induce substantial cost reductions.

Multipurpose Tool

TILT can be used in different phases of the project. During the design phase, TILT is a perfect decision-making tool. During the project phase, TILT serves as excellent monitoring tool. R&D manager Boudewijn van Gelder, who developed the tool in-house, explains: “TILT is a multipurpose tool. This tool models all links in the logistics chain that influence each other. In short, the program simulates a wind farm installation project, whereby the dynamic interactions of vessels, harbour access, buffer sizes etc. are computed in small time steps. The changing conditions of waves, wind and current have an effect e.g. on





sailing speed of the transport barges and various workability limits can delay certain operations for a period of time. Also other realistic disturbances, such as delays due to equipment failures, can be defined by the user.”

Design Phase

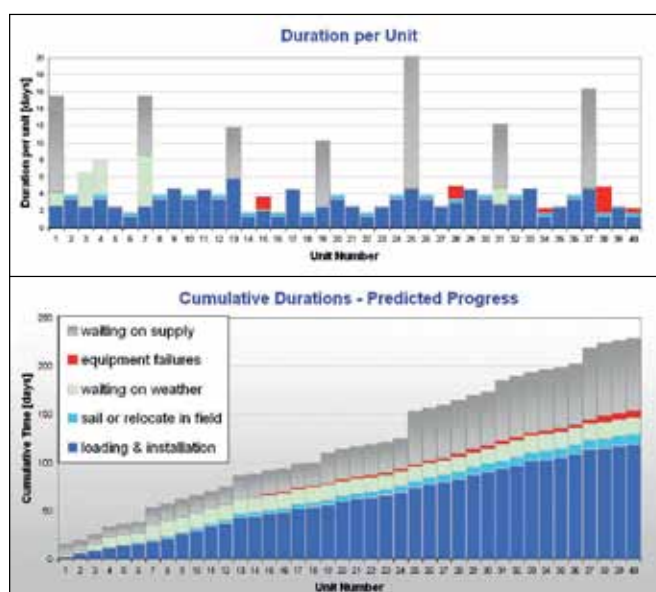
Different aspects in the model can help determine if a proposed harbour is suitable for the project. TILT answers question like:

- Is the harbour big enough for the number of vessels?
- Does the quay side have enough storage capacity?
- Does the tide obstruct the sail away of certain type of vessels or perhaps all vessels?
- Is the number of barges and tugboats high enough? Is their sailing speed fast enough and do they have sufficient storage capacity on board? Or would larger vessels be more suitable?

The harbour and vessel related aspects are just a few out of over 100 parameters that can be processed within TILT. Other parameters are e.g. wave height, wind speed and current. Van Gelder adds: “Certain boats and equipment are delayed or cannot work if wave heights and wind speeds exceed certain limits. These aspects will influence the choice of transport vessels and installation equipment at the offshore wind farm location. The original equipment considered could be over or under-dimensioned.”

Randomiser

Next to meteorological parameters, it is also possible to evaluate the base specifications of equipment in TILT. Failure rates on e.g. cranes can be incorporated into the model. If a crane would have a failure rate of once every one hundred lifts, it can be calculated how this would affect the other links in the logistics chain through time simulation in TILT. A randomiser is built into the algorithms

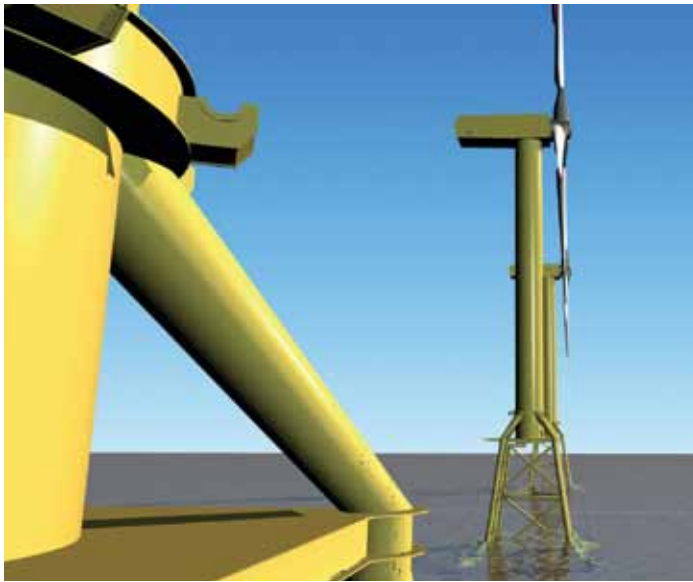


to process the failure rates. A result could be that smaller and cheaper types of vessels or barges would be most suitable for a specific project. It could also be the other way around. The conclusion could be that robust equipment with better performance statistics or heavier type of vessels would lead to the most optimal and cost effective solution.

Project Phase

Besides the use of TILT as a decision making tool in the design phase, TILT is also an excellent monitoring tool during project execution. The project planning can easily be monitored and updated based on the actual status. TILT can be used to match the fabrication delivery rates at the load-out yards with the installation rates offshore. This is a very useful feature as especially installation rates will vary in





time, for instance due to season effects. In addition, TILT can help to specify the size of storage buffers required at the load-out site and possible local buffers near the wind field. Any delay or failure can be processed through the model and will show the effect on all other project parameters. Vice versa, if operations go quicker than planned, parties involved can be requested in a preliminary phase to speed-up their activities.

In Practice

In practice these situations have already occurred in projects at the North Sea. A company installing monopiles was running ahead of schedule. Another company that took on the installation of the turbines and masts was not informed in time that they could start earlier although crew and vessel were available. The complexity of logistics is very difficult to oversee, especially as it is often managed through multiple subcontracts. The insights provided by TILT can save significant overruns and project delays in the complex logistical process.

Summarising, TILT's functionality is highly innovative in the offshore wind industry. In an unprecedented simple way, early decisions in multi million euro projects can be supported by well founded arguments and data. Used in an early stage in the project, TILT can optimise the project by making the right choices, reducing project costs substantially, and making logistics run like a well-oiled machine.

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