DP CAPABILITY AND THRUST CAPACITY ANALYSIS

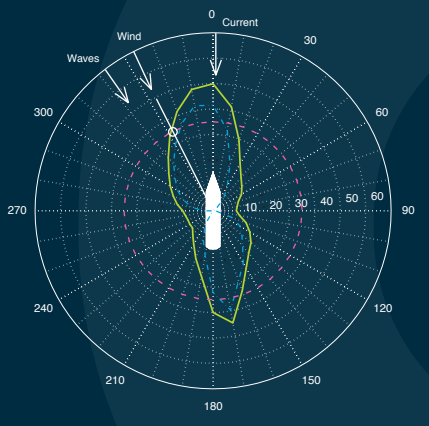
One of the main challenges when designing DP ships and rigs is to determine how many thrusters that are needed, the optimal location of these, and their maximum power and thrust. These are important design decisions with impact on station-keeping performance, ability to handle failure situations, as well as building and operational cost. For existing vessels the operability limits at given locations are important in the planning of marine operations.

Marine Cybernetics offers DP Capability and Thrust Capacity analysis to evaluate the station-keeping performance and determine if a given vessel design is suitable for specified weather conditions.

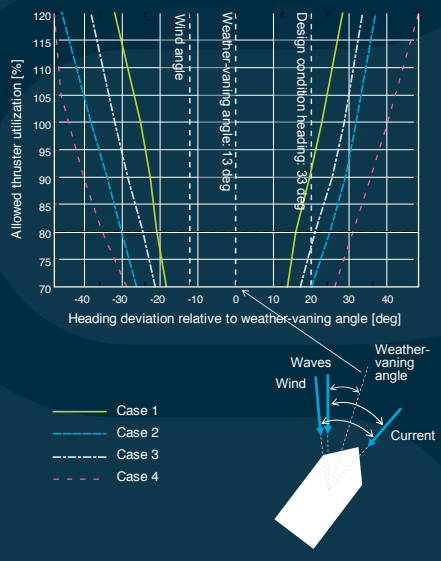
The standard DP Capability Analysis as specified by IMCA M140 has been extended to comprise current, wind, and waves attacking from different (non-colinear) directions, and includes wind and current loads from experimental data or database scaling, wavedrift loads from WAMIT based on vessel drawings, and sophisticated thrust loss models. In the analysis the weather-optimal heading of the vessel is determined, given the limitations of the operation. Then the heading angle is changed from the optimal value until the vessel cannot maintain its position and heading. The results are presented as plots of maximum heading deviation for different levels of allowable thrust. This is done for different design conditions and multiple thruster and power system configurations, including worst-case single point failure.

DP Capability and Thrust Capacity Analysis by Marine Cybernetics is a powerful tool for DP ship and rig design evaluations and operability analysis, in particular for reviewing the power plant configuration and number of thrusters, their location, and ratings in order to ensure a cost efficient vessel design that meet specific operating criteria.

DP CAPABILITY EXAMPLE



THRUST CAPACITY EXAMPLE



FACTS

DP Capability as specified by IMCA M140 is a static analysis where wind, wave, and current have the same direction. In the analysis the vessel has fixed position and heading, and is exposed to forces from a fixed current speed and correlated wind and waves. The wind speed is increased to the limiting value where the current, wind and wave forces exceed the available thruster forces and station-keeping is no longer possible. This is done for all wind directions and the limiting wind speeds are presented as polar plots called DP Capability envelopes.

DP Thrust Capacity studies are relevant for design of new builds, conversions, and operability studies of the following vessel types, amongst others

- Drilling vessels, DP or thruster assisted mooring
- Well intervention vessels
- FPSOs, DP or thruster assisted mooring
- DP Shuttle tankers and DP LNG tankers with offshore loading
- Diving support and construction vessels
- Heavy lift vessels
- Pipelay vessels

ABOUT MARINE CYBERNETICS

Marine Cybernetics specializes in independent HIL testing of control systems for the maritime, oil and gas markets.

Marine Cybernetics is ISO 9001 certified, and delivers HIL testing in compliance with DNV's Standard for Certification of HIL testing. Marine Cybernetics is a member of IMCA.

PIONEERS IN SOFTWARE TESTING

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