ANTI-HEELING REQUIREMENTS FOR SERVICE OPERATION VESSELS

Nowadays there is a growing demand for offshore wind power, with a trend for increasing turbine sizes. Service Operation Vessel ensure the safe operation of wind turbines at sea and offer the staff on board a comfortable accommodation. One of the main challenges for the operators is the dynamic working environment. The roll motion of the vessel for instance does not allow an automatic operation of a standard anti-heeling system.

Service Operation Vessels:

- Comfortable working environment for service technicians
- Fast and flexible operation of the crane, gangway or davit, with variable loads and motions

Anti-Heeling System Requirements:

- High compensation rates
- Fast and flexible reaction

HOW TO MEET THE OPERATIONAL REQUIREMENTS

Challenge:

Service Operation Vessels usually require high compensation rates, while having only moderately sizes Anti-Heeling tanks. This leads to relatively short running sequences of the AH-pump.

The closing time of the control valves are triggered by the recommendation of 1sec / 1cm diameter to avoid the water hammer effect (40sec for DN400).

The valve opening/closing time is conflict with the tank size.

Solution:

Hoppe has developed a standalone anti-heeling system that is designed to overcome the challenges in order to offer the best technical solution increasing the safety and efficiency of each offshore crane operation.

- **Flow Control (FC)** Anti-heeling system with flexible flow from “zero-flow” to maximum available flow using VFDs and certain control functionalities in combination with standard reversible propeller pumps.

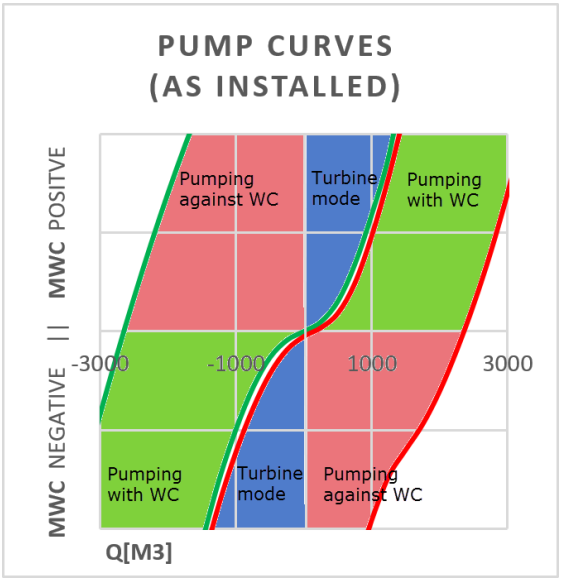
Benefits:

- Fast, flexible and accurate flow creation
- Less maintenance due to VFD operation
- No risk of motor overheating due to repeating start/ stop sequences

FLOW CONTROL SYSTEM

The basis of the Flow Control System is a reversible propeller pump operation with a variable, positive or negative pump rotation speed. The system precision required is ensured by a "Four Quadrat" operation of the pump based on known performance curves in all possible operation scenarios. The major features of the system are:

- Continuously running pump with variable RPMs
- Pump flow, gravity flow & turbine mode
- Flow duty point: RPM = F(MWC)
- Zero-Flow = System Standby
- Reduction of start-stop sequences
- Fast, flexible and accurate flow creation



OPERATION MODES

Manual Operation	Flow can be adjusted between zero flow and maximum available flow Pump direction, system start is se and stop is selected by push buttons
Automatic Operation	The system starts & stops operation automatically, when exceeding certain user defined thresholds. The flow speed is adjusted automatically depending on list angle offset. This operation mode is only usable in harbour.

OPTIONAL:

Joystick Operation	The system is interfaced with a joystick, that is installed next to the HMI and allows the operator a direct control of the flow speed in the manual mode
Load Moment Control Operation	The system is interfaced with the crane and/or the gangway and compensates automatically any moments implied by these systems. This operation mode allows automatic anti-heeling system operation at sea.