Power Management System With Fast Acting Load Reduction For DP Vessels

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Abstract

The last years, a number of DP class 2 and 3 vessels have been built for deepwater drilling, pipe and cable laying, etc. The majority of these modern vessels are equipped with a diesel-electric power generation plant and variable speed thrusters for positioning. In order to obtain the required redundancy, with a minimum of installation, the generation, distribution and thruster system is designed in several sections, divided by firewalls and may be separated by cross-bus feeders or bus-ties. One of the worst scenarios for a DP class 2 or 3 vessel is blackout of the power system, and a big effort is made by ship owners and vendors to increase the system's integrity towards failure. A key part of the blackout prevention functionality is found in the Power Management System. ABB has made significant improvements in the area of Energy or Power Management, introducing high-speed algorithms for quick power reduction and optimizing the thruster allocation for fuel optimization and utilization of running generator capacity. Results from this development are presented with full-scale data from sea trials of deepwater drill ships and semi-subs. It is shown that with an event-based load reduction function it is fully possible to prevent the feared domino effect of a fault in a DG-set. The key success factor is the close and coordinated link between power generation, frequency converters for thruster and drilling drives, dynamic positioning, and the power management system.

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