

Title: Power Management Systems for Offshore Vessels

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Abstract

Large offshore mobile drilling vessels contain onboard power systems with load demands as high as 50 MW. The load demand is supported by six or more electrical generators running in parallel on a single bus. These generators are driven by a variety of prime movers; the most common ones are two- and four-cycle diesel engines.

Common modes of faults may result in a complete blackout of the power system. On DP (dynamic positioning) drilling rigs, undesirable electrical system outages can result in revenue losses of millions of dollars, increased risk of an environmental incident, and damage to public opinion of the industry. This makes the electrical power system protection and control package critically important for DP vessels.

This paper first explains some of the protection failures currently experienced on these vessels, including failure or misoperation of generator exciters and governors, islanding of defective generators, slow fault detection, and clearing of wrong machinery. The criticality of designing complete systems for simplicity, robustness, maintainability, testability, local support, ease of commissioning, longevity, and availability is also explained.

This paper concludes with the discussion of a new paradigm for advanced prevention of blackouts, the keystone of which is a sophisticated generator protection and control system specifically designed for the needs of DP rigs.

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