Power Management and Black Out Protection

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Abstract

Current Offshore operations involving drilling, laying pipe, or mobile work platforms require Dynamically Positioned vessels, which depend upon the availability of electrical power for operation, integrity of the well and for safety – of both the ship and its personnel. The Power Management System (PMS) is a critical segment of the control equipment in the ship, to provide the power when it is wanted and to prevent blackouts. The equipment actually within the PMS includes the engines, generators, switchboards and controls along with the automation equipment that performs the calculation algorithms. Some trade-offs between efficiency and fault tolerance must be made to achieve a level of reliability that will provide the confidence necessary for a profitable partnership for the drilling contractor and for the oil company. These trade-offs begin during the conceptual design of the vessel, and continue during the day-to-day operation of the ship throughout its lifetime.

This paper looks at some system decisions that are made during design, how they affect the operation of the Power Management System, and provides some of the results from operational experiences of drillships based upon those decisions. The evaluation of fault tolerance or redundancy from the regulatory agencies, such as the ABS classifications of DPS-2 or DPS-3, is based upon the operational capability of the vessel while experiencing a single point failure. However, the design choices can result in more or less extensive effects from such failures. Design of the Power Management System and Blackout Protection must consider the performance characteristics of the system components, but it must also anticipate failures of critical equipment and provide continued protection for the remaining systems in spite of these failures.

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