

Title: Blackout Prevention and Recovery

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Abstract

Blackout is a condition where a ship experiences a total loss of electric power. The term "partial blackout" is sometimes used to describe loss of electric power in parts of the electric system, e.g. in one part of a redundant system.

For DP vessels and drilling rigs, a total loss of electric power is of course one of the most severe failures that can occur, where all electric systems are lost unless powered by battery back-up, and thrusters driven by electric motors are unavailable for station keeping. Blackout is therefore a condition to be avoided by all practical means, and if it yet should occur, restoring of the power plant should be reliable and within an adequate time. The term "adequate" time is used since it not necessarily means "as fast as possible"; the different vessel and their operational requirements influence the targeted recovery time. With an "as fast as possible" approach, the systems will become more complex to operate, using additional components and functionalities with new failure modes, and hence the required start up time must be considered during the design, without compromising the overall safety of the operations.

In this paper, various techniques that are used for black-out prevention, such as PMS load limitation, event based load reduction, frequency based load control, and advanced techniques for monitoring of the health of the power plant is being presented.

Black-out restart time sequences should be carefully defined in order to avoid unnecessary delays of the recovery of the electric power system. The paper presents methods to reduce the time sequence by critically evaluating the order and delay of events, both in conventional systems, and in system with enhanced recovery time functionality.

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