

Fault Analysis of Ship Power System Comprising of Parallel Generators and Variable Frequency Drive

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Abstract : Although advancement in technology has increased the reliability and ease of work in ship power system, but these advancements are also adding complexities. Ever increasing non linear loads, like power electronics (PE) devices effect the stability of the system. Frequent load variations and complex load dynamics are due to the frequency converters and motor drives, these problem are more prominent when system is connected with the weak grid. In the ship power system major consumers are thruster motors for the propulsion. For the control operation of these motors variable frequency drives (VFD) are used, mostly VFDs operate on nominal voltage of the system. Some of the consumers in ship operate on lower voltage than nominal, these consumers got supply through step down transformers. In this paper the vector control scheme is used for the control of both rectifier and inverter, parallel operation of the synchronous generators is also demonstrated. The simulation have been performed with induction motor as load on VFD and parallel RLC load. Fault analysis has been performed first for the system which do not have VFD and then for the system with VFD. Three phase to the ground, single phase to the ground fault were implemented and behavior of the system in both the cases was observed.

Keywords : non-linear load, power electronics, parallel operating generators, pulse width modulation, variable frequency drives, voltage source converters, weak grid

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