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Electromagnetic Assessment of Submarine Power Cable Degradation Using Finite Element Method and Sensitivity Analysis

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Abstract : Submarine power cables used for offshore wind farms electric energy distribution and transmission are subject to numerous threats. Some of the risks are associated with transport, installation and operating in harsh marine environment. This paper describes the feasibility of an electromagnetic low frequency sensing technique for submarine power cable failure prediction. The impact of a structural damage shape and material variability on the induced electric field is evaluated. The analysis is performed by modeling the cable using the finite element method, we use sensitivity analysis in order to identify the main damage characteristics affecting electric field variation. Lastly, we discuss the results obtained.

Keywords : electromagnetism, finite element method, sensitivity analysis, submarine power cables
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