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Published in:
Book of Abstracts : ESREL 2010, Rhodes, Greece

Publication date:
2010

Document Version
Publisher's PDF, also known as Version of record

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The costs to operation and maintenance (O&M) for offshore wind turbines are large, and riskbased planning of O&M has the potential of reducing these costs. This paper presents how Bayesian graphical models can be used to establish a probabilistic damage model and include data from imperfect inspections and monitoring. The method offers efficient updating of the failure probability, which is necessary for risk-based decision making. An application example is presented to demonstrate the capabilities of the method.