

JOURNAL: Energy Reports

TOPIC: Wind science and engineering: solutions and new Certificate of Approvals proposed for offshore wind turbine installation

ABSTRACT: Wind conditions are the most critical concerns during offshore wind turbine installation. Unfavorable wind can cause safety issues and a long time waiting, resulting in project delay and huge costs. Offshore wind energy industry utilizes weather forecast reports, however, many times the reports are found inconsistent, particularly in wind speed. The decision for installation work is then hard to make. The present paper provides a solution, by using the concept of time lag in Cross-Correlation and Pearson Correlation Coefficient, to analyze the similarity degree of the two reports, as well as to predict the next opening of weather window and the periodicity of the window. Not only aligning the reports, but also precisely judging of wind types are critical. The paper introduces a new view, in simulating four wind models, and defines their wind characteristics by Fourier Transform in frequency domain, to identify wind types in the anemometer measured data. The results show wind types in the anemometer data are identified. In whole paper, the industrial standard Certificate of Approvals are considered. Moreover, two new Certificate of Approvals specific to the above situations are proposed, for the industry's reference during offshore wind turbine installation. The purpose of this paper is to assist scientific/engineering frame works and the decision making for offshore wind, in the way of establishing new Certificate of Approvals. All inputs in the present paper are random or measured by author's personal devices to avoid the infringement of intellectual properties and patents.

