Structural Damage Detection for Hybrid Offshore Wind and Tidal Current Turbine

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ABSTRACT

Since the Kyoto Protocol took effect in 1997, there is lots of interest in the world on global warming and climate change resulting from the excessive use of fossil fuel. Subsequently, in 2015 COP21, known as the 2015 Paris Climate Conference, announces to reduce greenhouse gas emissions to limit the global temperature. Renewable energies have been emerged from the perspectives of securing energy supply and addressing the challenges of climate change, greenhouse gas emission reduction. Among those renewable energies, wind power has more commercially competitiveness and have been developed very fast for several decade. Further, recently to efficiently utilize ocean resources, the integrated exploitations of offshore wind and ocean energy have been carried out by a number of researches[1] [2]. Such the hybrid offshore wind and tidal current turbine (HOWTCT) plays an important role in supporting the energy-generating components (blades, hub and nacelle) and resisting wind and wave loads. Therefore it is necessary to develop the structural health monitoring (SHM) system for the supporting structure to secure the structural safety, as well as, to obtain sustainably the electric power from the HOWTCT.

The purpose of present study is to develop SHM system for the supporting structure of HOWTCT. The dynamic characteristics of the HOWTCT using conceptional HOWTCT model with structural damage at some locations is investigated in this study. To propose an appropriate damage detection technique for the HOWTCT, vibration-based damage detection technique was applied and verified by the finite element model of the conceptional HOWTCT model.

REFERENCES
