

Ambient Vibration Test and Numerical Modelling of Wind Turbine Towers including Soil Structure Interaction

Authors : Heba Kamal, Ghada Saudi

Abstract : Due to The rapid expansion of energy and growing number of wind turbines construction in earthquake areas, a design method for simple and accurate evaluation of seismic load to ensure structural integrity is required. In Egypt, there are some appropriate places to build wind turbine towers lie in active seismically regions, so accurate analysis is necessary for prediction of seismic loads with consideration of intensity of the earthquake, soil and structural characteristics. In this research, seismic behavior of wind turbine towers Gamesa Type G52 in Zafarana Wind Farm Egypt is investigated using experimental work by ambient vibration test, and fully dynamic analysis based on time history from El Aqaba Earthquake 1995 using 3D by PLAXIS 3D software, including the soil structure interaction effect. The results obtained from dynamic analyses are discussed. From this study, it is concluded that, the fully dynamic seismic analysis based on used PLAXIS 3D with the aid of the full scale ambient vibration test gives almost good simulation for the seismic loads that can be applied to wind turbine tower design in Egypt.

Keywords : Wind turbine towers, Zafarana Wind Farm, Gamesa Type G52, ambient vibration test

Conference Title : ICCE 2022 : International Conference on Concurrent Engineering

Conference Location : Dubai, United Arab Emirates

Conference Dates : March 21-22, 2022