Microwind Turbines: Static and Dynamic Wind Loads (1-Page Abstract)

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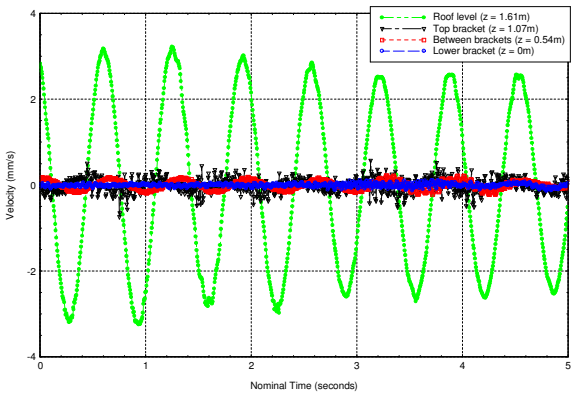
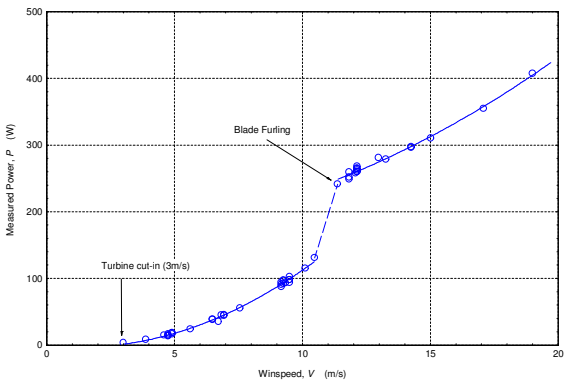
A recent guide to installation of renewable energy systems on roofs of residential buildings, NF30[1] has been released by the NHBC Foundation. This guide covers wind turbines, as well as passive systems such as PV and solar/thermal panels. Several problems encountered by the inappropriate mounting of small wind turbines to buildings are discussed therein. Wind-induced loads acting on wind turbines need to be transmitted to the structure of the building, and the poles and wall fixings must both be designed to withstand these forces.

The intended paper will bring together and summarise testing undertaken at BRE to investigate the static and dynamic wind loads generated by microwind turbines (wind turbines having a rotor diameter less than 2m) mounted on buildings. The findings of these studies enabled theoretical expressions to be derived for wind loads. These expressions are based upon the approach used in BS EN 61400[2], the UK code of practice for wind turbines.





Full-Scale Testing

Wind Tunnel Testing

The expressions given in BS EN 61400 have been extended to take into account the effect of the dynamic motion of the turbine pole. The work undertaken in this study has shown that there needs to be a new additional term which takes into account the effect of the dynamic motion. Simplified equations are presented as the method in NF30 that enables wind turbine mounting bracket shear forces and bending moments to be calculated. These equations take into account the static and dynamic wind loads.