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STATIC AND DYNAMIC WIND LOADS ON BUILDING-MOUNTED MICROWIND TURBINES

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A recently published NHBC Foundation guide to the installation of renewable energy systems on roofs of residential buildings covers wind turbines, as well as passive systems such as photovoltaics and solar thermal panels. Problems resulting from the inappropriate mounting of small wind turbines to buildings are discussed in the guide, which includes a new simplified theoretical approach for determining wind loads on microwind turbines attached to buildings.

Microwind turbines are turbines with a rotor diameter of less than 2 m. They are usually pole mounted and generate static and dynamic wind loads, which are transmitted to the building to which the pole is fixed. Full-scale measurements of microwind turbines and wind tunnel testing were used to develop the simplified theoretical approach given in the NHBC Foundation guide. Details of the testing and the theoretical derivation itself are not published in the Foundation guide, and reference to this Information Paper is made in the guide. This Information Paper both provides information about the testing undertaken at BRE and gives the detailed derivation of the expressions.

The NHBC Foundation guide is a document that is intended to be used by structural engineers and contractors who need to install all available types of renewable systems safely. With regard to wind-induced microwind turbine loads, certain simplifications make the guide easier to use in a practical context. However, to ensure that the calculated load values are safe, conservative assumptions have needed to be introduced.

This Information Paper is focused only on microwind turbine applications. It is intended for use by manufacturers and installers of microwind turbines and by structural engineers responsible for designing the mounting arrangements for turbines. The benefit of this paper to the manufacturers and installers is that by understanding fully the simplifications made in the NHBC Foundation guide, in many circumstances reductions in the wind loads can be achieved without compromising the safety of the installation.

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