

ACI ITG-9R-16

Report on Design of Concrete Wind Turbine Towers

Reported by ACI Innovation Task Group 9



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Report on Design of Concrete Wind Turbine Towers

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This report examines the benefits of the design of concrete towers for land-based wind turbines with heights in excess of 325 ft (100 m), in comparison to those of round steel tubular towers. These benefits include reduced cost, increased stiffness, and superior service life performance. Construction alternatives, design criteria, design methodologies, and guidance for preliminary design of concrete towers are presented.

The report recognizes that final tower design requires close coordination with the turbine supplier. The report is intended for those involved in developing preliminary tower designs. Concrete towers designed for maximum wind forces can be satisfactory for preliminary design, but the final design requires checking for all loads, especially fatigue and dynamic effects from wind and turbine operations. Design of connections and their proportions require an understanding of fatigue requirements during preliminary design for the connection design to remain valid during final checks.

Keywords: concrete tower; full-height tower; hybrid tower; precast elements; prestressing; slipformed; spread footings; turbine; wind; wind farm.

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