

STEEL WIND TURBINE TOWERS WITH INTERNAL RING STIFFENERS: ANALYSIS AND NUMERICAL INVESTIGATION

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ABSTRACT

Recent environmental phenomena along with the upcoming fossil fuel shortage make the use of renewable sources of energy imperative for the near future. Wind energy as a rather promising renewable energy source has advanced and is expanding rapidly. To this end, the improvement of the structural detailing of steel wind turbine towers is critical for the improvement of their performance thus resulting to more efficient, durable and robust structures facilitating their wider application and consequently the expansion of wind energy production. The present study identifies the contribution of steel internal circumferential stiffening rings placed along the tower height, to the overall structural behavior of the tower. The stiffening rings are suggested as a mean to reduce local buckling phenomena, increasing the buckling capacity of these slender steel structures. The beneficial role of the rings is established by the utilization of finite element model of the wind tower. Different distributions and locations of the rings are parametrically analyzed.

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