

Field Test for a Prefabricated External Prestressed Concrete Wind Turbine Tower

Yuqi Cao*, Renle Ma*, Huiqun Liu^a, Feng Liang^a

*College of Civil Engineering, Tongji University
Shanghai, 200092, China
09caoyuqi@tongji.edu.cn

^a Tongji Architectural Design (Group) Co., Ltd

Abstract

The prefabricated external prestressed concrete wind turbine tower is a competitive solution to large-scale turbine for its high stiffness and reasonable cost; as such, a 120-meter-high test tower supporting a 3MW turbine was built in Eastern China. A series of field test work was done to ensure its reliability. Vibrational chord strain gauges were adopted for monitoring the strain of key positions during the stressing process and operation period. Pressure sensors were used to monitor the force of prestressed steel strands. Finally, accelerometers were installed to collect the vibration at the top of the tower. The results matched with a previously done shell element model. The strain gauges results and the measured strand forces proved the feasibility of the structure solution. The natural frequency and damping ratio extracted from the acceleration data could provide reference for sequent modal estimate and seismic design.



Figure 1 Photo of the concrete wind turbine tower