

An Introduction to the SEM Substructures Focus Group Test Bed – The Ampair 600 Wind Turbine

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ABSTRACT

Recent advances have provided renewed interest in the topic of experimental dynamic substructures. A focus group has been formed in the Society for Experimental Mechanics to advance the experimental dynamic substructures technology and theory. Sandia National Laboratories has developed two identical test beds to enable the focus group to advance the work. The system chosen was an Ampair 600 wind turbine with a fabricated tower and base. Some modifications were made to the system to make it more linear for initial studies. The test bed will be available for viewing in the technology booth of the IMAC exposition. A description of the turbine and modifications will be presented. Initial measurements on the full system will be described. Initial modal tests have been performed on six blades at the University of Massachusetts at Lowell. Geometry and mass measurements for finite element modeling have been performed by the Atomic Weapons Establishment in the UK. Initial efforts to quantify each blade as an experimental substructure are ongoing. One goal is to develop an experimental dynamic substructure of the blades and hub to couple with a finite element model of the nacelle and tower to predict parked system response.

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