

SMART Wind Consortium

Subgroup Leads



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October



KANSAS STATE
UNIVERSITY
Department of Civil Engineering



Structural Engineering
subgroup lead

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Education

- PhD in Civil (Structural) Engineering from University of Southern California (USC, 2001)
- MS in Civil Engineering from USC
- MS in Electrical Engineering “Image/Signal Processing, Random Processes, and Solid-State Devices, from USC
- MS in Civil Engineering, Tehran University, 1985
- BS in Civil Engineering, Tehran University 1982



Teaching

- Professor of “Structural Engineering” at Kansas State University, Civil Engineering Department, since August 2002
- Teaching
 - Graduate Courses
 - Structural Dynamics
 - Advanced Reinforced Concrete
 - Design of Structures under Dynamic Loads
 - Undergraduate Courses
 - Design of Reinforced Concrete Structures
 - Design of Steel Structures
 - Structural Analysis
 - Statics/Dynamics

Research Interests

- Material models and analytical methods in reinforced concrete structures
- Experimental Methods in civil engineering applications
- Damage detection and Structural Health Monitoring
- Performance-Based Design
- Risk-assessment methods and stochastic models in civil engineering
- Remote sensing
- Imaging techniques

Research

- **Research**

- Damage Detection of Structures
 - Using wavelet Transform with a known excitation
 - Random excitation (wind/traffic load)
- Post Tensioning Inverted T Girders,
- Time-dependent properties of SCC,
- Confined Concrete Models and behavior,
- Seismic Response of Bridge Piers under Various Loading Scenarios,
- Thermal Effects on Integral Bridges, and
- Optimal Algorithms for Structural Damage Detection
- Material (concrete) pore detection (and development of software)

Professional

- **Professional Societies**

- ASCE

- ASCE-EMI Institute
 - Chair, Experimental Analysis and Instrumentation Committee

- ACI

- Committee 441 (Reinforced Concrete Columns)
 - Information Technology

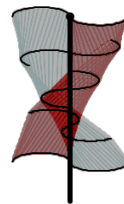
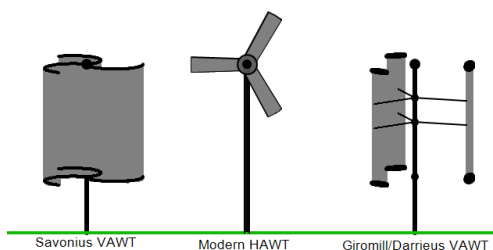
- Associate Editor of the ASCE Journal of Bridge Engineering

- Guest Editor of ASCE Journal of Engineering Mechanics

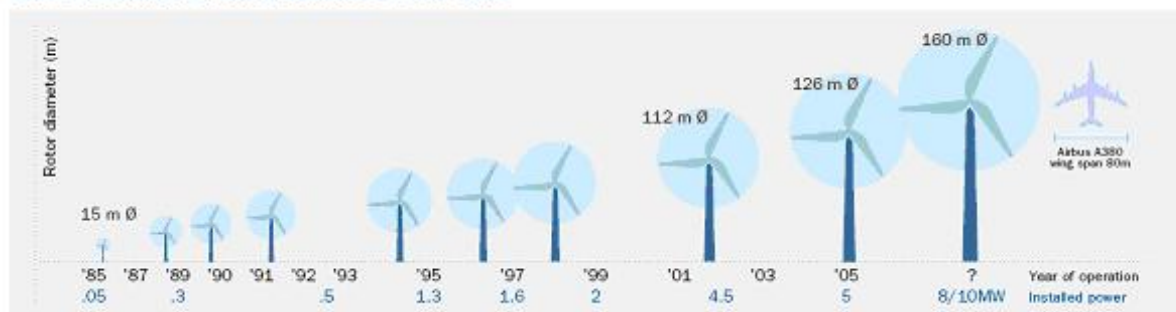
- Experimental Methods in Damage Detection and **Wind Engineering**

Distributed Wind Activities

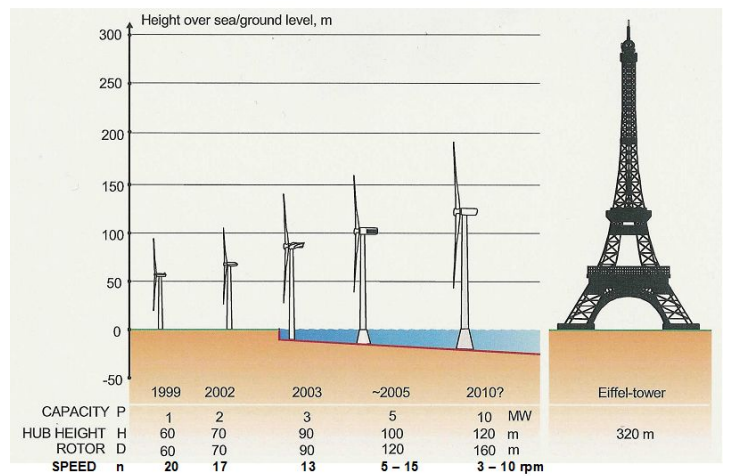
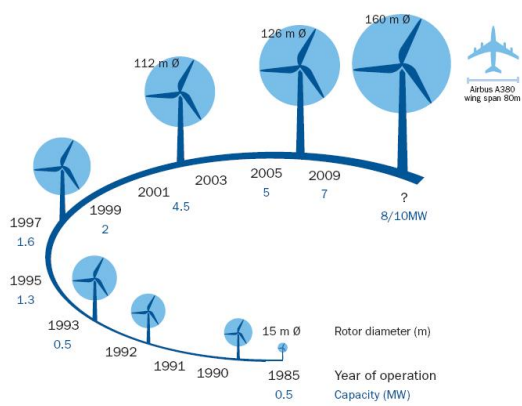
- Structural issues are a very important aspect of wind turbine – Evolution on time:



Size evolution of wind turbines over time



Size evolution of wind turbines over time



Structural Issues

- **Quality (various components, including structural)**
 - **Material Quality and Choice**
 - **Proper specifications and following that**
 - **Manufacturing problem**
 - **Mounting/fastening**
 - **Proper maintenance**
 - **Consideration of loads (especially dynamic loads) during the life time of the wind farm considering the site conditions**



Structural Issues

- **Dynamic properties of the structure as a whole, and also, dynamic response of individual components**
 - **Structural vibration modes, as a whole and components**
 - **Vibration induced by wind**
 - **Resonance**
 - **Noise issue**
- **Fatigue and failure of critical structural parts**
- **Many other structural issues that go hand in hand with mechanical/electrical aspects**

Structural Issues

- **Past failures, help with a safer design and maintenance**
 - **Well studied selection of the type, size , material, etc. considering the location and targeted power generation**
 - **Design and construction process**
 - **Maintenance**
 - **A reliable inspection process**
 - **A reliable continuous health-monitoring system and real-time damage detection**





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