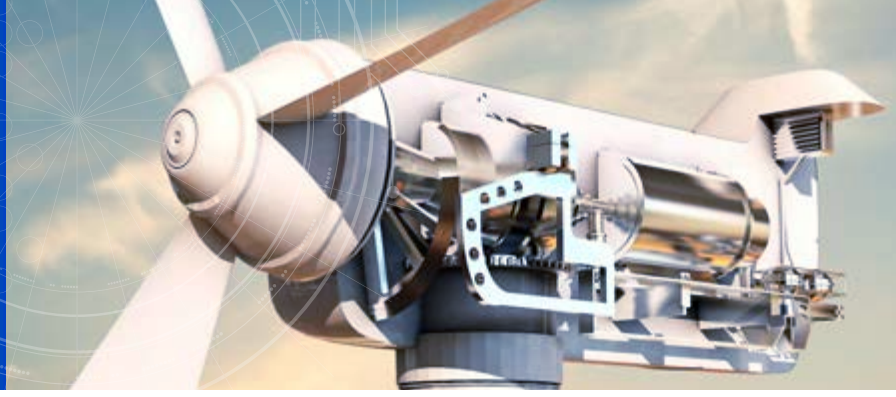




SOUTHWEST RESEARCH INSTITUTE



Wind Power Technology Services

The Mechanical Engineering Division of Southwest Research Institute® (SwRI®) has been involved in the design, analysis, testing and problem resolution of energy industry machinery for more than 50 years. With this background, Institute staff have developed expertise in machinery dynamics, thermal and fluid systems, and aerodynamic performance. SwRI engineers regularly apply this expertise using both commercially available and custom-engineered tools such as finite element analysis (FEA) and computational fluid dynamics (CFD) codes, as well as field and laboratory-based data acquisition tools and instrumentation.

Because the Institute is an independent organization, SwRI is uniquely positioned to provide third-party design audits, due diligence studies, prototype development and testing, and failure analysis. Our technical depth and breadth can be a valuable asset to smaller organizations that cannot afford the technical staff required for prototype development, and to larger organizations that cannot meet their engineering requirements with existing staff.

SwRI is particularly suited to contribute to the wind power industry, providing a variety of services for manufacturers, owners and entrepreneurs.

Prototype Design and Testing

- Prototype development from concept to actual hardware
- Instrumentation development and integration
- Design analysis (FEA, CFD, etc.)
- Test planning, operation and reporting
- Wind tunnel testing of prototype (up to 4 m diameter)

Torsional Vibration Analysis

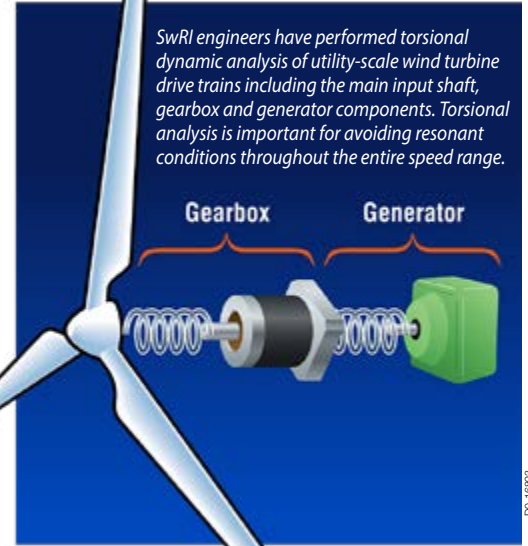
- Drivetrain modal analysis
- Forced response analysis
- Transient shock event analysis
- Wind spectrum analysis

Field Vibration Troubleshooting

- Drivetrain vibration
- Bearing failures
- Gearbox failures
- Strain measurement telemetry

Bearing and Gearbox Failure Analysis

- Metallurgical examination for failure mode
- Root cause failure analysis (RCFA)



DO 18583



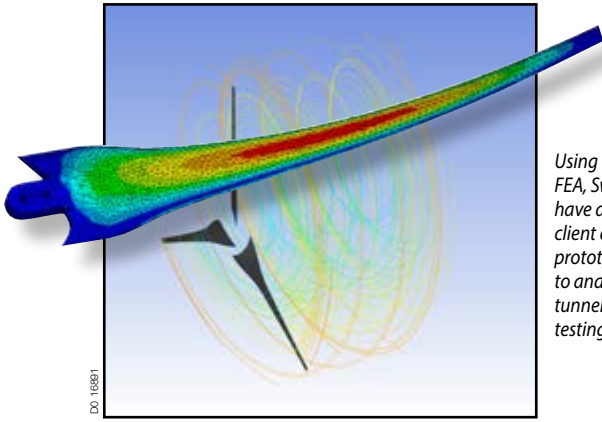
DM016752_0661

Metallurgical and root cause failure analyses are performed by SwRI engineers for a variety of energy industry machinery including gear box components, bearings and turbine blades.



DO 18582

SwRI field engineers have applied the same expertise in machinery diagnostics and problem analysis to utility-scale wind turbines as is regularly applied to other energy industry machinery, including instrumentation, data acquisition, data analysis, system modeling and problem resolution.



Using CAD, CFD and FEA, SwRI engineers have developed client concepts into a prototype reality, up to and including wind tunnel performance testing.



SwRI engineers make adjustments to instrumentation installed on a prototype wind turbine assembly. The turbine has instrumentation to measure blade strain and generator power as well as flow visualization features for testing in a full-scale wind tunnel facility.

We welcome your inquiries.

For more information, please contact:

Jeff Moore, PhD
 Institute Engineer
 210.522.5812
jmoore@swri.org

Machinery Department Mechanical Engineering Division

Southwest Research Institute
 6220 Culebra Road • PO Box 28510
 San Antonio, Texas 78228-0510

machinery.swri.org



SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world's most challenging scientific and engineering problems. Headquartered in San Antonio, Texas, our client-focused, client-funded organization occupies 1,200 acres, providing more than 2.3 million square feet of laboratories, test facilities, workshops, and offices for more than 2,600 employees who perform contract work for government and industry clients.

An Equal Employment Opportunity/Affirmative Action Employer
 Race/Color/Religion/Sex/Sexual Orientation/Gender Identity/National Origin/Disabled/Veteran
 Committed to Diversity in the Workplace

Like. Share. Follow. Listen.

210.522.2122

ask@swri.org



swri.org

©2019 Southwest Research Institute.
 All rights reserved.

Designed & printed by SwRI MPS 18-0119 JCN 260939 bl