

Xdot Engineering and Analysis, PLLC

Rotor Dynamics

Test Rig Design, Analysis and Troubleshooting

Foil Bearing Application Development

Engineering consulting blending practical hands-on experience
with experimental and analytical investigations since 1990.

Specializing in unusual and difficult challenges

Rotor Dynamic Analysis and Evaluation

Lateral, Torsional

Active Magnetic Bearing

Coupled Torsional/Lateral, Other Coupled Analysis

Rotating Machinery Test Rig Development and Troubleshooting

Foil Bearing Application Development

Experimental Modal Analysis

Signal and Data Processing and Presentation

Data Acquisition Systems and Instrumentation

Vibration Analysis and Troubleshooting

Matlab Programming (including GUI development)

Selected Projects

Dynamics Audit for Small Active Magnetic Bearing Supported Compressor

Rotor Dynamic Design Audit for LP Turbine Upgrade of 1200 MW Steam Turbine/Generator

Rotor Dynamic Evaluation of High Speed Centrifuge

Rotor Dynamic Evaluation of Foil Bearing Supported Compressor

Rotor Dynamic Evaluation of Industrial Fans

Rotor Dynamic Evaluation of Planet Gear Supported Turbine

Active Magnetic Bearing Drop Test Stand Development and Debugging

Development and Debugging of Compliant Foil Bearing Demonstrator Rigs

Compliant Foil Bearing Testing

Testing Support for Small, Advanced Turbo-Machine

Xdot Engineering and Analysis, PLLC

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visit Xdot on the web at www.XdotEA.com for more information

Erik E. Swanson, Ph.D., P.E.

Erik Swanson is the president and founder of Xdot Engineering and Analysis, PLLC. He specializes in rotor dynamics, rotating machinery component and system test rigs, and foil bearing application development. Other activities include technical programming, design tool development work and bearing research. He has been actively working in the area of rotating machinery since 1990, with an emphasis on experimental work. He received his B.S., M.S., and Ph.D. in Mechanical Engineering from Virginia Tech. Prior to founding his company, he worked at Mohawk Innovative Technology, Inc. (MiTi®), where he was the manager of the department of machinery dynamics and tribology.

While at MiTi, Dr. Swanson was a program manager for a number of programs, including ten Small Business Innovative Research (SBIR) programs, and two commercial projects. He was the principle investigator for two Phase SBIR I programs. Outcomes from these projects ranged from the demonstration of the rotor-bearing system for the world's first totally oil-free, high speed (70,000+ RPM) plant air compressor supported on foil bearings, operating above the first bending critical speed, to achieving key milestones in the development of a rotary left-ventricle assist device (heart assist blood pump).

Since forming his own company, Dr. Swanson has performed a number of rotor dynamic evaluations for a range of machines. Some of the more interesting projects have included a rotor dynamic design audit of a LP turbine upgrade for a 1200 MW steam-turbine generator (lateral, torsional, catenary and blade-loss dynamics), test support for a small, advanced turbo-machine, and rotor dynamic evaluation of a new centrifuge. One of the most recent projects was the development of a unique analysis approach to model a turbine generator which relies on a planetary gearbox to act a bearing during operation.

Xdot Engineering is active in several areas on the research front. One recent publication describes work to develop a technique for shape optimization of fixed geometry bearings for enhanced stability. A paper discussing a modeling approach for foil bearing foundation dynamics has been accepted for publication, and a follow-on discussing supercritical foil bearing rotor design is in review.

Dr. Swanson's background and interests also include signal processing, modal/vibration analysis, machinery troubleshooting, control systems, as well as teaching. He is a member of ASME, STLE, Sigma Xi, Tau Beta Pi, and Pi Tau Sigma. He has served as a session co-organizer for the ASME Vibrations Conference, a session chair for the ASME Vibrations Conference, the AMSE/STLE Joint Tribology Conference and the International Modal Analysis Conference, and a paper review for both ASME and STLE. He was a NASA Graduate Research fellowship recipient. He has 28 publications, as well as one patent. He is licensed as a professional engineer in the states of North Carolina and Virginia.

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