

EXPERIENCE

BRG MACHINERY CONSULTING, LLC, Charlottesville, VA

Machinery Specialist, June 2003 – Present

Work with a group of highly qualified machinery specialists in providing a full range of rotating machinery management services. Currently, conducting research in journal bearing modeling in the areas of turbulence, directed lubrication applications and hydrostatic effects in high pressure nuclear pump journal bearings as well as modeling of hole-pattern/honeycomb seals in pumps and compressors. Actively involved in various projects including vibration troubleshooting, new machine auditing, failure analysis and software development. Recently involved in the following projects:

- Rotordynamic design audit of a 50,000 HP multi-stage centrifugal compressor per API 617
- Rotor redesign to solve separation margin problem on a 1200 HP, 3600 rpm vertical electric motor
- Motor bearing redesign and pedestal modification to mitigate large electrical unbalance problem
- Development of a computer code for hydrostatic bearing analysis
- Steady state and transient torsional analysis of compressor train with redesigned couplings

ALLAIRE DEVELOPMENT COMPANY, Charlottesville, VA

Consultant, August 1997 – December 2002

Responsibilities included rotor model creation, critical speed and mode shape calculation, unbalance response analysis, stability analysis, bearing and seal analysis and design. Major projects included the following:

- Assessed the long-term operational capability of a nuclear plant's decay/low pressure injection pump due to a damaged inboard bearing
- Solved high synchronous vibration problem for an 8-stage boiler feed pump
- Redesigned bearings and pedestal to solve high synchronous vibration for a FCC wet gas compressor steam turbine driver
- Developed a computer code for flexible ring seal analysis of pump wear rings

ROTATING MACHINERY & CONTROLS LABORATORIES, University of Virginia

Research Assistant, August 1996 – May 2003

Developed a state-of-the-art thermoelastohydrodynamic algorithm to analyze different types of fluid film journal bearings. Implemented this algorithm in a finite element computer program (MAXBRG) for industrial bearing analysis and design. The program is widely used by many rotating machinery OEMs, end users and bearing manufacturers (Dresser-Rand, ExxonMobil, Waukesha). Major advances included:

- 2-D energy equation that included axial flow and high ambient pressure conditions
- Lubricant starvation models applicable to both fixed geometry and tilting pad journal bearings
- A turbulence theory to explain the cooling mechanism of the popular inlet groove tilting pad bearing
- Started theoretical investigations for the spray bar bearing
- Included the thermal effects in the pressure dam bearing analysis

Teaching Assistant, August 1997 – May 2003

Graduate courses: Finite Element Method; Advanced Engineering Mathematics

Undergraduate courses: Structural Dynamics; Partial Differential Equations

EDUCATION

UNIVERSITY OF VIRGINIA, Charlottesville, VA

Doctor of Philosophy, Mechanical and Aerospace Engineering, May 2003

Dissertation: *Thermoelastohydrodynamic Analysis of Fluid Film Journal Bearings*

SICHUAN UNIVERSITY, Chengdu, China

Bachelor of Science, Chemical Engineering, June 1994

Field of Study: Chemical Machinery

PROFESSIONAL ACTIVITIES

Member, Society of Tribologists and Lubrication Engineers (STLE)

CONFERENCE PAPERS

“Thermoelastohydrodynamic Analysis of Journal Bearings with a Generalized 2-D Energy Equation,” *IFTToMM 6th International Conference on Rotor Dynamics*, Sydney, Australia, 2002, with P Allaire.

“TEHD Modeling of Leading Edge Groove Journal Bearings,” *IFTToMM 6th International Conference on Rotor Dynamics*, Sydney, Australia, 2002, with P Allaire, L Barrett and J Nicholas.

“Vibration Reduction in a Large Industrial Motor with Substructure Flexibility and Resonance Problems”, *11th DINAME International Symposium on Dynamic Problems of Mechanics*, Ouro Preto, Brazil, February 28-March 4, 2005. with R Rockwell, G Li, P Allaire, A Castilho, R Faierstein and E Vasconcellos.

“Hydrostatic Bearing Performance Considering Orifice Geometry Effects”, *60th STLE Annual Meeting*, Las Vegas, NV, May16-19, 2005, with X Song, P Allaire and CH Cloud.

“Fundamentals of Fluid Film Journal Bearing Operation and Modeling,” *34th Turbomachinery Symposium*, Texas A&M University, Houston, Texas, December 2005, with CH Cloud and JM Byrne.

“Effects of Pivot Locking on The Operating Characteristics of a Tilting Pad Journal Bearing with Ball and Socket Pivots”, *Eleventh International Symposium on Transport Phenomena and Dynamics of Rotating Machinery*, Honolulu, Hawaii, February 2006, with RR Brechting, RD Flack, CH Cloud and LE Barrett.

“Journal Bearing Vibration and SSV Hash,” *37th Turbomachinery Symposium*, Texas A&M University, Houston, Texas, September 2008, with SM Decamillo, CH Cloud and JM Byrne.

“Low Frequency Shaft Vibration Tests and Analyses,” *7th EDF/LMS Workshop: Operational Limits of Bearings*, Electricité de France Company and Université de Poitiers, October 2008, with SM Decamillo, CH Cloud and JM Byrne.

JOURNAL PUBLICATIONS

“A Pressure Dam Bearing Analysis with Adiabatic Thermal Effects”, *Tribology Transactions*, Vol. 47, pp. 70-76, 2004, with P Allaire, CH Cloud and J Nicholas.

“Influence of Journal Speed and Load on the Static Operating Characteristics of a Tilting-Pad Journal Bearing with Ball-and-Socket Pivots”, *Tribology Transactions*, Vol. 48, pp. 283-288, 2005, with R Brechting, R Flack, CH Cloud and L Barrett.

“Thermohydrodynamic Modeling of Leading-Edge Groove Bearings under Starvation Condition”, *Tribology Transactions*, Vol. 48, pp. 362-369, 2005, with P Allaire, L Barrett and J Nicholas.