



ROTATING MACHINERY TECHNOLOGY, INC.

**PRECISION BEARINGS AND SEALS
TURBOMACHINERY REPAIR AND SERVICE
ROTOR DYNAMIC ANALYSES**

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R E S U M E 2 0 0 8

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I. PERSONAL DATA

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II. EDUCATION

University of Pittsburgh	9/64-5/68	BSAE	1968	Aerospace Engineering
Northwestern University	9/68-3/71	MSME	1969	Mechanical Engineering
University of Virginia	9/73-4/77	PhDME	1977	Mechanical Engineering (Rotor & Bearing Dynamics)

III. EMPLOYMENT

9/88-present	Owner, Chief Engineer, Rotating Machinery Technology, Inc.
2/83-9/88	Supervisor, Rotordynamics Group, Dresser-Rand (Turbodyne)
5/78-2/83	Senior Engineer, Rotordynamics Group, Ingersoll-Rand
1/78-5/78	Visiting Assistant Professor, University of Virginia
9/77-12/77	Post Doctoral Fellow, University of Virginia
6/76-8/76	Analytical Engineer, Rotordynamics Group, Ingersoll-Rand

IV. PUBLICATIONS & SHORT COURSES

1. Co-author of 40 technical papers and journal articles (see Section VII).
2. Co-author of 21 technical reports at the University of Virginia.
3. Co-author of 48 technical reports at Ingersoll-Rand.
4. Co-author of 140 technical reports at Dresser-Rand.
5. Author of 195 rotordynamic reports at RMT.
6. Co-sponsor and co-instructor of over 40 short courses in rotordynamics and bearing design in the US, Europe & South America.

V. PATENTS

1. Fluid Film Pocket Bearing, U.S. (No. 4,302,060) and Canadian Patent.
2. Tilting Pad Journal Bearing Spray-Bar Blocker, U.S. Patent No. 5,738,447.
3. Bearing Assembly with By-Pass Cooling, U.S. Patent No. 6,485,182.
4. Disc Spring Centering Device for Squeeze Film Dampers, Patent Pending.

VI. PROFESSIONAL AFFILIATIONS AND HONORS

1. American Society of Mechanical Engineers.
 - a. Reviewer, *ASME Transactions*.
2. Society of Tribologists and Lubrication Engineers.
 - a. Reviewer, *Tribology Transactions*.
 - b. Paper Solicitation Chairman, 1985-1987 STLE Annual Meeting.
 - c. Associate Editor, *Tribology Transactions*, 1986-1989.
3. Member of the Vibrations Institute.
4. Author and Editor of the API 684 Stability Tutorial, 2002-2005.
5. API Stability Specification committee member, 2002-2005.

VII. PUBLICATIONS - TECHNICAL PAPERS AND JOURNAL ARTICLES

1. **Nicholas**, J. C., Gunter, E. J., Allaire, P. E., "Effect of Residual Shaft Bow on Unbalance Response and Balancing of a Single Mass Flexible Rotor, Part I: Unbalance Response," *ASME Journal of Engineering for Power*, Vol. 98, No. 2, April 1976, pp. 171-181.
2. **Nicholas**, J. C., Gunter, E. J., Allaire, P. E., "Effect of Residual Shaft Bow on Unbalance Response and Balancing of a Single Mass Flexible Rotor, Part II: Balancing," *ASME Journal of Engineering for Power*, Vol. 98, No. 2, April 1976, pp. 182-189.
3. Allaire, P. E., **Nicholas, J. C.**, Gunter, E. J., "Systems of Finite Elements for Finite Bearings," *ASME Journal of Lubrication Technology*, Vol. 98, No. 2, April 1977, pp. 187-197.
4. **Nicholas, J. C.**, Gunter, E. J., Barrett, L. E., "The Influence of Tilting Pad Bearing Characteristics on the Stability of High Speed Rotor-Bearing Systems," *Topics in Fluid Film Bearing and Rotor Bearing System Design and Optimization*, an ASME publication, April 1978.
5. **Nicholas, J. C.**, Gunter, E. J., Allaire, P. E., "Stiffness and Damping Coefficients for the Five Pad Tilting Pad Bearing," *ASLE Trans.*, Vol. 22, No. 2, April 1979, pp. 112-124.
6. Allaire, P. E., **Nicholas, J. C.**, Barrett, L. E., "Analysis of Step Journal Bearings - Infinite Length, Inertia Effects," *ASLE Trans.*, Vol. 22, No. 4, October 1979, pp. 333-341.
7. **Nicholas, J. C.**, Kirk, R. G., "Selection and Design of Tilting Pad and Fixed Lobe Journal Bearings for Optimum Turborotor Dynamics," *Proceedings of the Eighth Turbomachinery Symposium*, Texas A&M University, College Station, TX, November, 1979.

8. Kirk, R. G., **Nicholas, J. C.**, "Analysis of High Pressure Oil Seals for Optimum Turbocompressor Dynamics," *I.Mech.E*, 1980.
9. **Nicholas, J. C.**, Allaire, P. E., "Analysis of Step Journal Bearings - Finite Length, Stability," *ASLE Trans.*, Vol. 23, No. 2, April 1980, pp. 197-207.
10. **Nicholas, J. C.**, Barrett, L. E., Leader, M. E., "Experimental-Theoretical Comparison of Instability Onset Speeds for a Three Mass Rotor Supported by Step Journal Bearings," *ASME Journal of Mechanical Design*, Vol. 102, No. 2, April 1980, pp. 344-351.
11. **Nicholas, J. C.**, Allaire, P. E., Lewis, D. W., "Stiffness and Damping Coefficients for Finite Length Step Journal Bearings," *ASLE Trans.*, Vol. 23, No. 4, October 1980, pp. 353-362.
12. **Nicholas, J. C.**, Kirk R. G., "Theory and Application of Multi-Pocket Bearings for Optimum Turborotor Stability," *ASLE Trans.*, Vol. 24, No. 2, April 1981, pp. 269-275.
13. **Nicholas, J. C.**, "Stabilized Bearings with Finite- Element Analysis," *Machine Design*, No. 16, July 9, 1981, pp. 169-170.
14. Kirk, R. G., **Nicholas, J. C.**, Donald, G. H., Murphy, R. C., "Analysis and Identification of Subsynchronous Vibration for a High Pressure Parallel Flow Centrifugal Compressor," Symposium - Workshop on Rotordynamic Instability Problems in High-Performance Turbomachinery, *NASA Conference Publication 2133*, 1980.
15. Kirk, R. G., **Nicholas, J. C.**, Donald, G. H., Murphy, R. C., "Analysis and Identification of Subsynchronous Vibration for a High Pressure Parallel Flow Centrifugal Compressor," *ASME Journal of Mechanical Design*, Vol. 104, No. 2, April 1982, pp. 375-383.
16. **Nicholas, J. C.**, Kirk R. G., "Four Pad Tilting Pad Bearing Design and Application for Multi-Stage Axial Compressors," *ASME Journal of Lubrication Technology*, Vol. 104, No. 4, October 1982, pp. 523-532.
17. **Nicholas, J. C.**, "Double Pocket Bearing Design and Application," *Computer-Aided Lubrication Analysis and Bearing Design*, ASME publication, October 1982.
18. **Nicholas, J. C.**, "Pressure Dam Bearing Design for Optimum Turbomachinery Stability," *Hydrocarbon Processing*, April 1983, pp. 91-93.
19. **Nicholas, J. C.**, "Stability, Load Capacity, Stiffness and Damping Advantages of the Double Pocket Journal Bearing," *ASME Journal of Tribology*, Vol. 107, No. 1, January 1985, pp. 53-58.

20. Allaire, P. E., Kocur, J. A., **Nicholas, J. C.**, "A Pressure-Parameter Method for Finite-Element Solutions of Reynolds Equation," *ASLE Trans.*, Vol. 28, No. 2, April 1985, pp. 150-158.
21. **Nicholas, J. C.**, "Stabilizing Turbomachinery with Pressure Dam Bearings," *Encyclopedia of Fluid Mechanics*, Vol. 2, Gulf Publishing Co., 1986.
22. Barrett, L. E., **Nicholas, J. C.**, Dhar, D., "The Dynamic Analysis of Rotor-Bearing Systems Using Experimental Bearing Support Compliance Data," *Proceedings of the 4th International Modal Analysis Conference*, Union College, Schenectady, NY, Vol. 2, February 1986, pp. 1531-1535.
23. **Nicholas, J. C.**, Barrett, L. E., "The Effect of Bearing Support Flexibility on Critical Speed Prediction," *ASLE Trans.*, Vol. 29, No. 3, July 1986, pp. 329-338.
24. **Nicholas, J. C.**, Whalen, J. K., Franklin, S. F., "Improving Critical Speed Calculations Using Flexible Bearing Support FRF Compliance Data," *Proceedings of the Fifteenth Turbomachinery Symposium*, Texas A&M University, College Station, TX, November, 1986.
25. **Nicholas, J. C.**, "Operating Turbomachinery on or Near the Second Critical Speed in Accordance with API Specifications," *Proceedings of the Eighteenth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September, 1989.
26. **Nicholas, J. C.**, Moll, R. W., "Shifting Critical Speeds Out of the Operating Range by Changing from Tilting Pad to Sleeve Bearings," *Proceedings of the Twenty-Second Turbomachinery Symposium*, Texas A&M University, College Station, TX, September, 1993.
27. **Nicholas, J. C.**, "Tilting Pad Bearing Design," *Proceedings of the Twenty-Third Turbomachinery Symposium*, Texas A&M University, College Station, TX, September, 1994.
28. **Nicholas, J. C.**, Wygant, K. D., "Tilting Pad Journal Bearing Pivot Design for High Load Applications," *Proceedings of the Twenty-Fourth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September, 1995.
29. **Nicholas, J. C.**, "Tilting Pad Bearing Design and Application," *Proceedings of the Fifth Latin American Turbomachinery Congress*, November, 1995.
30. **Nicholas, J. C.**, "Hydrodynamic Journal Bearings - Types, Characteristics and Applications," *Mini Course Notes*, 20th Annual Meeting, The Vibration Institute, Willowbrook, IL, June 1996.
31. **Nicholas, J. C.**, Edney, S. L., Kocur, J. A., Hustak J. F., "Subtracting Residual Unbalance for Improved Test Stand Vibration Correlation," *Proceedings of the Twenty-Sixth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September, 1997.

32. **Nicholas, J. C.**, "Utilizing Dynamic Support Stiffness for Improved Rotordynamic Calculations," *Proceedings of IMAC-XVII*, 1999.
33. Edney, S. L., **Nicholas, J. C.**, "Retrofitting a Large Steam Turbine with a Mechanically Centered Squeeze Film Damper," *Proceedings of the Twenty-Eighth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September 1999.
34. **Nicholas, J. C.**, "Lund's Pad Assembly Method for Tilting Pad Journal Bearings" *Proceedings of the ASME Design Engineering Technical Conferences and Computers and Information in Engineering Conferences*, September 2001.
35. **Nicholas, J. C.**, Edney, S. L., Matthews, T., Varela F. J. M., "Eliminating a Rub-Induced Startup Vibration Problem in an Ethylene Drive Steam Turbine," *Proceedings of the Thirtieth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September 2001.
36. **Nicholas, J. C.**, "Tilting Pad Journal Bearings with Spray-Bar Blockers and By-Pass Cooling for High Speed, High Load Applications," *Proceedings of the Thirty-Second Turbomachinery Symposium*, Texas A&M University, College Station, TX, September 2003.
37. **Nicholas, J. C.**, "Lund's Tilting Pad Journal Bearing Pad Assembly Method," *ASME Journal of Vibrations and Acoustics*, Vol. 125, No. 4, October 2003, pp. 448-454.
38. He, M., Allaire, P. E., Cloud, C. H., **Nicholas, J. C.**, "A Pressure Dam Bearing Analysis with Adiabatic Thermal Effects," *STLE Tribology Transactions*, Vol. 47, No. 1, January 2004, pp. 70-76.
39. He, M., Allaire, P. E., Barrett, L. E., **Nicholas, J. C.**, "Thermohydrodynamic Modeling of Leading-Edge Groove Bearings Under Starved Conditions," *STLE Tribology Transactions*, Vol. 48, No. 3, July 2005, pp. 363-369.
40. **Nicholas, J. C.**, Kocur, J. A., "Rotordynamic Design of Centrifugal Compressors in Accordance with the New API Stability Specifications," *Proceedings of the Thirty-Fourth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September 2005.
41. Kocur, J. A., **Nicholas, J. C.**, Lee, C. C., "Surveying Tilting Pad Journal Bearing and Gas Labyrinth Seal Coefficients and Their Effect on Rotor Stability," *Proceedings of the Thirty-Sixth Turbomachinery Symposium*, Texas A&M University, College Station, TX, September 2007.
42. **Nicholas, J. C.**, Elliott, G., Shoup, T. P., Martin, E., "Tilting Pad Journal Bearing Starvation Effects," *Proceedings of the Thirty-Seventh Turbomachinery Symposium*, Texas A&M University, College Station, TX, September 2008.