

SHORT COURSE 1
on
CENTRIFUGAL PUMP OPERATION FOR OPERATORS



Robert J. (Bob) Hart is an independent consultant and is the Senior Member of the consulting firm, Robert J. Hart Enterprises, LLC. He was previously employed by the Dupont Company (27 years) and retired as a Principal Consultant in the Rotating Machinery Group in the Engineering Department. His primary responsibilities were to define Corporate pumping system philosophy and procedures, provide technical guidance on special pumping applications, chaired the Pump Standards effort, chaired the Dupont Corporate Pump Committee, and provided technical leadership in the major Dupont Pump Supplier Alliance.

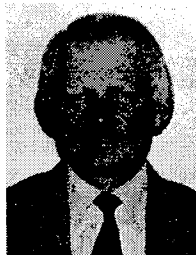
Mr. Hart is Chairman of the ANSI B73 Pump Committee and a former member of the Texas A&M Turbomachinery Laboratory's International Pump Users Symposium Advisory Committee. He was previously employed for 13 years in the Engineering Department of Cooper Bessemer and served four years in the U.S. Navy aboard various ships.



Jerome A. (Jerry) Lorenc is Senior Research Engineer in the Industrial Pump Group of ITT Industries, in Seneca Falls, New York. He has been with ITT since 1976, serving as Instrumentation Engineer, Supervisor of the R&D Lab, and his present position. His responsibilities include design of pump test facilities, managing new technology projects, and engineering assistance to sales and field service. Mr. Lorenc has been involved in vibration, pressure pulsation, and condition analysis of pumps for the past 25 years. He has published four papers and has a centrifugal pump related U.S. patent.

Mr. Lorenc received a B.S. degree (Aircraft Maintenance Engineering, 1970) from Parks College of Saint Louis University, completed a full year of graduate work in Mechanical Engineering at Rochester Institute of Technology (1976), and is certified Vibration Specialist III (1996). He is a member of ISA and the Vibration Institute.

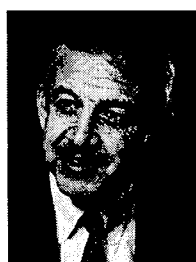
SHORT COURSE 3
on
SHAFT SEAL DESIGN AND APPLICATIONS (ADVANCED)



Alan O. Lebeck started Mechanical Seal Technology, Inc. (MSTI) in 1987, in Albuquerque, New Mexico. MSTI performs research and product development, designs software, and consults, all in relation to mechanical seals.

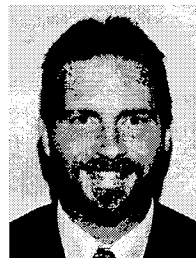
Dr. Lebeck served on the faculty of the University of Illinois, then worked for Shell Development. From 1971 to 1987, he served as Professor and Director of the Mechanical Engineering Department at the University of New Mexico, and as Director of the Bureau of Engineering Research. During this time, he started a mechanical seal research program under the sponsorship of the National Science Foundation and the U.S. Navy. This work served as the basis for numerous papers, reports, and inventions. A seal test program was started in 1978 and has continued. His book, *Principles and Design of Mechanical Face Seals*, was published by John Wiley (1991).

Dr. Lebeck received his B.S. (1964), M.S. (1965), and Ph.D. (1968) degrees (Mechanical Engineering) from the University of Illinois.



Michael D. (Mike) Concannon is currently Senior Application Engineer for Flowserve, located onsite at Pharmacia in Kalamazoo, Michigan. He has held assignments as Research Engineer and Senior Research Engineer with Flowserve. Prior to joining Flowserve (formerly Durametallc) in 1984, he was Director of Research and Development for a pulp and paper equipment manufacturer.

Mr. Concannon received a B.S. degree (Electrical Engineering, 1969) from Western Michigan University. He has written several technical papers and is a registered Professional Engineer in the State of Michigan.



Joseph (Joe) Boylan is Vice President - Business Development at Morgan Advanced Materials & Technology, in St. Marys, Pennsylvania. He has held several positions in his 15 years in the mechanical carbon industry, including Test Engineer, Manager of Manufacturing Engineering, Product Engineer, and Manager of Product Engineering. Mr. Boylan has been responsible for the design, development, and marketing of the various carbon-graphite and silicon carbide materials. With the addition of the product testing responsibilities, he has an extensive background in the field of self-lubricating materials. With the acquisition of Pure Carbon by Morgan Crucible in March 1995, Mr. Boylan assumed the responsibility of all product engineering responsibilities for the America's. Most recently, he has assumed the marketing role as well.

Mr. Boylan received his B.S. degree (Electrical Engineering, 1984) from the Pennsylvania State University. He is a member of SAE, SME, and STLE.



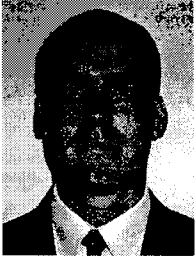
Michael Huebner is the Manager of Product Development at Flowserve Corporation, Flow Solutions Division, in Temecula, California. He has more than 16 years of experience in the design of mechanical seals, centrifugal and positive displacement pumps, and fluid conditioning equipment. For Flowserve, he has served in design testing and application functions in both Europe and the U.S.

Mr. Huebner received his B.S. degree (Engineering Technology) from Texas A&M University.



James R. (Jim) Wasser is the Product Engineering Manager with John Crane Mechanical Seals, located in Morton Grove, Illinois. Before John Crane, he worked at Magenta Corporation, a custom molder of thermoplastics, as a Design Engineer. He is currently responsible for new product development in North America and has been with John Crane since 1986. Mr. Wasser holds six patents in the field of dry running seal technology and has written papers for the International Pump Users Symposium, STLE, and AICHEMA.

Mr. Wasser received his B.S. degree (Mechanical Engineering, 1985) from Illinois State University.



Ed Wilcox is a Senior Staff Engineer with Conoco, Inc., in Westlake, Louisiana, where he is the Reliability Engineer for Excel-Paralubes, a joint venture between Conoco and Pennzoil. He also provides technical support for the adjacent Conoco Refinery. His responsibilities include maintenance, troubleshooting, and specification of rotating equipment.

Mr. Wilcox received his BSME degree from the University of Missouri-Rolla and MSME degree from Oklahoma State University. He has also done post graduate work at the Georgia Institute of Technology in the areas of machinery vibration, lubrication, and rotordynamics. He is a Vibration Institute certified Level III Vibration Specialist, a member of STLE, and a registered Professional Engineer in the State of Oklahoma.

SHORT COURSE 4
on
CENTRIFUGAL PUMP AND SYSTEM INTERACTION



Michael Volk is President of Volk & Associates, Inc., a consulting firm specializing in pumps and pump systems, in Oakland, California. Holding B.S. and M.S. degrees in Mechanical Engineering, Mr. Volk is a registered Professional Engineer in the State of California with over 25 years of practical pump experience. He is the author of *Pump Characteristics and Applications*, published by Marcel Dekker, New York, New York, now in its fourth printing. Prior to forming his own consulting firm in 1982, Mr. Volk had experience in pump system design with Bechtel Corporation, held various engineering and marketing positions with Goulds Pumps, and started up and managed a Goulds pump repair center in Houston, Texas. His consulting activities with Volk & Associates have included teaching hundreds of pump courses in the U.S. and a dozen other countries; assisting users and consultants with pump system design and specification development; and evaluating, troubleshooting, and testing installed pumps.

SHORT COURSE 5
on
**LIFE-CYCLE COST FOR PUMPING SYSTEMS—
REDUCING THE COST OF OPERATION AND MAINTENANCE
THROUGH IMPROVED SYSTEM PERFORMANCE**

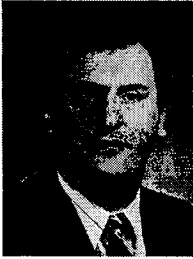


Gunnar Hovstadius is Director of Technology with ITT Fluid Technology Corporation, in Upper Saddle River, New Jersey. He joined ITT Flygt in Solna, Sweden, in 1981, where he headed R&D for their extensive pump program, including its hydrogenerator program. In 1985, he moved to ITT Flygt (USA), assuming the position of Technical Manager for ongoing development activities. In 1996, Dr. Hovstadius was appointed to his current position. Prior to joining ITT Flygt, he worked at the Aeronautical Research Institute of Sweden as a Research Engineer and at Alfa Laval (Sweden) as head of the Fluid Dynamic Research Group.

Dr. Hovstadius became involved in the US Department of Energy's Motor Challenge Program early in 1995. He has presented many seminars for the DOE.

Dr. Hovstadius received B.S. and M.S. degrees from the University of Upsala and a Doctor of Science degree (Fluid Dynamics) from the Royal Institute of Technology in Stockholm.

SHORT COURSE 6
on
POSITIVE DISPLACEMENT PUMPS



Lev Nelik is a President of Liquiflo Equipment Company, in Garwood, New Jersey. He has over 20 years of engineering, manufacturing, sales, field, and management experience in the pump industry. Previously, he worked at Roper Pump, IDP (Ingersoll-Rand), and ITT (Goulds Pumps).

Dr. Nelik is a registered Professional Engineer and has published over 50 documents, including a "Pumps" section for the *Encyclopedia of Chemical Technology*, a section for the *Handbook of Fluids Dynamics*, and a book *Centrifugal and Rotary Pumps: Fundamentals with Applications*.

Dr. Nelik is a member of the International Pump Users Symposium Advisory Committee, an Advisory Board Member of *Pumps & Systems* and *Pumping Technology* magazines, and a former Associate Technical Editor of the *Journal of Fluids Engineering*. He is a full member of ASME, and a Certified APICS (CIRM). He is a graduate of Lehigh University with an M.S. degree (Manufacturing Systems) and a Ph.D. degree (Mechanical Engineering).



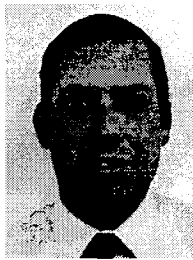
John Petersen is Vice President, Technical Customer Service, for Viking Pump, Inc., in Cedar Falls, Iowa. His responsibilities include application, troubleshooting, and technical support for gear, lobe, and gerotor type rotary pumps. Previous responsibilities at Viking include Project Engineer, Chief Design Engineer, Chief Engineer-Research and Development, and Vice President, Engineering.

Mr. Petersen received his B.S. degree from Iowa State University (1970) and is a registered Professional Engineer in the State of Iowa. He is a member of the Hydraulic Institute and serves on the Rotary Pump Committee.



James R. (Jim) Brennan is Market Services Manager for Imo Pump, in Monroe, North Carolina. His responsibilities include worldwide marketing and technical support for pumping applications. He has 30 years of service with Imo Industries. Engineering manager for five years, Mr. Brennan has spoken at a number of conferences worldwide and has published more than three dozen technical articles and papers.

Mr. Brennan is a 1973 graduate of Drexel University in Philadelphia and a member of the Society of Petroleum Engineers.



Robert (Bob) Limper is Director of Sales for Bran + Luebbe, Inc., in Folly Beach, South Carolina. He has been involved with all aspects of sales and service to the pump industry for more than 18 years. Throughout his career, he has been involved with the engineering and sale of nearly every type of pump, from centrifugal through positive displacement.



Lez Warren is a Director of Cat Pumps (U.K.) Limited, manufacturers of high pressure triplex pumps, in Hampshire, England. He runs their European Technical Centre and has been responsible for a number of unique developments within the high pressure pumping industry.

Mr. Warren graduated from Loughborough England with first class honors in Aeronautical Engineering. He then joined the British Ministry of Defence as an Aerospace Research Scientist, specializing in materials and heat transfer. He then worked for two specialist material suppliers before joining Cat Pumps some 26 years ago.
