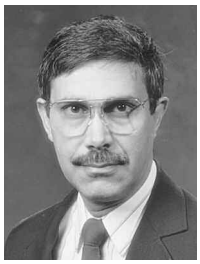
SHORT COURSE 1
on
BASIC PUMP HYDRAULICS WITH A MINIMUM OF MATHEMATICS

Robert J. (Bob) Hart, Consultant, was previously employed by the DuPont Company (28 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 was Chairman of the ANSI B73 Pump Committee for nine years 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.



John P. Joseph II is an independent consultant with Rotating Equipment Systems Technical Associates, in Houston, Texas. He was previously with BP Amoco where he provided technical and maintenance support for rotating equipment systems to existing asset organizations in BP Amoco, and to Project Management on new projects. Prior to that, Mr. Joseph was with the Amoco Petroleum Products Refinery, in Texas City, Texas. He supervised the rotating equipment engineers and the rotating equipment specialists for the refinery. Mr. Joseph spent six and one half years as Superintendent of Central Shops and three years in Amoco's Refining and Transportation Engineering Department, in Chicago, Illinois. Previous assignments at the Amoco Texas City refinery also included the Rotating Equipment Consulting Group, the Project Engineering Group, and as a Maintenance Engineer on the Hydrocracking Unit.

Mr. Joseph received his B.S. degree (Mechanical Engineering, 1972) from the University of Texas at El Paso.

SHORT COURSE 2
on
THE RELATIONSHIP OF VIBRATION TO PROBLEMS IN CENTRIFUGAL PUMPS

Paul Boyadjis is a Senior Staff Engineer of the rotating machinery consulting and troubleshooting company, Mechanical Solutions, Inc., in Parsippany, New Jersey. During his 20 year career, he has specialized in advanced solids modeling techniques as well as vibration and structural analysis of turbomachinery using advanced finite element analysis methods. Prior to joining MSI in 2002, he was previously lead analytical engineer in the Corporate Research and Development Group for Flowserve Corporation, formerly Ingersoll-Dresser Pump Company. While there, Mr. Boyadjis wrote many of the structural and vibration analysis procedures for the Government Marine Business unit of IDP. He also developed and perfected FEA methods for accurately predicting natural frequencies in vertical pumps. He is currently an associate editor of the *Tribilogy and Lubrication Technology* magazine.

Mr. Boyadjis received his BSME (1984) and MSME (1998) degrees from Lehigh University.

Richard J. Cronin is a Senior Engineer for Mechanical Solutions, Inc., in Eldersburg, Maryland. He has more than 15 years of experience in the design, development, analysis, and troubleshooting of rotating equipment. While at Ingersoll-Dresser Pump (Flowserve), he was the lead mechanical design engineer for the development of their line of submersible sewage pumps (MSX) and vertical turbine nonclog pumps (QMN). He received three United States and international patents for work performed on these developments.

Mr. Cronin has a BSME degree from the University of Maryland at College Park, and he is a registered Professional Engineer in the States of Virginia and Maryland.

William D. Marscher is President and Technical Director for Mechanical Solutions, Inc., in Parsippany, New Jersey. He has held senior positions at Dresser Pump, Pratt & Whitney, and Concepts NREC, and founded Mechanical Solutions Inc. in 1996. He has spent his career of 33 years involved in the design, development, and troubleshooting of pumps and all kinds of turbomachinery. His capabilities and experience include finite element analysis, rotordynamic analysis, experimental modal analysis, vibration testing, predictive maintenance, and the mechanical design of fluid systems. His machinery vibration test procedures won the Dresser Creativity Award, and his rotor bearing rub analysis method won the ASLE Hodson Award. He has authored and coauthored chapters for seven handbooks, and is coauthor of the book, *Centrifugal Pumps*, published by Oxford University Press.

Mr. Marscher has BSME and MSME degrees from Cornell University, where he was a NASA Fellow, and an M.S. degree from RPI.

SHORT COURSE 3
on
MECHANICAL SEALS—DESIGN, OPERATION, AND TROUBLESHOOTING

William A. (Alan) Evans is the Global Business Development Manager for the Commercial Water Markets for the A.W. Chesterton Company, in Groveland, Massachusetts. He has more than 24 years of experience working with various types of rotating equipment including pumps, agitators, turbines, compressors, and drives. Prior to joining Chesterton, Mr. Evans was a Rotating Equipment/Reliability Engineer in the chemical process/utilities industry for more than 14 years.

Mr. Evans holds an MBA (High Technology Management) from Northeastern University, a B.S. degree (Mechanical Engineering Technology) from Rochester Institute of Technology, and an AAS degree (Mechanical Engineering) from Pennsylvania State University. He is a member of STLE, Chairman of the Seals Technical Committee, and sits on the International Pump Users Symposium Advisory Committee.

Michael B. Huebner is a Staff Engineer in the Flow Solutions Division of Flowserve Corporation, in Deer Park, Texas. He has more than 20 years' 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 the U.S. and Europe.

Mr. Huebner received his B.S. degree (Engineering Technology) from Texas A&M University. He is a member of the International Pump Users Symposium Advisory Committee and the API 682 Task Force.

SHORT COURSE 4
on
FUNDAMENTALS OF CENTRIFUGAL PUMP AND SYSTEM INTERACTION

Michael Volk is President of Volk & Associates, Inc., in Oakland, California, begun in 1982. He is the author of *Pump Characteristics and Applications* (Marcel Dekker), now in its ninth printing. His consulting activities 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. Since 1997, Mr. Volk has been an owner and partner in Pumpstock, a manufacturers' representative and regional business manager for pump manufacturers in the western states. Previously, he 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.

Mr. Volk has B.S. and M.S. degrees (Mechanical Engineering), and is a registered Professional Engineer in the State of California with over 30 years of practical pump experience.

SHORT COURSE 5
on
POSITIVE DISPLACEMENT PUMPS

Jack E. Boteler is with Capital Process Equipment Ltd., LLP, in Houston, Texas.

James R. (Jim) Brennan is Projects Manager for IMO Pump, in Monroe, North Carolina. His responsibilities include worldwide marketing and technical support for pumping applications. He has more than 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.

Lev Nelik is President of Pumping Machinery, LLC, in Norcross, Georgia. He has more than 25 years of engineering, manufacturing, management, sales, and field experience in the pump industry. He has previously worked with Ingersoll-Rand, Goulds Pump, Liquiflo, and Roper Pump. Dr. Nelik is an International Pump Users Symposium Advisory Committee member, a former Associate Technical Editor of the *Journal of Fluids Engineering*, and as Associate Editor of *Water and Waste Digest*. He is a full member of ASME and APICS certified.

Dr. Nelik is a graduate of Lehigh University with an M.S. degree (Manufacturing Systems) and a Ph.D. degree (Mechanical Engineering). He is a registered Professional Engineer, and he has published over 50 papers, including a book, *Centrifugal and Rotary Pumps: Fundamentals with Applications*, and a chapter on pumps for the *Encyclopedia of Chemical Technology*. He has traveled extensively and consulted worldwide on pumps reliability, design, and pump/system analysis.

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 has more than 33 years of experience in the pump industry. He has authored a number of articles on the design and application of positive displacement pumps in industry publications and is past Chairman of the Hydraulic Institute Rotary Pump Committee. Mr. Petersen is a registered Professional Engineer in the State of Iowa.

Paul Rose is presently the International Sales and Tech Services Manager, for Warren Rupp, Inc., out of Mansfield, Ohio. He has been employed at Warren Rupp for the last six years in a variety of positions relating to product design, applications, and sales. He has experience designing and installing waterflood projects for the oil field, and was responsible for significant design improvements in a high-speed mixer design used in the wastewater treatment industry. Mr. Rose has been involved in the application and sales of a variety of pump designs including canned motor, gear, self-priming centrifugal, mag drive, and progressing cavity prior to his present position. He has presented papers relating to the proper application of progressing cavity drilling motors and the potential for air operated double diaphragm pumps in the chemical process industry.

Mr. Rose has an A.S. degree from Temple Junior College and a B.S. degree (Petroleum Engineering) from Texas A&M University.

Jim Siebolt is with Allweiler Pumps, Colfax Pump Group, in Baton Rouge, Louisiana.

SHORT COURSE 6
on
INDUCTION MOTORS DESIGN IN FUNCTION OF THE DRIVEN LOAD AND INERTIA

Lodewijk (Ludwig) Fostier is with Areva Framatome ANP in Jeumont, France. He is the Product Manager of the division whose mission it is to design a machine dedicated to a typical use including special requirements for the network, the driven machine, and the environment. He has been involved in the design of special electrical machines (asynchronous and synchronous) for several applications in petrochemical plants, classical power plants, and nuclear power plants. He has been employed by Jeumont-Schneider Company since 1982, which was purchased by Framatome in 1993.

Mr. Fostier has a degree (Electromechanics, 1978) from La Faculté Polytechnique de Mons, Belgium. He has worked as assistant to the Laboratory of Electrotechnics of this university for four years studying the behavior of induction motors fed by inverters. He also teaches Electrotechnics at two universities: Conservatoire National des Arts et Métiers and Catholic University of Lille.