the KAPPE LECTURE Series

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2007

AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS®

THE 2007 KAPPE LECTURER

RUDY J. TEKIPPE, Ph.D., P.E., BCEE

Senior Vice President, MWH

EDUCATION

Iowa State University	1965	BS
Iowa State University	1966	MS
University of Wisconsin	1970	PhD
Harvard University	1992	AMP

PROFESSIONAL CREDENTIALS

Registered Professional Engineer in two states
Diplomate, American Academy of Environmental Engineers

PROFESSIONAL HONORS

Distinguished Service Award, University of Wisconsin

Dr. Tekippe has served in the Environmental Engineering field for over 40 years. He grew up on a farm in Iowa and attended Iowa State to get his BS in Civil Engineering and his MS in Sanitary Engineering. His MS research and thesis were focused on settling tanks used in wastewater treatment. At the University of Wisconsin, he completed his Ph.D. in the field of coagulation and flocculation in water treatment.

In 1969, he began work for James M. Montgomery, Consulting Engineers (JMM) in Pasadena, CA. This firm's name later evolved to Montgomery Watson and then MWH. Early on, he conducted research on water and wastewater treatability, corrosion, algae in ponds and other related issues. In 1972, he served for two years as JMM's project manager for a 303 Basin Plan project for the State of California. In 1974, he became manager of the firm's Wastewater Engineering Department and served as project manager on a number of large wastewater treatment plant studies and designs nationwide. In the years that followed, he became a company officer and member of the board of directors. In 1982 he became manager of the firm's Pasadena Office.

Given an opportunity to return to academic life, he took a teaching and research position as an associate professor at Iowa State University in academic year 1983/84. He returned to JMM as the Assistant Chief Engineer and subsequently became the Director of Technology as well as the Product Line Leader of Wastewater Engineering.

In 1990, Dr. Tekippe was awarded the role of Program Manager for his firm's program management project for the Water Board in Sydney, Australia. He led a team of over 100 people in the client's office and was chartered with comprehensive planning and early project implementation for wastewater management facilities serving 3.6 million people in the greater Sydney area. Upon returning to the USA, he resumed his role as Director of Technology, became the first president of MWH Soft, and was active in training.

Dr. Tekippe has written over 30 papers, chapters in several books and many reports on the subject of wastewater treatment. His specialties are suspended growth biological treatment and clarifier design. He has served as the lead chapter author of the past two issues of the WEF text "Design of Municipal Wastewater Treatment Plants" and WEF's manual "Clarifier Design".

His professional memberships include: AWWA, WEF, IWA, ASCE, NSPE, and AAEE, for which he was an elected member at large to the Board of Trustees for three years.

ABSTRACTS OF LECTURES OFFERED

Wastewater Treatment Clarifier Design and Research

Clarification has served as a cost-effective process in the treatment of water and wastewater for centuries, yet the practice of designing these units has continued to evolve with few experts believing that a true optimum design has been found. In the field of municipal wastewater treatment, this basic process is commonly used in primary and secondary treatment, with some minor application in tertiary treatment. Rectangular and circular units have largely replaced all other shapes, however, within this pair lies a wide array of details that have a profound influence on the effectiveness of the process. Indeed, performance of some tanks with the same basic geometry can vary by a factor of two or more, depending on the design of details.

The construction costs of wastewater treatment clarifiers in the USA each year is in the hundreds of millions of dollars. The units often occupy a large portion of the footprint of most plant sites. Because of the extremely low velocities and performance sensitivity to temperature and density variables, research and process improvements are most commonly conducted on full-scale facilities. In recent years, digital computer models have been developed to simulate these units and have found to be successful in many applications to assist in design improvement. The development of membrane technology and its use to separate solids from wastewater in treatment will compete for some of the separation market, but clarifiers will perform this function for most plants for years to come; especially in the larger facilities. Thus, improvements in clarifier design represent a way to save large amounts of money and resources.

This lecture will illustrate a few of the fundamentals of clarifier engineering and focus on the array of details that are available to achieve success in treatment. It will explain some of the types of designs that have been used in the past to serve as a basis for comparison to the state-of-the-art practices of today. Figures, photos and performance data are presented to show how each of the key variables in design can affect results. The comprehensive evaluation of all of the variables is needed to define the best design for each treatment plant application. Features that are found to be favorable to most design engineers to achieve balance between cost and performance are presented and discussed.

In the late 1980's, Dr. Tekippe completed a project for the USEPA that defined research needs for secondary clarifiers in wastewater treatment. The priorities established at that time will be examined and compared to what has since been completed. His recommendations on further research needs and methodology to further improve this process and its application by design engineers will be included.

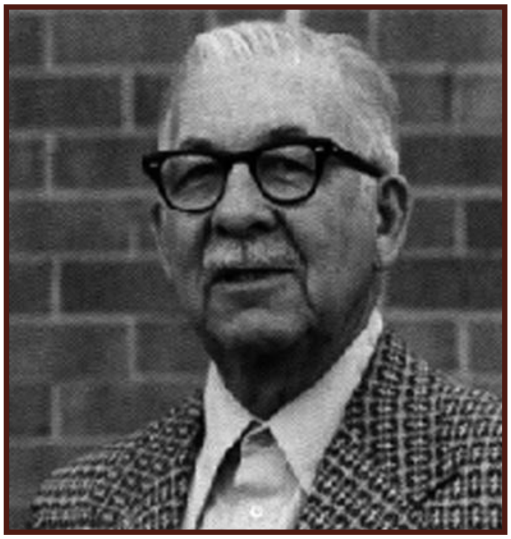
Consulting Environmental Engineering on a Global Basis and its Relationship to Wastewater Treatment Technology

For most of the past century, wastewater treatment engineering was performed by private and public professionals who operated in rather limited circles of collaboration. Many different technologies were applied to meet a range of objectives and product water quality. Numerous innovations have been created to improve the cost effectiveness of treatment. Through the use of publications and presentations among professionals, these technologies have been shared around the world, but many differences still remain.

In the past two decades, the community of large consulting engineering firms has changed in the way in which technology and professionals are applied to projects. Several of these firms have expanded to form truly global organizations that have native employees performing designs with the support of instantly available experts and state-of-the-art tools that revolutionize the profession. This is complimented by the fact that product development and research in several countries is continually bringing to the forefront new process concepts, details and equipment. Furthermore, the means of project delivery acceptable to public institutions has expanded to a wider range of alternatives. The common USA practice of completing a design, putting it out to bid and awarding the construction to the low bidder has given way, to a large degree, to alternatives such as design-build, construction management at risk, and other such alternative delivery methods. Some of these options give more opportunity to the engineering-construction professionals to incorporate innovative technologies as they take on the added risks in competition to secure the work.

This lecture will describe these global changes and how they affect the future of engineering applications and research in the environmental engineering market. It will include a case study of one large firm that is highly globalized and uses leading edge methods of knowledge management to facilitate the latest information in project planning and execution. The advantages and disadvantages of bringing in process innovations from various countries around the world are compared. A specific example of how technical improvements found effective in a foreign country, but have constraints in USA applications is given. A broader set of examples including numerous processes, such as belt presses, special screens, unique tertiary filters and others, is shown to illustrate how and why some such technical transfers succeed and others fail.

Conclusions and recommendations relative to teaching and research at universities in the USA are offered. Also, the merits of new engineering graduates considering working for global engineering consulting firms will be discussed and recommendations given to help them prepare for practicing their new profession in an increasingly global world.



"A man's debt
to his profession
is to help
those that follow"

STANLEY E. KAPPE, P.E., DEE, a successful environmental engineer, believed he owed a debt to the profession that rewarded him so well. During his life, he gave of himself to his university and to his profession through countless hours of volunteer activity. And, through this Lecture Series, he continues to share his good fortune with tomorrow's environmental engineers.

He graduated from Pennsylvania State University in 1930 with a bachelor's degree in sanitary engineering. He served with the Pennsylvania State Health Department and the U.S. Army Corps of Engineers before joining the Chicago Pump Company as its Eastern Regional Manager in 1935. In 1945, he founded Kappe Associates, Inc., a water supply and wastewater equipment company headquartered in Rockville, Maryland, and continued as its Chief Executive Officer until his death in 1986.

His peers recognized his contributions to the profession by numerous awards, including the AWWA Fuller Award, the WPCF Arthur Sidney Bedell Award, the WPCAP Ted Moses and Ted Haseltine Awards, and the AAEE Gordon Maskew Fair Award. In 1985, Pennsylvania State University named him Outstanding Engineer Alumnus.

Stanley E. Kappe was an activist member and leader in several national and Chesapeake region professional societies. He served as the Executive Director of the American Academy of Environmental Engineers from 1971 to 1981.

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