TEXAS TECH UNIVERSITY
Department *of* Chemical Engineering

Developing Effective Safety Programs for Academia and Industry

M. Sam Mannan
Regents Professor and Director
Mary Kay O'Connor Process Safety Center
Artie McFerrin Department of Chemical Engineering
Texas A&M University System
College Station, Texas 77843-3122, USA
mannan@tamu.edu; http://process-safety.tamu.edu

ABSTRACT

Having an effective safety program is one of the central and most important focuses of an organization, either in industry or academia. For the latter, it is even more critical since an effective safety program will help ensure a healthy educational and research environment, as well as prepare students with must-needed safety experience through direct interactions in various activities during their study. However, while industry must continue to put considerable amount of effort on developing and implementing their safety programs, academia also needs to do its part. Recent incidents at UCLA, Texas Tech, Texas A&M University and many other universities have put safety issues, especially those in research laboratories, in the spotlight, that demand more effective safety programs in academia. In many ways, an effective safety program in academia is similar to that in industry. Elements such as commitment, involvement and accountability at every level are recognized as the foundations of an effective safety program. Built upon those are other important factors such as process hazard assessment, education and training, accident investigation and so on. The Mary Kay O'Connor Process Safety Center has worked closely with Texas A&M University to develop and implement such a program not only for laboratory safety settings, but also for mainstream education and research. The Center, founded with a vision to promote and improve safety in industry and academia, has trained generations of engineers equipped with essential safety knowledge and experience. They are a vital factor in establishing effective safety programs in both academia and industry.

The seminar will emphasize some critical research needs which have to be addressed in the process safety area. Issues regarding fundamental questions for process safety research and how academia can drive fundamental research to design inherently safer chemical (and biological) plants will also be covered. There are significant areas of societal needs where fundamental research must be conducted if advances are to be made in technology, management systems, and other aspects of process safety. Some of these research areas are Aerosol and Dust Explosions; Flammability of Liquid Mixtures; Inherently Safer Design; LNG Safety; Quantitative Risk Analysis; Runaway Reactions and Reactive Chemicals Research; and Safety Culture and Its Impact on Safety Performance.

BIOGRAPHICAL SKETCH

DR. M. SAM MANNAN, PE, CSP, DHC
Regents Professor and Director
Holder of T. Michael O'Connor Chair I
Mary Kay O'Connor Process Safety Center

Artie McFerrin Department of Chemical Engineering
Texas A&M University System

Dr. M. Sam Mannan is Regents Professor in the Chemical Engineering Department at Texas A&M University and Director of the Mary Kay O'Connor Process Safety Center at the Texas Engineering Experiment Station. The mission of the Center is to improve safety in the chemical process industry by conducting programs and research activities that promote safety as second nature for all plant personnel in their day-to-day activities. Before joining Texas A&M University, Dr. Mannan was Vice President at RMT, Inc., a nationwide engineering services company.

Dr. Mannan is a registered professional engineer in the states of Texas and Louisiana, is certified by the National Council of Examiners for Engineers and Surveyors, and is a Certified Safety Professional. His experience is wide ranging, covering process design of chemical plants and refineries, computer simulation of engineering problems, mathematical modeling, process safety, risk assessment, inherently safer design, critical infrastructure vulnerability assessment, aerosol modeling, and reactive and energetic materials assessments.

Dr. Mannan is involved very closely with projects that include hazard assessment and risk analysis, process hazard identification, HAZOP (hazard and operability) studies, vulnerability assessment, process safety management, and risk management. His research interests include development of inherently safer processes, application of computational fluid dynamics to study the explosive characteristics of flammable gases, development of quantitative methods to determine incompatibility among various chemicals, application of calorimetric methods for the assessment of reactive hazards, and the application of consequence analyses to assess the impact of process plant incidents. He co-authored the ***Guidelines for Safe Process Operations and Maintenance*** published by the Center for Chemical Process Safety, American Institute of Chemical Engineers. He is the editor of the 3rd edition of the 3-volume, 3,680-page, authoritative reference for process safety and loss prevention," **Lees' Loss Prevention in the Process Industries**. Dr. Mannan has published 155 peer-reviewed journal publications, 2 books, 7 book chapters, 155 proceedings papers, 12 major reports, and 158 technical meeting presentations.

Dr. Mannan is the recipient of numerous awards and recognitions including the American Institute of Chemical Engineers ***Service to Society Award***, the Texas A&M University Association of Former Students' ***Distinguished Achievement Award for Teaching***, the Texas Engineering Experiment Station ***Research Fellow***, the Texas A&M University Dwight Look College of Engineering ***George Armistead, Jr. '23 Fellow***. In 2003, Dr. Mannan served as a ***consultant to Columbia Accident Investigation Board***. In 2006, he was named the inaugural holder of the T. Michael O'Connor Chair I. In 2007, he was elected Fellow of the American Institute of Chemical Engineers. In December 2008, the Board of Regents of Texas A&M University System recognized Dr. Mannan's exemplary contributions to the university, agency, and to the people of Texas in teaching, research and service by naming him Regents Professor of Chemical Engineering. In September 2011, the Technical University of Łódź, Poland, conferred the Doctoris Honoris Causa on Dr. Mannan.

Dr. Mannan received his B.S. in chemical engineering from the Engineering University in Dhaka, Bangladesh in 1978, and obtained his M.S. in 1983 and Ph.D. in 1986 in Chemical Engineering from the University of Oklahoma.