

5th Annual AIChE Midwest Regional Conference

January 31st – February 1st, 2013

Organized by the Chicago Local Section of the AIChE

Hosted by the Illinois Institute of Technology, Chicago, IL

Session Fr2C: 1:00pm -2:30pm, Friday February 1, 2013 (Trustee Room)

Process Safety

Session Organizer: Donald J. Chmielewski, Illinois Institute of Technology

Session Co-Chairs: John Mammoser, Rolf Jensen & Associates, Inc. and Ryan Hart, Exponent, Inc.

1:00pm NFPA Codes and their Relevance to Chemical Processes

Jeremy Lebowitz and John Mammoser, Rolf Jensen & Associates, Inc.

The National Fire Protection Association (NFPA) has several hundred codes and standards in print designed to increase fire protection and life safety across a wide range of occupancy classifications. NFPA has numerous codes devoted to the specific hazards posed by chemical process plants. This presentation will introduce a variety of relevant codes, how they are applicable, and their relevance to improving chemical process safety. It will also discuss the main focuses of these codes and several ways in which process areas can easily become safer.

1:30pm Chemical Process Safety and Sustainable Materials Hazards

Ryan Hart and Delmar “Trey” Morrison, Exponent, Inc.

The core Chemical Engineering disciplines (i.e. chemical kinetics, mass transfer, thermodynamics, process design, and process safety) are integral to the application of fossil fuels to deliver products and services to society. Chemical engineers are also at the forefront of the development of sustainable petroleum alternatives including renewable raw materials, renewable energy sources, and sustainable solvents. As these novel materials and processes are scaled up from R&D laboratories to pilot plants, and ultimately to commercial scale operations, the process safety aspects related to the design, operation, maintenance, and management stands paramount. In this talk, process safety management elements (of which CCPS identifies 20 distinct elements) will be highlighted with respect to the design and development of novel sustainable materials. As this topic is uniquely large in scope, the discussion will focus primarily on two sustainable material classes: ionic liquids and biomass. Ionic liquids are being developed as low vapor pressure solvents replace conventional volatile organic solvent systems. In contrast, biomass is a more mature industry, which is being shaped to expand beyond combustion-related power to motor fuels and traditionally petrochemical raw materials. A brief discussion of pertinent aspects of each novel technology will be provided, and then the presentation will highlight the process safety management elements that are unique to the novel sustainable material classes. The process safety of ionic liquids and biomass will then be contrasted with conventional petroleum-based technologies, summarizing with guidelines that the professional Chemical Engineer can use to address sustainable material hazards that may be encountered in their workplace.

2:00pm Dust Explosion Hazards, Prevention & Protection Strategies

Zachary Hachmeister, Fauske & Associates, LLC

The first reported dust explosion occurred on Dec 14, 1785 at a bakery in Turin, Italy and have continued to result in the destruction of process plants and equipment, injury to workers, and loss of production. Even with today's current safety standards and regulations, dust explosion hazards are still prominent in the workplace. This is largely due to the lack of awareness and knowledge about this subject matter in industry. This presentation will identify hazards associated with handling combustible dusts, illustrate test strategies for quantifying the hazard and provide general guidance for mitigation strategies that reduce the risk associated with handling combustible dusts. Approaches for dust fire and explosion protection will be based on National Fire Protection Association (NFPA) guidelines as well as best practices in industry.