

Safety & Health News

AIChE

AMERICAN INSTITUTE OF
CHEMICAL ENGINEERS

SAFETY AND HEALTH
DIVISION
www.shdiv.aiche.org



A Supplement to *Process Safety Progress*

Spring 2004

SAFETY FORUM TWENTY-FIVE!

"It shall: (a) further the application of chemical engineering to the broad field of safety and health; (b) provide a communication medium for chemical engineers and others to exchange information concerning all facets of safety and health; (c) act as a source of information for chemical engineers not actively engaged in safety and health, and alert them to the importance of the field; and (d) address the problems of safety and health, and of the protection of property in the manufacture and use of chemicals."

With this charge, the AIChE Council (now the Board of Directors) approved the formation of the Safety and Health Division in 1979. Thus, in this year of 2004, the Division is recognizing its 25 years of service and successful activities.

Following World War II, there was unprecedented growth in the petroleum, petrochemical, and chemical industries. New plants were constructed to meet the demand for new products. Not only were new processes being used, but very large facilities were built. For example, ammonia, which was produced in plants of 200 tons/day capacity, was now being made in very large units at up to 1,500 tons/day capacity.

Unfortunately, during this growth period, there were a number of significant explosions, fires, and runaway reactions in the process industry resulting in injuries, death, and substantial property losses, although not specifically related to new facilities. There was no organized attempt within the industry or government to identify the problems, to understand fully the root causes, and to introduce safeguards to prevent further incidents. Information was fragmentary.

Following a formation committee meeting in 1956, the first Safety in Air and Ammonia Plants

Symposium was held at the AIChE National Meeting in Baltimore. Norton Walton of Atlantic Refining Company was one of the key organizers. Emphasis later shifted from air separation plants to other facilities related to ammonia manufacture. These symposiums have now been held every year, with the 49th Annual Symposium scheduled for this coming September.

In 1965, several large explosions and fires occurred at petroleum and petrochemical facilities. These incidents and other trends led Russell Miller of Monsanto Chemical Company and William Doyle of Factory Insurance Association (now HSB Industrial Risk Insurers) to put together a Symposium on Loss Prevention in the Process Industries held at the AIChE Spring Meeting in Houston in 1967. The response was overwhelming. A committee was formed to organize annual symposiums on the topic with the 38th Annual Loss Prevention Symposium scheduled for the AIChE Spring Meeting in April of this year.

The success of the Loss Prevention Symposiums was the primary impetus to forming a Safety and Health Division in 1979, not only to provide continuing quality programming in the safety field but to serve the Institute members in a broader capacity. For example, the Division has responsibilities for the technical content of *Process Safety Progress* and has a liaison relationship with CCPS.

Initially, two programming committees were established: Area 11a for Loss Prevention, and Area 11b for General Safety and Health. Later, the Safety in Ammonia Plants and Related Facilities joined as Area 11c.

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A. S. West, P.E., *Editor*
3896 Sidney Road
Huntingdon Valley, PA 19006
215-938-7181

e-mail: aswest@worldnet.att.net

SAFETY AND HEALTH DIVISION 2004

Scott W. Ostrowski, Chair
ExxonMobil Chemical Company
P. O. 4900
Baytown, TX 77522-4900
281-834-5344
scott.w.ostrowski@exxonmobil.com

Walter Silowka, 1st Vice-Chair
Air Products & Chemicals, Inc.
Corporate Engineering Dept.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
610-481-6808
silowkw@apci.com

Robert P. Benedetti, 2nd Vice-Chair
NFPA International
One Batterymarch Park
Quincy, MA 02269-9101
617-984-7433
rbenedetti@nfpa.org

Kris Chatrathi, Past-Chair
CRB Consulting Engineers
7410 N.W. Tiffany Springs Parkway
Kansas City, MO 64153
816-880-9330, X-3014
kris.chatrathi@crbusa.com

Albert I. Ness, Secretary/Treasurer
Rohm and Haas Company
Engineering Division
3100 State Road
Croydon, PA 19021
215-785-7567
ANess@rohmmaas.com

DIRECTORS

Susan R. Cyganiak (2002-2004)
Pharmacia
4901 Searle Parkway
Skokie, IL 60077
847-982-4752
susan.r.cyganiak@pharmacia.com

William F. Early (2002-2004)
Early Consulting
12330 Lanny Lane
Houston, TX 77077
281-558-5418
skipearly@sbcglobal.net

Robert W. Johnson (2003-2005)
Unwin Corporation
1920 Northwest Boulevard, Suite 201
Columbus, OH 43212
614-486-2245
rjohnson@unwin-co.com

Erdem A. Ural (2003-2005)
Loss Prevention Science &
Technologies
659 Pearl Street
Stoughton, MA 02072
781-344-7656
erdem.ural@lpsti.com

Peter N. Lodal (2004-2006)
Eastman Chemical Company
P. O. Box 511
Kingsport, TN 37662-5000
423-229-2675
pnlodal@eastman.com

Katherine E. Pearson (2004-2006)
Rohm and Haas Company
6519 State Highway 225
Deer Park, TX 77536
281-228-8236
KatherinePearson@rohmmaas.com

PROGRAM COORDINATORS

Robert W. Johnson
(see Director 2003-2005)

Walter L. Frank
ABS Consulting
5301 Limestone Road, Suite 201
Wilmington, DE 19808
302-239-0496
wfrank@absconsulting.com

AWARDS COMMITTEE

Robert P. Benedetti, Chair
(see 2nd Vice-Chair)

PUBLICATIONS COMMITTEE

Daniel A. Crowl, Chair
Michigan Technological University
Department of Chemical Engineering
Houghton, MI 49931
906-487-3221
crowl@mtu.edu

WEBMASTER

Daniel A. Crowl
(see Publications Committee)

AIChE STAFF LIAISON

Karen E. Person
Center for Chemical Process Safety
American Institute of Chemical
Engineers
3 Park Avenue
New York, NY 10016-5991
212-591-7319
karep@aiiche.org

MEMBERSHIP COMMITTEE

Joseph F. Louvar
Wayne State University
Department of Chemical Engineering
5050 Anthony Wayne Drive
Detroit, MI 48202-9988
313-577-9358
jlouvar@eng.wayne.edu

John F. Murphy
U.S. Chemical Safety Board
2175 K Street, NW, Suite 400
Washington, DC 20037-1809
205-261-7622
john.murphy@csb.gov

CONTINUING EDUCATION COMMITTEE

Dennis C. Hendershot, Chair
Rohm and Haas Company
Engineering Division
3100 State Road
Croydon, PA 19021
215-785-7243
DHendershot@rohmmaas.com

Peter N. Lodal
(see Director 2004-2006)

Chad V. Mashuga
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192
734-324-6685
mashugc@basf.com

GOVERNMENT RELATIONS

Randy Freeman
ABS Consulting
16855 Northchase Drive
Houston, TX 77060-6008
281-877-6407
rffreeman@absconsulting.com

EDITORS - PROCESS SAFETY PROGRESS

Daniel A. Crowl
(see Publications Committee)

Joseph F. Louvar
(see Membership Committee)

SAFETY AND HEALTH DIVISION UPDATE

SCOTT OSTROWSKI, CHAIR

Welcome to the year of 2004! I encourage your continued active participation in the AIChE Safety and Health Division. As Division Chair for 2004, this is my first general communication to the more than 1200 members of the Safety and Health Division.

As I reflect back over my 20-year career in Process Safety and System Safety Engineering, I note there have been a number of significant process safety incidents, and, in turn, regulatory responses. This December will mark the 20th anniversary of the tragedy in Bhopal. We must also remember the 1988 Piper Alpha fire, the 1988 Shell Norco explosion, the 1989 Phillips Pasadena explosion, the 1992 La Mede France explosion, the 1997 Visakhapatam India explosion, and the 2001 Toulouse France explosion just to name a few. In response to these and other incidents, the chemical process industry has come under increased scrutiny and regulation. We have seen the promulgation of the OSHA Process Safety Management (PSM) and the EPA Risk Management Program (RMP) regulations in the US.

Beyond these regulations, we have seen the creation, staffing, and activation of the US Chemical Safety and Hazard Investigation Board. The Board is now providing valuable information regarding lessons learned from process safety related incidents including recommendations to prevent similar incidents in the future. In 2003 alone, the Board issued formal investigation reports for eight chemical-related incidents, and has pushed for increased regulation of reactive chemicals in industrial settings. The costs associated with the incidents mentioned above clearly support a business case for process safety.

As chemical engineers with safety and health responsibilities, we must continue to play an active role in the prevention of process safety incidents. Your membership and active participation in the Safety and Health Division will provide you with the necessary resources to make a difference in your careers. The Division is committed to:

- furthering the application of chemical engineering to the broad field of safety and health;
- providing a forum for chemical engineers and others to exchange information concerning all facets of safety and health issues; and
- acting as a source of information for chemical engineers not actively engaged in safety and health matters, and alerting them to the

importance of the field.

To help achieve these commitments, the Division sponsors three symposiums: the Loss Prevention Symposium (Program Area 11a) on an annual basis; the Process Plant Safety Symposium (Program Area 11b) on a biennial basis; and the Safety in Ammonia Plants and Related Facilities Symposium (Program Area 11c) on an annual basis. Each of these groups is responsible for organizing appropriate symposiums that emphasize technology, latest advances in the field, and methods to assist practicing engineers to do a better job managing safety and health related risks, whether in research, development, design, or plant operations. The papers presented are compiled into *Proceedings* to provide the best engineering practices in a readily accessible reference.

The 38th Annual Loss Prevention Symposium is scheduled during the AIChE Spring Meeting, April 25-29, 2004, to be held at the New Orleans Hyatt Regency Hotel. Details of the program are on page 8 of this Newsletter. The 49th Annual Safety in Ammonia Plants and Related Facilities will be held September 20-23, 2004, at the Denver Hyatt Regency. Up-to-date details of these meetings can be found at the AIChE web site: www.aiche.org.

In addition to sponsoring symposiums, the Division has four regular publications that are designed to provide the safety and health professional with the essential information needed to make a real difference. Articles in these publications come from a variety of sources, including government, industry (oil, petrochemical, chemical, pharmaceutical, plastics), universities, consulting and design companies, equipment manufacturers, and consensus-building organizations. These publications offer a mix of a high level technical content, thought-provoking topics, and best practices in industry.

Division members regularly receive two publications: *Process Safety Progress* (quarterly) and *Safety & Health News* (quarterly). *Proceedings* of the Loss Prevention Symposiums and of the Safety in Ammonia Plants Symposiums are available at the appropriate meetings and later through the AIChE Publications Department. *Proceedings* of the Process Plant Safety Symposiums are available at the meetings.

(continued on page 4 - see UPDATE)

UPDATE (continued from page 3)

Finally, I would like to thank each of you for your continued support and participation in the Safety and Health Division. I encourage each of you to visit the Division web site at: www.shdiv.aiche.org to determine how you can increase your involvement in Division activities. Certainly you can promote membership in the Division with your non-member associates - there is plenty of room for growth in the Division. The web site also has numerous useful links to other process safety web sites which can be of value to you in your work. Working together, we can help maximize the benefits of the Division to its members.

I look forward to seeing you at the 38th Annual Loss Prevention Symposium in New Orleans in April. If any of you have any suggested concerns or suggested improvements for the Division, please feel free to contact me at:

scott.w.ostrowski@exxonmobil.com.

Scott Ostrowski

KULLMAN IS SPEAKER AT ANNUAL BANQUET

The 2004 Safety and Health Division Annual Banquet will be held on Monday, April 26, at the Court of Two Sisters Restaurant in the heart of the French Quarter in New Orleans (613 Royal Street). A cash bar will open at 6:30 PM and dinner will be served at 7:00 PM. Reservations can be made when registering for the AIChE Spring Meeting either on-line or by the hard copy registration form.

The scheduled dinner speaker is Ellen Kullman, Group Vice President, DuPont Safety & Protection, one of the five growth platforms at the company with a business of \$3.6 billion. This group includes DuPont Advanced Fiber Systems, DuPont Chemical Solutions Enterprise, DuPont Nonwovens, DuPont Safety Resources, and DuPont Surfaces. The Group is focused on becoming the global market leader in providing solutions for people, property, and operations in the area of safety, security, and protection.

Ellen Kullman received a BS degree in mechanical engineering from Tufts University and an MBA from Northwestern University. Following work at General Electric, she joined DuPont in 1988 as marketing manager in the medical imaging business. She was named a vice president in 1995, and has been in her present position since February 2002.

This dinner is always a popular attraction for Division members. ■

DIVISION ELECTION

In the recently completed Safety and Health Division election for Officers and Directors, **Bob Benedetti** became 2nd Vice-Chair, starting the progression to Chair. **Pete Lodal** and **Kathy Pearson** were elected Directors for the 2004-2006 term. **Albert Ness** of Rohm and Haas was reelected as Secretary/Treasurer for a one-year term.

Scott Ostrowski of ExxonMobil Chemical Company moved to the Chair post, and **Walt Silowka**, Air Products & Chemicals, advanced to 1st Vice-Chair.

Bob Benedetti has considerable experience on the Executive Committee having served as a Director 1995-1997 and then through the officer progression to Chair in 2000. He is a principal engineer with expertise in flammable liquids for the NFPA International organization. He graduated from Northeastern University in chemical engineering, and is a licensed Professional Engineer and a Certified Safety Professional.

Pete Lodal holds BS and MS degrees in chemical engineering from Purdue University. He is Senior Technical Associate and Group Leader, Plant Protection Services, for Eastman Chemical Company at the Kingsport, TN, plant. He is a licensed Professional Engineer.

Kathy Pearson is a Senior Risk Analyst for Rohm and Haas Company located at the Deer Park, TX, facility. She is a graduate of Georgia Tech and is a licensed Professional Engineer. She leads process hazard analyses and security vulnerability assessments.

All of the Officers and Directors have had significant leadership activities, both technical and managerial, in the Division.

STUDENT AWARDS

The Safety and Health Division National Student Design Competition Awards for Safety were presented at the AIChE 2003 Annual Meeting in San Francisco. The winners were Joshua Jondro, Joshua Grilly, and Nicole Winters of Northeastern University; Steve Dupuis and Tom Sanders of Wayne State University; Kristin Burford, Rebecca Hoffmann, and Amy McMartin of Washington University; and Ellen Brennan, Kevin Cash, and Jeffrey Pierce of Northeastern University.

The award is for the best utilization of the principles of inherent safety in the 2003 AIChE Student Design Competition. ■

THE CCPS PAGE CENTER FOR CHEMICAL PROCESS SAFETY

ANNUAL CCPS CONFERENCE EMERGENCY PLANNING: P/P/R

The 19th Annual International Conference and Workshop, organized by CCPS, is moving from its traditional fall date to late June in 2004. The meeting, "**Emergency Planning: Preparedness, Prevention, and Response**," will be held on **June 29 - July 1, 2004**, at the Caribe Royal Hotel in Orlando, FL. Real-world, practical sessions will cover everything you need to know in order to prepare for, prevent, and react to an emergency in the process industries.

Session topics include: (1) scenario development and planned response; (2) prevention, including inherent safety, facility siting, training, and physical and cyber security measures; (3) Layer of Protection Analysis (LOPA); (4) transportation mode selection; (5) storage location size and design; (6) response to incidents, including community involvement; (7) utilization of consequence modeling; and (8) lessons learned from case histories and incident investigations.

In addition to attending the sessions, conference attendees will be able to listen to featured keynote and luncheon speakers, peruse the various exhibit booths, network with others from a broad range of industries and government entities, and be treated to a variety of get-togethers including a continental breakfast, a wine and cheese evening reception, and various coffee and dessert breaks.

Up-to-date information, including registration fees, can be found at: www.aiche.org/ccps/icw. A savings of \$200 is available through registration by April 15, 2004. ■

HUMAN FACTORS PROJECT

CCPS has started work on a new concept book covering human factors in industrial work. The project is still in the initial stages. The Technical Subcommittee is now planning the outline and scope of the book. Initial work will include gathering testimonials and examples from industry on where the applications of the principles of human factors have provided dividends to the company. Bob Ormsby is serving as the CCPS Staff Consultant on the project.

For more information or to learn more about participation in this project, contact Karen Person at **215-581-7319** or karep@aiiche.org. ■

SAFETY MESSAGES

The CCPS *Process Safety Beacon* program started in 2001, is designed to provide one-page safety messages for manufacturing personnel each month. In the past, these color messages have been available free to CCPS sponsor organizations through monthly e-mails. Non-sponsors could view them on a trial basis through the CCPS web site.

Three recent issues covered the following topics:

- Nov. 2003 Pressure Rating
- Dec, 2003 "Christmas" Trees
- Jan. 2004 Fuel/Air Mixtures

In order to promote process safety awareness across the industry, CCPS has decided to expand free distribution in 2004. You may register for your free distribution at: www.aiche.org/ccps/safetybeacon.htm. The document is delivered by e-mail in a language of choice (English, French, German, or Spanish). Companies, organizations, and individuals are invited to sponsor an upcoming issue. Volunteers fluent in other languages are sought to help make the *Process Safety Beacon* available to an even wider audience.

If you are interested in sponsoring future issues or are interested in being a translator, please contact Adrian Sepeda at:

ccps_beacon@aiiche.org.

LOSS PREVENTION ON CD ROM II

The Second Edition of the Loss Prevention Symposium CD-ROM will be available this spring. This CD-ROM includes all of the papers presented at the Loss Prevention Symposiums from 1967 through 2002, and the CCPS Conferences and Workshops from 1987 through 2002. This product of two discs contains well over 1,000 papers and 20,000 pages of process safety information, including papers that were presented but not published at the time.

This is a joint project of CCPS and the Safety and Health Division.

Information and an order form can be found at: www.aiche.org/pdflibrary/pubs/book02.pdf. ■

DUST EXPLOSIONS

The CCPS project to develop a new book entitled *Guidelines for Safe Handling of Powders and Bulk Solids* is nearing completion. A draft is now out for peer review, and publication is expected within a few months.

This book is primarily intended to provide a tool for design and plant engineers who are responsible for designing and operating processes that handle powders and bulk solids in the chemical, pharmaceutical, and related industries. The material also applies to the food processing, grain handling, and coal mining industries. It focuses on the instability, reactivity, and combustibility hazards of particulate solids. This book will be an aid for Process Hazard Analysis (PHA) teams and leaders, and for people operating small plants and toll operations. The book may also be quite useful to insurance and regulatory personnel with assignments at industrial facilities that process, store, or transport large quantities of solid substances.

Information about the availability of the book will be included in the next issue of this Newsletter.

The subject of dust explosions is particularly timely. The U.S. Chemical Safety Board is continuing investigations of two catastrophic dust explosions and fires, one in North Carolina in January 2003, and another one in Kentucky in February 2003.

A nationwide review of safety issues raised by these accidents has been initiated. The CSB is examining the number and severity of dust explosions throughout the USA over the past several decades. Preliminary results of this study are expected to be available within the next few months. The review will include determination if the hazards of combustible dust have been adequately controlled through codes, standards, and good operating practices. The information is expected to be applicable to a variety of industries.

The explosion in North Carolina at a manufacturing facility is believed to be the result of accumulation of fine polyethylene dust particles above the tiles of a false ceiling, creating an explosion hazard. At this writing, the ignition source has not been determined.

The explosion in Kentucky was at a fiberglass insulation manufacturing plant.

At a Public Meeting in June 2003, the CSB demonstrated the explosive potential of even small amounts of combustible dust. It was indicated that laboratory tests are underway to determine possible ignition points such as hot surfaces and different spark sources. ■

RELIEF SYSTEM DESIGN

The AIChE Design Institute for Emergency Relief Systems (DIERS) is offering several relief valve design software options, recognizing that proper relief system design is critical in any processing plant.

SuperChems for DIERS software, a joint venture by DIERS and ioMosaic, is designed for handling complex reactive systems. With a database of over 1,200 chemicals, SuperChems allows one to model multiphase and non-ideal systems, to perform two-phase dynamic vessel simulations in either design or rating modes, to rate complex arrangements of relief lines for single- or two-phase flow, and to access quickly a wide range of input specifications for various scenarios. SuperChems is available for a one-time license fee of \$12,500 with an annual license/maintenance fee of \$2,000. This tool is great for companies designing and verifying relief systems in quantity.

MACH II CDS Relief Design software by Digital Solutions Technology also incorporates DIERS methodology. This modeling software is a web-based tool that enables rapid execution of design calculations with up to 24 scenarios for the same relief valve simultaneously. The free MACH II CDS reader allows one to view existing cases and review the results from the DIERS benchmarks. The MACH II design software is available for a cost of \$500 per relief valve design. Licenses for unlimited use are also available.

If purchased directly from AIChE/DIERS or AIChE/CCPS, a share of the proceeds will help the DIERS research and programming efforts.

For more information, contact Karen Person at **212-591-7319**. ■

SACHE

The Safety and Chemical Engineering Education (SACHE) program, initiated in 1992, is a cooperative effort between the CCPS and engineering schools to provide teaching materials and programs that bring elements of process safety into the undergraduate education of undergraduate engineers. SACHE has over 125 member schools.

SACHE is funded by universities at \$300 (for USA and Canada) and \$420 (for other international memberships) annually, with funds matched two-for-one by CCPS to a maximum of \$30,000 each year. Materials supplied to the universities include slide/lecture sets, video lectures, problem sets, course outlines, and instructional modules.

SAFETY NOTES

- Scheduled to take effect on October 1, 2004, HM-223 (also known as RSPA-98-4952), covering shipping of hazardous materials, was published in the *Federal Register* by the Department of Transportation. This rule codifies new definitions and addresses certain technical issues arising from the Homeland Security Act of 2002. Specifically, the rule defines "pre-transportation functions," which are carried out by a shipper, and "transportation," which begins when a carrier takes possession of a shipment and continues until the shipment is delivered to a final destination. Hazmat rules will regulate the packaging of hazardous materials, pre-transportation functions, and certain transportation functions such as loading and unloading. Information on the rule can be found at <http://hazmat.dot.gov>.
- A new homeland security matrix tool is now available on the OSHA web site to help employers with the planning and preparation for possible workplace emergencies caused by a terrorist's explosive device or act of arson. The "Fire and Explosion Planning Matrix" covers general aspects of fire prevention planning, and suggests preparedness measures appropriate for workplaces in each of three risk zones. On-line resources are also included in the matrix.
- Providing small businesses with information and education on chemical safety is the foundation of a new OSHA national alliance with the Society for Chemical Hazard Communication. The objective is to improve Material Safety Data Sheets and hazard communications. The alliance also increases awareness about the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.
- The Board of Certified Safety Professionals announced the following election results for officers in 2004. **Henry Smahlik**, CSP, CIH, of Hagemeyer North America was elected President; **C. L. Lewis**, CSP, PE, of American Airlines was elected Vice-President; and **Jeffrey Robinson**, CSP, PE, of Westinghouse was elected Secretary-Treasurer.
- DualGlo Ltd. of Hereford, UK, in collaboration with the Universities of Warwick and Wolverhampton, has developed a glow-in-the-dark substance that can be added not as a coating but directly to polymers as part of a product. It glows up to 7 times more brightly than previous phosphorescent materials. The first application is in a brightly colored flashlight that can be located easily in the dark. Promising uses include protective clothing, safety devices, and signs.
- The National Library of Medicine now has available a consumer's guide to provide information on the potential health effects of more than 4,000 common household products. This extensive data base is available at: <http://householdproducts.nlm.nih.gov>.
- About 4.7 million injuries and illnesses were reported in private industry workplaces during 2002 according to the latest report by the Bureau of Labor Statistics (Department of Labor). This translates to a rate of 5.3 cases per 100 full-time employees which is less than the rate of 5.7 per 100 workers in 2001. Although there were differences in the record keeping procedures for those two years, there was nonetheless a significant reduction in the number of injuries and illnesses.
- Researchers increasingly can provide greater insight into toxicity of chemicals as information in the fields of genomics, proteomics, and metabonomics develops. To incorporate this new type of information, the Environmental Protection Agency is starting to analyze such data as an approach to its regulatory decisions on chemicals. The emphasis at EPA is on computational toxicity, that is, techniques that merge mathematical or computer models with data from molecular biology studies about the effects of chemical exposure. This approach has the potential to help the agency speed up the necessary risk assessments of chemical substances.
- Here is a handy guide to modern science - if it wiggles, it's biology; if it stinks, it's chemistry; if it doesn't work, it's physics. ■





38TH ANNUAL LOSS PREVENTION SYMPOSIUM NEW ORLEANS, LA APRIL 26-28, 2004.

The Loss Prevention Symposium, organized by the Safety and Health Division Program Area 11a, has been held annually since 1967. The objective of the symposium is to promote safety in the chemical process and allied industries by providing a forum for practitioners from industry, academia, and government to share experiences, technological advances, and new ideas. The 38th Annual Symposium will consist of the following seven sessions of five or six papers each.

Symposium Chair
Robert W. Johnson
Unwin Corporation

Symposium Vice-Chair
Walter L. Frank
ABS Consulting

T2001 - FIRE, EXPLOSION, AND REACTIVE HAZARDS. The analysis, prevention, and mitigation of fire, explosion, and reactivity hazards continues to be important to the loss prevention community. The U.S. Chemical Safety and Hazard Investigation Board (CSB) has recently issued an investigative report on managing reactivity hazards. This session includes papers that identify, characterize, or offer design guidance on fire, explosion, and chemical reactivity hazards.

Chair
Daniel A. Crowl
Michigan Tech. Univ.

Vice-Chair
Christopher Hanauska
Hughes Associates, Inc.

T7002 - LOSS PREVENTION ASPECTS OF LARGE STORAGE TANK DESIGN. This session addresses design issues related to large storage tanks. Siting and spacing, seismic design, mechanical integrity, fire protection, overflow protection and prevention, secondary containment, and floating roofs are a few of the design issues that are the subject of current work and discussions. Design must allow for cleaning, inspection, and maintenance.

Chair
Robert P. Benedetti
NFPA International

Vice-Chair
Stanley S. Grossel
Process Safety & Design

T7003 - SAFETY INSTRUMENTED SYSTEMS/LAYER OF PROTECTION ANALYSIS. Protection systems must reliably and effectively detect, diagnose, and control process deviations before the deviations can result in loss events such as fires and explosions. Topics related to analyzing, designing, and implementing these safeguards include abnormal situation management (ASM), layer of protection analysis (LOPA), safety instrumented systems (SIS), and alarm management will be covered.

Chair
Joseph R. Natale
Baker Eng. Consultants

Vice-Chair
Scott W. Ostrowski
ExxonMobil Chemical Co.

T7004 - ADVANCES IN CONSEQUENCE MODELING I. Engineers often use consequence analysis tools to assess the risks of accidental or deliberate incidents, as well as to communicate them to the regulatory agencies,

to the public, and to company management. Such tools are invaluable in establishing priorities for the cost-effective allocation of resources for mitigation. Papers are included that describe areas of consequence modeling such as material/energy release, dispersion/dissipation, fire/explosion, domino effects, loss/injury effects, and mitigation modeling.

Chair
Erdem Ural
Loss Prevention
Science & Tech. Inc.

Vice-Chair
Dennis C. Hendershot
Rohm and Haas Co.

T7007 - ADVANCES IN CONSEQUENCE MODELING II.

Chair
Dennis C. Hendershot
Rohm and Haas Co.

Vice-Chair
Erdem Ural
Loss Prevention
Science & Tech. Inc.

T7005 - ENGINEERING SOLUTIONS TO FACILITY SECURITY CHALLENGES. The focus of this session is on developing engineering solutions to reducing facility vulnerability to sabotage and terrorist attack through enhancing security or reducing the consequences of a hazardous chemical release. Inherently safer alternatives that reduce or remove the hazards, and improvement in design, layout, and operation of equipment handling hazardous chemicals that would make the facility a less attractive target will be discussed. (This session is co-sponsored by Program Area 12d - Manufacturing.)

Chair
Walter L. Frank
ABS Consulting

Vice-Chair
Korkut Uygun
Wayne State Univ.

T7006 - CASE HISTORIES AND LESSONS LEARNED. Reviews of process safety incidents and near misses provide valuable learning opportunities. Papers dealing with incidents, near misses, and the lessons learned are scheduled in this popular session that has been included in the Loss Prevention program for a number of years.

Chair
John Murphy
U.S. Chemical Safety
Board

Vice-Chair
Henry Febo
FM Global





CALL FOR PAPERS
39TH ANNUAL LOSS PREVENTION SYMPOSIUM
APRIL 10-14, 2005
HYATT REGENCY, ATLANTA, GEORGIA

With the broad objectives as stated on page 8 for the 38th Annual Loss Prevention Symposium, here are the session topics for the 39th Annual Symposium. Papers are solicited. Accepted papers will be published in the *Proceedings* and may be chosen for publication in *Process Safety Progress*.

Symposium Chair

Walter L. Frank
 ABS Consulting
 5301 Limestone Road
 Suite 210
 Wilmington, DE 19808
302-239-0496
 wfrank@absconsulting.com

Symposium Vice-Chair

Erdem A. Ural, PhD
 Loss Prevention Sciences &
 Technologies, Inc.
 659 Pearl Street
 Stoughton, MA 02072
781-344-7656
 erdem.ural@lpsti.com

1. PROCESS HAZARDS IN THE PHARMACEUTICAL INDUSTRY - Many processes for the manufacture of pharmaceuticals involve hazardous chemicals and hazardous processes. This session invites papers addressing design methods and operating procedures used in pharmaceutical manufacture such as safe handling of hazardous chemicals, safe procedures for various unit operations and unit processes, design of reaction systems, and methods of avoiding runaway reactions.

Chair

Stanley S. Grossel
 Process Safety & Design Inc.
 41 Sussex Road
 Clifton, NJ 07012-2017
973-779-8579
 psadi28@aol.com

Vice-Chair

Greg Hounsell
 Pfizer, Inc.
 202 East 42nd Street
 New York, NY 10017
212-573-7686
 greg.hounsell@pfizer.com

2. FIRES AND EXPLOSIONS - Fire and explosion hazard identification, analysis, prevention, and mitigation are important issues in loss prevention. This session invites papers that offer new data, methodologies, technologies, and cost effective solutions that address these hazards.

Chair

Erdem A. Ural, PhD
 Loss Prevention Sciences &
 Technologies, Inc.
 659 Pearl Street
 Stoughton, MA 02072
781-344-7656
 erdem.ural@lpsti.com

Vice-Chair

Ephraim A. Scheier
 BP America, Inc.
 501 Westlake Park Boulevard
 Houston, TX 77079-2696
281-366-2573
 ephraim.scheier@bp.com

3. INERTING OF REACTORS AND PROCESS EQUIPMENT - This session addresses the design and installation of inerting systems for equipment and processes containing flammables, combustible dusts, monomers requiring the presence of oxygen to activate an inhibitor, and other applications where an inert atmosphere is needed for process safety.

Chair

Raymond A. Freeman, PhD
 ABS Consulting
 16855 Northchase Drive
 Houston, TX 77060
281-877-6307
 rfreeman@absconsulting.com

Vice-Chair

Joseph R. Natale
 Baker Engg. & Risk Consultants
 121 Batchelor Lane
 Hammonton, NJ 08037
609-561-8917
 natala@bakerrisk.com

4. DUST EXPLOSIONS - Recent incidents in North Carolina, Indiana, and Kentucky illustrate how catastrophic dust explosions can be. Investigations by the U.S. Chemical Safety Board indicate that many organizations do not adequately understand the hazards of combustible dusts. This session invites papers discussing dust explosion hazards, methods to prevent them or mitigate their effects, and ways of enhancing awareness of dust explosion hazards in all potentially impacted facilities.

Chair

John F. Murphy
 U.S. Chemical Safety Board
 2175 K Street, NW, Suite 400
 Washington, DC 20037-1809
202-261-7600
 john.murphy@csb.gov

Vice-Chair

Dennis C. Hendershot
 Rohm and Haas Company
 3100 State Road
 Croydon, PA 19021
215-785-7243
 DHendershot@rohmmaas.com

5. CHEMICAL REACTIVITY HAZARDS - The analysis of chemical reactivity hazards and the prevention and mitigation of uncontrolled chemical reactions are centrally important to the loss prevention community. This session invites new research, tools, and methods that identify, characterize, or offer design and operational guidance related to chemical reactivity hazards. Related issues include controlling intended reactions that yield useful products, runaway reactions, instability, thermal sensitivity, material incompatibility, and uncontrolled reaction consequences.

Chair

Robert W. Johnson
 Unwin Company
 1920 Northwest Boulevard
 Columbus, OH 43212-1197
614-486-2245
 rjohnson@unwin-co.com

Vice-Chair

Brian R. Dunbobbin, PhD
 Air Products & Chemicals, Inc.
 7201 Hamilton Boulevard
 Allentown, PA 18195-1501
610-481-6736
 dunbobbr@apci.com

6. CASE HISTORIES AND LESSONS LEARNED - Reviews of process safety incidents and near misses provide valuable learning opportunities. Papers dealing with incidents, near misses, and the lessons learned are solicited.

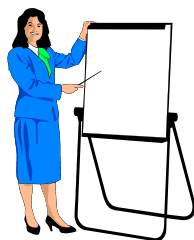
Chair

Henry L. Febo
 FM Global
 P. O. Box 9102
 Norwood, MA 02062
781-255-4771
 henry.febo@fmglobal.com

Vice-Chair

David G. Clark
 DuPont Company
 31 Bass Court
 Newark, DE 19713
302-774-8044
 david.g.clark@usa.dupont.com

TO PROPOSE A PAPER, please contact the appropriate session chair and submit a typed abstract of 150-200 words by **July 8, 2004**. Electronic submissions by e-mail are encouraged. Session chairs will select the papers to be presented and contact the authors by **August 1, 2004**. Authors of selected papers will need to complete a Proposal-to-Present (PTP) on the AIChE web site by **September 30, 2004**. Manuscripts for publication in the *Proceedings* are due to the chairs by **December 10, 2004**. ■



PAPERS PAPERS PAPERS

"A General Criterion to Define Runaway Limits in Chemical Reactors,"

J.M.Zaldivar et al, *J.Loss Prev.Process Ind.* **16**, No.3, 187-200 (May 2003).

A general runaway criterion valid for single as well as for multiple reaction types, e.g., consecutive, parallel, equilibrium, and mixed kinetic reactions, and for several types of reactors, e.g., batch reactor, semi-batch reactor, and continuous stirred tank reactor, has been developed. Furthermore, different types of operating conditions, e.g., isoperibolic and isothermal, have been analyzed. The criterion indicates that a runaway situation exists when the divergence of the system becomes positive ($div > 0$) on a segment of the reaction path. The results show that this is a general runaway criterion that can be used to calculate the runaway limits for chemical reactors.

"The Runaway Scenario in the Assessment of Thermal Safety: Simple Experimental Access by Means of the Catalytic Decomposition of H_2O_2 ," M.Eissen, A.Zogg, and K.Hungerbuhler, *J.Loss Prev.Process Ind.* **16**, No.4, 289-296 (July 2003).

The runaway scenario can be used as the basis for the assessment of thermal process risks. In this context, the time to maximum rate (TMR_{ad}), that is, the time between cooling failure and thermal explosion, can be a measure of the time in which safety measures must be taken. This paper highlights the discussion of TMR_{ad} by presenting the catalytic decomposition of hydrogen peroxide with potassium iodide. The experimental procedure is easily practiced. An overview of the theoretical background is given.

"Safety Analysis of CSTR Towards Changes in Operating Conditions," A.Molnar, J.Markos, and L.Jelemensky, *J.Loss Prev.Process Ind.* **16**, No.5, 373-380 (September 2003).

This paper presents a sensitivity analysis of an exothermic reaction involving the hydrolysis of propylene oxide to propylene glycol in a CSTR with jacket cooling. The objective is to determine how multiple steady states might arise. A comparison of the static and continuation method of the identification of multiple steady states and their stability is presented. The implications of safety analysis for operation and control of

reactors with multiple steady states are discussed.

"Alkoxylation Runaway Reaction Incident at Baker Petrolite, Hartlepool," S.Gakhar and D.Carr, *ICHEM E Symp.Series* **149**, 577-590 (2003).

In 1999, a runaway reaction occurred in a 22 m³ reactor during an alkoxylation reaction using propylene oxide. The subsequent pressure increase caused the rupture disc to burst releasing propylene oxide to the atmosphere. The releases occurred despite the presence of a knockout pot designed to capture released material. The incident and its causes are described along with improvement measures implemented to prevent recurrence and to provide better protection against overpressure and environmental release. Improvement measures included changes in process control, a re-design of the pressure relief system of all the reactors in the plant, and the installation of a quench tank.

"Hydroxylamine Explosion in a Chemical Plant," M.Tamura, *Loss Prevention Bulletin (ICHEM E)*, **Issue 172**, 25-30 (August 2003).

This paper describes an explosion that occurred in June 2000 in a re-distillation tower at a chemical plant in Japan producing 50% hydroxylamine in water solutions. The facility, manufacturing process, and the re-distillation process are described. The state of damage at the vicinity, events leading to the incident, ignition and explosive properties of HA-water solutions, possible causes of the explosion, and factors that could have influenced the initiation are discussed. Recommendations for preventing recurrence of such an explosion are included.

"An Incident Investigation on an Unexpected Loss of Containment and Damage to PHI-TEC II During Acrylonitrile Runaway Tests," C-M Shu and C-J Wang, *J.Loss Prev.Process Ind.* **16**, No.6, 593-595 (November 2003).

This article describes a laboratory incident that occurred during the analysis of a thermal runaway reaction of acrylonitrile. This failure was attributed to human error. Researchers in the area were exposed to considerable danger. The failure characteristics are discussed, and countermeasures are developed to prevent such an incident from recurring.

AND MORE PAPERS

"Autocatalytic Decomposition Reactions, Hazards, and Detection," L.Bou-Diab and H.Fierz, *J.Hazardous Materials* **93**, No.1, 137-156 (July 1, 2002).

Estimation methods based on dynamic Differential Scanning Calorimetry (DSC) measurements have been developed for preliminary screening of the risk associated with chemical operations. An important point for the assessment of thermal risk is the identification of autocatalytic reactions. These types of reactions require special attention and should be clearly distinguished from nth order reactions. Until now, the most reliable tool for identification of autocatalytic decompositions was an isothermal DSC measurement. A new screening method based on DSC measurements for the identification of autocatalytic decompositions has been developed. The method consists of fitting a first order kinetic model to the measured heat release rate curve (from dynamic DSC measurements) and determining the apparent activation energy. If it is higher than 220 kJ/mol, the decomposition is autocatalytic.

"Estimation of the Critical Rate of Temperature Rise for Thermal Explosion of First-Order Autocatalytic Decomposition Reaction Systems Using Non-Isothermal DSC," H.Zhang et al, *J.Hazardous Materials* **94**, No.3, 205-210 (October 14, 2002).

A method of estimating the critical rate of temperature rise for thermal explosion of first-order autocatalytic decomposition reaction systems using non-isothermal DSC is presented. Information is obtained on the increasing rate of temperature rise in highly nitrated nitrocellulose containing 14.14% nitrogen when the first-order autocatalytic decomposition converts into thermal explosion.

"Using the Ideal Gas Specific Heat Ratio for Relief Valve Sizing," A.Shackelford, *Chem.Eng.* **110**, No.12, 54-59 (November 2003).

In API Recommended Practice 520, the basis for evaluating the ideal gas specific heat ratio was modified from standard conditions (in the sixth edition) to relieving conditions (in the seventh edition). This provides the impetus for evaluating the use of the ideal gas specific heat ratio in the

vapor sizing equations as well as the validity of the ideal gas assumption to provide a good estimate of the mass flux through a nozzle. The ideal gas specific heat ratio can be used as an estimate of the isentropic expansion coefficient. Examples are provided in the paper.

"The Use of Certified K_R for Rupture Discs," J.Scoville, *Chem.Eng.* **110**, No.12, 60-61 (November 2003).

The ASME code established a new symbol for rupture discs called UD. It requires that any product carrying the UD stamp to be flow tested at an ASME PTC-25 accepted flow laboratory in the presence of a representative from the National Board of Boiler and Pressure Vessel Inspectors. Results of the flow testing are communicated directly to the user via the certified resistance factor, K_R , and the minimum net flow area (MNFA). Use of this information in the design and use of rupture discs is discussed in the paper.

"Ethical Issues in the Legal Defense of Corporations in Toxic Tort Litigation," J.C.Carver, *Chem.Health & Safety* **10**, No.4, 19-22 (July/August 2003).

Litigation involving allegations of injury due to exposure to toxic chemicals is known as Toxic Tort Litigation. There is also litigation centered around the alleged injuries due to failure of products, known as Products Liability Litigation. The success or failure of the claims depends largely on the underlying science, sometimes legitimate, sometimes speculative at best. This article focuses on the ethical considerations for lawyers who defend corporations in such litigation. In the practice of law, an attorney is often faced with grey decisions. Such problems can be magnified in the areas of Toxic Tort and Products Liability Litigation. When the attorney has a good knowledge of chemistry or has a scientific background, these grey areas can sometimes be resolved more readily.

"Sustainable Development and Sustainability Metrics," *AICHE Journal* **49**, No.8, 1928-2232 (August 2003).

Work at EPA laboratories to develop methods of defining and measuring sustainable development is discussed. ■

DIVISION (continued from page 1)

Interest in the programming in Area 11b declined with time, and more recently, Area 11b became the home for the Biennial Process Plant Safety Symposiums, initially organized for local presentation by the AIChE Houston Local Section.

One of the early activities of the Division was the establishment of the Norton H. Walton/Russell L. Miller Award to honor those people who have made significant contributions to safety in the process industries. More recently, the Loss Prevention Symposium Programming Committee established the William H. Doyle Award which is presented annually to the person presenting the most outstanding paper at the Loss Prevention Symposium.

The 13th Annual Loss Prevention Symposium was held in Houston in 1979, the year of the founding of the Safety and Health Division. The six sessions were: Plant Layout and Equipment Spacing for Safe Operation; Large Scale Toxic Gas Releases; Experience with Plastic Equipment; Hot Problems and Cool Flames; Case Histories and Means of Prevention; and Selected Topics. The Program Committee (then called Area 4e) included Bill Bradford, John Davenport, Gene DeHaven, Bill Doyle, Stan Grossel, Owen Kubias, Ted Ventrone, and Bill Wood, all of whom became actively involved with the Division.

Sam West

NEWSLETTER CHANGES?

There may be some changes in the frequency and distribution of *Safety & Health News* brought about by the agreement which AIChE entered into with John Wiley & Sons to provide publishing services for *Process Safety Progress* as well as *Environmental Progress* and *AIChE Journal*. Under this partnership, AIChE will retain ownership and editorial control while Wiley will provide all publishing services including launching online editions through *Wiley Interscience*.

Since the Division Newsletter had been distributed to members with *Process Safety Progress* through the AIChE Publications Department, the new agreement with Wiley may require a change in the way the Newsletter is developed and distributed. This will be a major topic of discussion at the Division Executive Committee Meeting in New Orleans in April. All members are indeed welcome to attend this meeting. The most likely time is late Tuesday afternoon, April 27. The location and time will be posted.

There are several options. Arrange for distribution through Wiley (more expensive than through AIChE), mail separately (expensive), electronic version only, reduce frequency (now quarterly) in any event, eliminate, or? Your comments are indeed solicited. Please send to: aswest@worldnet.att.net. ■



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(Spring 2004)

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