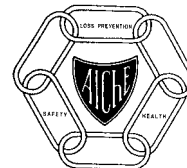


Safety & Health News

AIChE

AMERICAN INSTITUTE OF
CHEMICAL ENGINEERS

SAFETY AND HEALTH
DIVISION
www.shdiv.aiche.org



FALL 2005

SAFETY FORUM ACCEPTABLE RISK

What is an acceptable risk? There is reality and there is perception. People will generally refer to something as "safe" or "unsafe" without recognizing that safety is a value judgment, that is, the degree to which risks are acceptable. They want an event, a process plant, or a chemical product to be "absolutely" safe!

It is critical to understand that the public is willing to accept significant risks voluntarily, but will set a different set of standards for risks assumed involuntarily. Driving is an example. Based on the number of deaths and injuries caused each year by motor vehicles, cars should be considered as "unsafe" and thus hazardous to health. But the public exercises the prerogative to determine that the benefits outweigh the risks involved, the risks are assumed voluntarily, the driver can exert some control over the use of the vehicle, and thus the risk becomes acceptable.

Then there is perception versus reality. The public will place the risk of nuclear power generation very high, perhaps as number one of the riskiest activities and technologies. But it is in reality well down the list. Smoking is rarely selected as the riskiest activity, perhaps because it is obvious, but it is certainly the riskiest activity in terms of the number of deaths caused. The public considers the use of pesticides as a risky activity, but the actual ranking is also well down the list.

Engineers and scientists are versed in understanding risk assessments for a variety of chemistry, process, and plant activities. Recognition must be given, though, to the fact that the public will probably have different perceptions and acceptances of any risks. This is a particular problem when the public is commonly fearful of events that they cannot control, e.g., an incident inside a chemical plant affecting them on the outside, or on the use of a new product containing unfamiliar chemical substances.

Lowrance¹ points out that technically trained professionals have special responsibilities to society in matters of personal safety, for example, in the following principal types of risks: (1) technically complex risks; (2) risks that can be significantly reduced by applying technology; (3) risks with technical components constituting public problems; (4) risks involving technical intrusions on personal freedom made in the pursuit of safety; and (5) risks where the possible consequences appear so grave or irreversible that extreme precautions must be urged.

There are indeed many opportunities for knowledgeable scientists and engineers to take an active role in discussions with the public on safety issues, particularly in various government regulatory issues. Keep in mind in such instances, though, that the public perception may well differ from reality, and that the public may assume significant risks voluntarily but can object strongly to what might appear to be an involuntary risk.

¹W.W. Lowrance, *Of Acceptable Risk - Science and the Determination of Safety*, William Kaufmann Inc. (1976).

Sam West

Safety & Health News is issued quarterly by the Safety and Health Division of the American Institute of Chemical Engineers (AIChE). It is available on the Division web site: www.shdiv.aiche.org. News items of interest to the Division of Chemical Health and Safety (CHAS) of the American Chemical Society (ACS) are included.

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OBITUARY

Walter Silowka, the AIChE Safety and Health Division Chair for 2005, died August 14 of leukemia at the age of 57. Walt was active in the Division for a number of years, serving as a Director 2001-2003 and Vice-Chair 2003-2004. He was also involved in CCPS activities. He was a key contributor in the Risk Assessment Subcommittee which wrote the 2nd Edition of the book *Guidelines for Chemical Process Quantitative Risk Assessment* and also *Guidelines for Consequence Analysis of Chemical Releases*.

He retired early from Air Products and Chemicals, Inc. in June 2005 where he had worked for 31 years. His most recent assignment there was as Director of Process Safety and Reliability in the Corporate Engineering Department. In this capacity, he managed a group of process safety specialists who developed and implemented the policies, tools, and work practices that the company followed worldwide in the areas of process safety. This work included hazard identification, consequence and fault tree analysis, and employee and public risk assessment. Previous assignments included work as a process design engineer and Director of Process Technology. Previously he had worked for NL Industries and DuPont.

He received his BS degree from the University of Delaware and his MS degree from Lehigh University, both in chemical engineering. For several years, he was consultant/lecturer for the chemical engineering senior design course at Lehigh. He was a member of the Society of Plastics Engineers as well as AIChE.

OBSERVATIONS ON DIVISION MEMBERSHIP

Membership in the Safety and Health Division has dropped by approximately 100 each of the past 5 years with the result that there are now just over 1,000 members. Membership in AIChE has also dropped during this period. Of interest is the fact that the percentage of AIChE members who are Safety and Health Division members has remained fairly constant at about 2.7%. Total Division membership has also declined during this same period, but the changes have not been the same for all Divisions. Some have shown precipitous declines as work interests change.

The Environmental Division recently ran an on-line survey of its members to identify future directions and efforts of the Division that would best satisfy the needs of the membership and would help to increase the membership rolls. The results of this survey can well be of use to other Divisions in planning for the future. A remarkable 20% response rate was obtained which provided a solid basis for identifying what is valuable and what is needed by the members of the Division.

The membership expected the Division to provide current information on environmental technologies (93%), updates on environmental regulations (76%), networking opportunities (43%), and improved career opportunities (36%). Traditionally, AIChE and the Divisions have relied on National and Annual Meetings to meet these needs, although 88% of the respondents indicated that they rarely or never attend these meetings. A number of reasons were cited for lack of attendance including lack of relevance to the immediate work, cost, and lack of support from their employer. Improvements in content and ability to link more clearly the technical programming to the needs of the employer could improve attendance at the meetings. At least in the short term, however, improvements in the technical programming are unlikely to satisfy the needs of a large portion of the membership or to increase meeting attendance. Alternative approaches are and will be necessary to meet the expectations.

There was strong support for the quarterly journal *Environmental Progress* with 84% of the respondents identifying it as one of the most beneficial aspects of Division membership. Only 7% were dissatisfied with the journal, although 12% would like to be able to remain a member of the Division without receiving the journal (presumably by paying considerably lower annual dues).

Some 80% of the respondents would like to see environmental articles added to the Division web site, and 86% would consider joining and participating in an electronic forum for the Division. Almost half of the respondents indicated a willingness to provide articles or other materials for the web site. This expansion of content in electronic format could be a useful direction for the Division.

A more complete discussion of the survey can be found at *Environmental Progress* **24**, No.2, 117-118 (July 2005). The information, while not necessarily directly applicable to all Divisions, can be helpful in determining future directions as related to membership needs. ■

50TH ANNUAL SAFETY IN AMMONIA PLANTS SYMPOSIUM

The 50th Annual Safety in Ammonia Plants and Related Facilities Symposium, organized by Program Area 11c (Ammonia Committee), is scheduled for **September 26-29, 2005**, at the Fairmont Royal York Hotel in Toronto, Canada. Presentations cover issues of safety interest in plants that manufacture ammonia, urea, nitric acid, ammonium nitrate, and methanol. Papers include concrete ideas on how to avoid or manage potential plant incidents, how to solve safety issues, and overviews of procedures and products that can be used to ensure safety measures. Special events and international speakers, in recognition of 50 years of success, will be included this year in this popular symposium. Information can be found at www.aische.org in the Meetings Section.

GLOBAL CONGRESS ON PROCESS SAFETY - FIRST AND SECOND

The First Global Congress on Process Safety was held in conjunction with the 2005 AIChE Spring Meeting in Atlanta on April 10-15. This is the first time that three separate process safety symposiums - the 39th Annual Loss Prevention Symposium, the 7th Process Plant Safety Symposium, and the 20th Annual CCPS International Conference and Workshop - were held at a single meeting. Since the Global Congress was part of the larger AIChE Spring Meeting, it is difficult to determine precisely how many attendees were there as a result of the process safety symposiums, but a number of 400 was estimated. Attendance at the sessions in the Loss Prevention Symposium ranged from about 50 to 160. As with any start-up venture, there were some glitches in that the presentation times for the papers in the three symposiums did not really line up in a satisfactory manner, and the options to obtain the Proceedings for the three separate symposiums were confusing to the attendees. However, there was mostly positive feedback about again holding the three symposiums at the same time. As a result, the Second Global Congress on Process Safety has been established to be held at the 2006 AIChE Spring Meeting scheduled for Orlando, FL, on April 23-26.

A special 40th Annual Loss Prevention Symposium is scheduled, together with the 8th Process Plant Safety Symposium and the 21st Annual CCPS International Conference. The latter is entitled "Process Safety Challenges in a Global Economy." The program summaries for the symposiums will be included in the Winter 2005/2006 Newsletter. It is certainly not too early to mark the dates on your 2006 calendar now. ■

WALT FRANK NAMED FELLOW OF AIChE

Walter L. Frank, ABS Consulting, was recently elected a Fellow of AIChE in recognition of his professional attainment and significant accomplishments in chemical engineering. A minimum of 25 years of chemical engineering practice and outstanding contributions, both technically and professionally, are requirements for election to Fellow, the highest grade of AIChE membership. The number of Fellows is limited at any time to ten percent of the total number of Fellows and Senior Members in the Institute.

At ABS in their Wilmington, DE, office, Walt provides consulting support to industry in the areas of process hazard analysis, consequence assessment, quantitative risk assessment, incident investigation, and the application of process safety management systems. Prior to joining ABS, he spent 24 years with DuPont, the last ten in the Process Safety and Fire Protection Group of the Engineering Department.

Long active in the Safety and Health Division, Walt served as Division Chair in 2002, following progression as a Director for 3 years and as a Vice-Chair for 2 years. He not only was Chair of the Loss Prevention Symposium in 2005, but was instrumental in coordinating the CCPS and the Process Plant Safety Symposium sessions in organizing the First Global Conference on Process Safety. Walt continues to be involved in CCPS and NFPA activities.

Walt obtained his BS degree in chemical engineering from Rose-Hulman Institute of Technology. ■

WEB SITE FOR FEDERAL SCIENCE DATA

Version 2 of the federal government science web site is now in operation at www.science.gov. This web site can search 47 million pages of government documents in 30 databases and 1700 web sites. Results are presented in relevancy-ranked order. Information is provided by 12 agencies including the Environmental Protection Agency, NASA, Department of Energy, National Science Foundation, and Department of Health and Human Services.

A CHEMICAL SAFETY TIMELINE RUSSELL PHIFER, CHAIR ACS DIVISION OF CHEMICAL HEALTH AND SAFETY

What do Pliny the Elder, Paracelsus, and Bernardino Ramazzini all have in common? Each made significant contributions to the early study of chemical safety. Nearly 2000 years ago, Gaius Plinius Secundus (Pliny the Elder) invented the first respirator to protect workers from inhaling lead oxide. Paracelsus (1493-1541), a Swiss physician, developed the basis for modern toxicology - "What is it that is not a poison? All things are poison and nothing is without poison. It is the dose only that makes a thing not a poison." He also was the first to publish a description of the symptoms of chronic mercury poisoning, and developed the first "chemotherapy" of using mercury for the treatment of syphilis (a treatment that was used for 350 years!). Paracelsus also was the first to recognize that silicosis came from inhaling metal vapors. Dr. Ramazzini (1633-1714) is generally recognized as the father of occupational medicine. He was the first doctor to ask "what type of work do you do?" instead of "where does it hurt?" His studies encompassed 43 different occupations, examining the related chemical exposures and offering practical advice for prevention and mitigation.

We could say that prehistoric man was the first to consider chemical safety as he recognized that a certain food which kills someone else may not be safe to eat. He also recognized that certain stuff at the end of an a dart hastened the death of an animal. Despite these very early chemical safety manifestations, the first safety-related organizations date only from the end of the 19th century. The first was arguably the U.S. Marine Hospital Service (predecessor to the U.S. Public Health Service and later NIH), which began in 1887. The American Society of Safety Engineers, founded in 1911, is likely the first non-government safety organization, followed by groups such as the National Safety Council (1913), Holmes Safety Association - for mine safety - (1916), the British Industrial "Safety First" Council (1917), the American National Standards Institute (1918), and the International Labour Organization (1919). The American Industrial Hygiene Association was begun in 1939.

The Division of Chemical Health and Safety of ACS did not achieve official Division status until 1980! The AIChE Safety and Health Division was chartered just about one year before that.

The mandating of chemical health and safety into the workplace is actually a fairly recent phenomenon with most efforts taking place within the past 35-40 years. The implementation of the Occupational Safety and Health Act of 1970 was a major driving force. Prior to that time, safety was driven in the chemical process industries through worker protection and boiler codes, but the significant technical application and the formalization of chemical safety, toxicology, and process safety are fairly recent events.

Obviously, we owe a great debt to those who came before us in the study of chemical health and safety, but the continued emphasis on chemicals in industrial manufacturing processes, in the life sciences, in consumer products, and in all other aspects of every day life ensures the need to continue and to expand all of the earlier efforts. Any "new" science will undoubtedly provide new challenges; let's hope we can continue to meet them.

Russell Phifer

CHAS AWARD WINNERS



Three 2005 CHAS Awards were presented at the ACS 230th National Meeting in Washington, August 28 - September 1.

The Howard Fawcett Chemical Health and Safety Award was presented to **Edward Rau**, NIH, Bethesda, MD. He conceived, developed, organized, and implemented the "Mad as a Hatter Campaign for a Mercury-Free NIH," the first pollution prevention initiative covering all NIH facilities in the U.S.

The CHAS College/University Award was shared by the **University of Nevada - Reno** and **Massachusetts Institute of Technology**. This award is given to recognize the most comprehensive laboratory safety program in higher education at the undergraduate level. Since its inception, this award has been instrumental in helping to develop a proper chemical safety attitude in university laboratories.

Russell Phifer of WC Environmental Consultants LLC, West Chester, PA, was the recipient of the Tillmanns-Skolnick Award for outstanding service to the Division. Russ has been very active in CHAS affairs for a number of years and is the 2005 Division Chair. ■

TWO STUDENTS INJURED IN CHEM LAB FIRE

Two students were seriously injured in a fire on June 18, 2005, the last day of school, in a chemistry laboratory at Huntington Beach High School, CA. A supervised classroom chemistry lesson was in progress in the college preparatory chemistry class. The injuries, involving methanol, were caused by the fire, not the chemical exposure. The flare-up occurred during a science demonstration for about 40 students. It was an experiment that the particular teacher had done many times. Detailed investigations are underway by both school personnel and by the Fire Department.

CHAS is actively involved in working with the ACS Committee on Professional Training (CPT) since that group is currently revising teaching guidelines at this time. There is a general feeling that students are not properly trained with regard to safety. This impacts not only graduate chemists entering academia and industry, but also teachers entering school systems. It is critical for CHAS to work closely with CPT.

Members of CPT do recognize the importance of safety throughout the undergraduate chemistry curriculum. Currently, safety issues are addressed in their Guidelines and the *Safety Education Supplement*. CPT expects to enhance the focus on safety awareness and risk assessment. Use of the ACS Committee on Chemical Safety publication *Safety in Academic Chemistry Laboratories* as a reference is highly recommended. CHAS will continue to work closely with CPT on the laboratory safety issues. ■

ACS COMMITTEE ON CHEMICAL SAFETY

The work of the Committee on Chemical Safety (CCS) continues to advance on a number of initiatives. The important publication *Safety in Academic Laboratories, Volume 2*, has been reprinted. Efforts to publish a Spanish version on the web site are underway. CCS members are examining integration of green chemistry concepts into future editions.

The third edition of *Chemical Safety Manual for Small Businesses* is in the final review process. Two documents, "A Checklist for Small Chemical Plant and Academic Facility Security Managers to Deal with Terrorism and Vulnerability Issues," and "High School Student Laboratory Code of Conduct" are in preparation. The task force of the former Committee on Chemical Safety-Committee on Environmental Improvement (CCS-CEI) Laboratory Environmental Health and Safety is now the CCS Task Force on Laboratory Health and Safety. Its publications and the other CCS publications can be found at www.chemistry.org/committees/ccs.

CCS members are pursuing information on chemical health and safety practices for academic laboratories engaged in emerging technologies such as nanotechnology and biotechnology. A new "Nanotechnology Safety" resource link is on the CCS web site.

CCS cosponsored the Presidential Symposium on "Chemical Plant Security" at the ACS 230th National Meeting in Washington on August 28. CHAS was also a cosponsor. ■

NATIONAL TOXICOLOGY PROGRAM

The National Toxicology Program (NTP), which is headquartered at the National Institute of Environmental Health Sciences, celebrated its 25th Anniversary earlier in 2005 with a symposium that reviewed the continually evolving field of toxicology. The contributions and the leadership provided by NTP were highlighted. The vision for the 21st Century was described. This vision addressed three main areas: (1) refining traditional toxicology assays, (2) developing rapid mechanism-based predictive screens for environmentally induced diseases, and (3) improving the overall utility of NTP products for public health decisions. The Roadmap is available at <http://ntp-niehs-nih.gov>, select "Vision and Roadmap."

The Department of Health and Human Services released the 11th Edition of the Report on Carcinogens (RoC) early in 2005, adding 17 substances to the growing list of cancer-causing agents, bringing the total to 246. This report is prepared by NTP. It is an informational scientific and public health document that identifies and discusses agents, substances, mixtures, or exposure circumstances that may pose a carcinogenic hazard to human health. It serves as a meaningful and useful compilation of data on: (1) the carcinogenicity, genotoxicity, and biological mechanisms of the listings in humans and/or animals, (2) the potential for exposure to the substances, and (3) the regulations promulgated by the Federal Government to limit exposures. The report now contains 58 listings "known to be human carcinogens" and 188 listings "reasonably anticipated to be human carcinogens." Federal law requires the Secretary of HHS to publish the report every two years.

For the first time, viruses are listed in the report, including hepatitis B virus and hepatitis C virus. Other new listings include lead and lead compounds, and X-rays.

The report is available at: <http://ntp-niehs-nih.gov>, select "Report on Carcinogens." ■

THE CCPS PAGE CENTER FOR CHEMICAL PROCESS SAFETY

PROCESS SAFETY BEACON - SAFETY MESSAGES

The CCPS *Process Safety Beacon* program, started in 2001, is aimed at delivering one-page color safety messages each month to operators and other manufacturing personnel via e-mail. These messages are available free to CCPS sponsor organizations. In order to promote process safety awareness and information across the industry, the safety messages are also available to anyone registering to receive them. The document is delivered by e-mail in a language of choice, for example, English, Arabic, Chinese, Dutch, French, German, Hebrew, Hindi, Italian, Portuguese, and Spanish. The document is read by over a half million process safety and plant personnel in chemical, petrochemical, petroleum, pharmaceutical, insurance, consulting organizations, and government agencies world wide. Topics covered in the last six months have been:

March 2005	Tower Top Rockets Off
April 2005	Pressure Explosion Results
May 2005	Storage Area Completely Destroyed
June 2005	Too Many Start-Stop Switches
July 2005	Piper Alpha Oil Platform Destroyed
August 2005	Toxic Reaction in Sewer is Fatal

Companies and individuals are invited to sponsor a single or more issues. Volunteers fluent in other languages are sought to help make the *Process Safety Beacon* available to an even wider audience. For information regarding issue sponsorship, to register for subscription, or to volunteer for translations, contact Adrian Sepeda at: ccps_beacon@aiche.org.

For information regarding the benefits and costs of becoming a sponsor organization of CCPS, contact Karen Person at: karep@aiche.org. ■

NEW CCPS WEB SITE

The CCPS web site is currently undergoing a substantial overhaul. The new site, www.ccpsonline.org/, is scheduled to open October 1, 2005. Please visit the new site on this date (or later) as new resources will be available as well as full CCPS project listings and volunteer opportunities.

LIQUIFIED NATURAL GAS CONFERENCE

On September 11-14, 2005, in Vancouver, British Columbia, Canada, the AIChE and the Canadian Society of Chemical Engineering (CSCHE) will jointly sponsor their first LNG Conference with the theme title of "LNG: Environment and Safety." CCPS, as a technical-industrial constituent of AIChE, has been actively involved with the development of this Conference. Suppliers of LNG technologies, carriers of LNG, and operators of LNG facilities, as well as regulators and concerned leaders from the public sector will explore the business, supply, safety, environmental, and regulatory issues associated with the projections of a rapid growth in the North American LNG market. Many new LNG shipping, receiving, storage, and distribution projects will be undertaken in the next five years. LNG poses several unique fire and explosion hazards. Sound process safety principles must be applied during all phases of these projects. Details of the conference and registration information can be found at: www.aiche.org/conferences/LNG/index.htm.

Note, for your information, that the September 2005 issue of *Process Safety Progress* (24, No.3, 142-212) was devoted almost entirely to issues of LNG safety. ■

ELEMENTS OF PROCESS SAFETY MANAGEMENT

CCPS identified¹ twelve elements that must be part of any chemical process safety management program. As a reminder, these elements are: (1) Accountability: Objectives and Goals; (2) Process Knowledge and Documentation; (3) Capital Project Review and Design Procedures; (4) Process Risk Management (Internal and Toll); (5) Management of Change; (6) Process and Equipment Integrity; (7) Incident Investigation; (8) Training and Performance; (9) Human Factors; (10) Standards, Codes, and Laws; (11) Audits and Corrective Actions; and (12) Enhancement of Process Safety Knowledge.

¹ *Guidelines for Technical Management of Chemical Process Safety*, AIChE/Center for Chemical Process Safety, New York (1988).





SAFETY NOTES

- Acting Assistant Secretary of Labor for OSHA Jonathan L. Snare told safety and health professionals in a speech June 13 that the agency is headed in the right direction as workplace injuries and illnesses continue to decline. Snare spoke during a plenary session at the Professional Development Conference of the American Society of Safety Engineers in New Orleans. He challenged ASSE members to work to build on successes that will continue to drive down on-the-job injuries and deaths. The OSHA Deputy Assistant Secretary Steven Witt, and Paula White, the Head of OSHA Cooperative and State Programs, also delivered presentations.
- OSHA urges employers and workers to take appropriate safety measures to avoid injuries and illnesses associated with the recovery and cleanup efforts following hurricanes. The potential for fatal accidents involving electrocution from power lines as well as serious injuries associated with cleanup and recovery efforts have prompted the agency to remind employers, workers, and the public to observe appropriate safety and health precautions. This includes coordinating with control centers responsible for power circuits so that workers do not enter areas where there are live wires. Fact sheets on issues and hazards related to recovery and cleanup activities following hurricanes are available on the [OSHA Natural Disaster Recovery](#) page. This information is of particular importance this year because of the unusually high number of hurricanes to date and expected for the remainder of the season.
- A major research project called Nanosafe2 was initiated in April in Europe to study the entire life cycle of nanoparticles from their production and storage through transport and use in final products. Seven countries and 23 partners are involved. One of the major industrial participants in the project is BASF AG which is investigating the possible health risks associated with inhalation of nanoparticles. Because the emphasis of Nanosafe2 lies in workplace and plant safety, BASF is also involved in developing physical measurement methods and measuring equipment to detect nanoparticles. The results of the project will be made available in the form of databases, handling procedures, and workshops.
- NIOSH is conducting research to understand the ways in which people may be exposed to nanoparticles in the production and use of nanomaterials, and whether or not such exposures may result in adverse health effects. Recommendations on safe working practices are expected to be issued in 2005. Information on this research program can be found at www.cdc.gov/niosh/topics/nanotec.
- The Board of Certified Safety Professionals (BCSP) recently signed an agreement with the Institution of Occupational Safety and Health (IOSH) recognizing each organization's designation and their related educational, experience, and evaluation standards. IOSH is the leading body in Europe for health and safety professionals, representing 27,000 members in 50 countries. The agreement is an important part of making professional certification transportable among nations. The Comprehensive Examinations of both organizations must still be passed for joint certification, but much of the preliminary activities can be waived for holders of certification designations from either organization. Information about this program can be obtained at www.bcsp.org and at www.iosh.co.uk.
- In May, the U.S. Department of Transportation initiated a new program to improve safety along railroads, one that will target the most frequent, highest risk causes of accidents, focus oversight and inspection resources more directly, and accelerate research into new technologies that can vastly improve rail safety. Key issues include expanding rail inspection capacity, highway-rail grade crossing safety, and the safe transport of hazardous materials by rail. Responding to concerns about material shipments, the railroad industry will provide local emergency responders a ranked listing of the top 25 hazardous materials transported through their communities.
- The United Steel Workers of America are concerned about behavior-based safety from the viewpoint that incident investigations may be carried out improperly such that they can turn into "blame the worker" results with less attention to removing hazards. ■

NOMINATIONS SOUGHT FOR WALTON-MILLER AWARD

The AIChE Safety and Health Division is seeking nominations for the Norton H. Walton/Russell L. Miller Award for 2006. The Award is named for **Norton Walton**, who was Director of Loss Prevention at Atlantic Refining Company (predecessor to ARCO) and who organized the first AIChE Air and Ammonia Plant Safety Symposium in 1957, and for **Russell Miller**, then Director of Safety and Loss Prevention at Monsanto Company, who organized (with Bill Doyle) the first Loss Prevention Symposium in 1967.

This Award, sponsored by the Division, recognizes an individual's outstanding chemical engineering contributions to and achievements in the areas of loss prevention, safety, and health. Nominees must be members of AIChE and nominations must be submitted by members of the Safety and Health Division. Nominations must be submitted by **November 30, 2005** to the Chair of the Division Awards Committee. The selected winner will be honored during the 2nd Annual Global Congress on Process Safety in Orlando, April 23-26, 2006, as part of the AIChE Spring National Meeting.

A nomination form can be downloaded from the Division web site (www.shdiv.aiche.org) or from the AIChE Awards page (www.aiche.org/awards). For further information, contact Bob Benedetti at **617-984-7433** or at bbenedetti@nfpa.org. The mailing address is Robert P. Benedetti, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471. ■

ENGINEERING EDUCATION

The National Academy of Engineering issued a report (*The Engineer of 2020*, National Academics Press, Washington, DC, 2004) that described a vision for engineering practice by the year 2020. The profession will undergo continuous changes influenced by breakthrough technologies such as biotechnology, nanotechnology, materials science and photonics, and information and communication technology (ed.note - no mention of safety and health). World-class engineers will be distinguished by their: (1) strong technical skills and creative problem-solving ability; (2) outstanding team and communication skills; (3) high ethical and professional standards; and (4) understanding the global and societal context of their work. Becoming a world-class engineer is a journey that begins with undergraduate study and requires a commitment to continued learning and professional development.

To meet this challenge, changes in the education of engineers and in the way engineering is taught will be required. Indeed, universities are already engaged in moving to meet the challenges of the vision described. It is also imperative that pre-college education be changed as well, starting now, since engineering students graduating in 2020 are already in elementary school. This is perhaps the more difficult task.

Meanwhile, there are some recently reported disturbing trends in the engineering education process. A *Denver Post* report indicates that relative to the sizes of their populations, universities in Asian nations such as Taiwan and South Korea are graduating five times as many engineers as in the United States. Engineering is at the core of many essential industries, but a looming crisis might hurt the economic progress in the USA. A further factor is that foreign students earned 58% of engineering doctoral degrees in the United States last year, most of whom returned to their native countries such as India and China. Experts fear that such numbers might help other nations surpass the United States in its ability to develop new industrial ideas.

Another problem, pointed out in a recent item in the *Denver Business Journal*, is the reduction in the number of undergraduate women venturing into technical fields. Girls are frequently disinterested in math and science in high school as indicated by the fact that only 15% of the students who took the Science Advanced Placement exam in 2004 were female, while 55% of those overall taking AP tests were female. Perhaps the dot-com collapse has eroded general interest in technology. High female enrollments in law and medicine indicate that women do not fear the long hours required for success in a field. The off-shoring of technical jobs is of concern, however.

In *Issues in Science and Technology*, Kent Hughes, author of *Building the Next American Century: The Past and Future of American Competitiveness*, warns that the United States is in danger of losing its lead in the global economy unless it systematically focuses on innovation. To remain a viable global competitor, the United States must increase research investment, make improvements in its educational system so that it extends through a lifetime, and sustain its attractiveness to students, researchers, and professionals. ■

An engineer is someone who solves a problem you didn't know you had in a way you don't understand. You might be an engineer if at an air show you know how fast the skydivers are falling, or you see a good design and still want to change it, or you've tried to repair a \$5 radio.

FINAL ANNOUNCEMENT INTERNATIONAL COMPETITION TO DESIGN A NEW LOGO FOR THE LOSS PREVENTION SYMPOSIUMS

The AIChE Safety and Health Division Program Area 11a Committee, which organizes the annual Loss Prevention Symposiums, is pleased to announce an international competition for the creation of a new logo in time for the 40th Annual LPS to be held in 2006 in conjunction with the AIChE Spring National Meeting as part of the Second Global Congress on Process Safety. Both AIChE and the Safety and Health Division are professional organizations that do not pursue any profit goals. The objective of the Loss Prevention Symposiums is to promote safety in the chemical process and allied industries by providing forums for practitioners from industry, academia, and government to share experiences, technological advances, and new ideas in the prevention of industrial accidents that involve fires, explosions, runaway reactions, and hazardous material releases.

An invitation is extended to all parties to submit a design or designs of a new logo for consideration. This is an open competition to be judged by the Program Area 11a Committee members. The Committee reserves the right to select one or more or none of the entries.

In order to allow full creative and artistic flexibility, no form requirements are imposed. However, the Committee desires the proposed logo designs to meet the following criteria:

- easily identifiable as the LPS logo,
- relates to the LPS objective stated above,
- scalable, and
- simple and not too detailed, so it can be displayed in low resolution.

All entrants must certify that any art work and images used are the original work of the entrant, and are unencumbered by any third-party copyrights or trademarks. The entrant, by submitting an entry, agrees to grant the AIChE, the Safety and Health Division, and the Program Area 11a Committee a non-exclusive, royalty-free license to use the logo entry for purposes of the contest. The entrant also agrees to grant the AIChE, the Safety and Health Division, and the Program Area 11a Committee an exclusive, royalty-free license to use the logo if it is chosen as the winner.

The Committee will pay US\$100.00 for the winning entry as the sole consideration for acquiring all the rights to use this logo exclusively. The new logo and its designer will be featured in the Proceedings of the 40th Loss Prevention Symposium. The successful logo will also enjoy wide exposure through selected LPS Committee communication channels, including symposium announcements, Proceedings, compact discs, web sites, and archival publications.

All entries must be submitted prior to **October 15, 2005**, by e-mail to logo@lpsti.com. You may use this e-mail address to ask any questions regarding the contest.

Anyone and everyone can enter the competition. International participation and student participation are encouraged. If possible, the entry should be submitted in an editable image file format such as PSD or MIC.

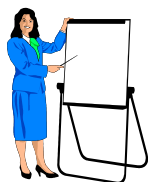
This invitation and offer is void where prohibited by law. ■

SACHE WORKSHOP - TEACHING THE TEACHERS

The 7th Safety and Chemical Engineering Education (SACHE) faculty workshop is scheduled for September 18-21, 2005, at the Rohm and Haas Company Croydon (PA) location. SACHE is organized by a Project Committee of CCPS. The Workshop is open to all faculty members whose departments are current members of SACHE. The focus this year will be chemical reactivity, dust explosions, and accident investigation. Tours to Chilton Technology, Inc., and to a facility that specializes in spray drying are scheduled. All expenses are covered with the exception of round trip travel from your department to the Workshop hotel. Participation by faculty who have under 10 years teaching experience is particularly encouraged.

If you are not a chemical engineering faculty member, you can pass this information on to faculty members at your alma mater or in your Local Section to promote attendance. Process safety is indeed an important component of the education of the next generation of chemical engineers, and these Workshops have been endorsed enthusiastically by attendees in the past.

For further information, contact Ron Willey at r.willey@neu.edu.

**PAPERS PAPERS PAPERS**

"A Comprehensive Analysis Between Temperature and Pressure Measurements for Early Detection of Runaway Initiation," J.Bosch et al, *J.Loss Prev. Process Ind.* **17**, No.6, 385-395 (November 2004).

The authors analyzed the use of pressure instead of temperature measurements for the early warning detection of runaway initiation. This is possible due to the fact the their runaway criterion, i.e., divergence > 0 , does not depend specifically on which state space variable is used for divergence calculation. A series of runaway experiments, carried out in a 250-liter pilot-scale reactor, was used to compare the results. In accordance with a previous analysis, the authors show that pressure may be used for runaway detection. It was observed that temperature works better than pressure in terms of early detection.

"An Advanced Approach to Reactivity Rating," A.Kosoy, A.Benin, and Y.Akhmetshin, *J.Hazardous Materials A118*, 9-17 (2005).

Four well-known hazard indicators: (1) time to certain conversion limit TCL, (2) adiabatic time to maximum rate TMR, (3) adiabatic temperature rise; and (4) NFPA reactivity rating number N_r , are analyzed in this paper. It was ascertained that they could be safely used for preliminary assessment of reactive hazards provided that: (1) the selected indicator is appropriate for the specific conditions of a process, and (2) the indicators have been determined by using the pertinent methods. The applicability limits for every indicator were determined. The advanced kinetics-based simulation approach, which allows reliable determination of the indicators, is proposed. The technique of applying this approach is illustrated by two practical examples.

"Sensitivity Analysis in Polymerization Reactions Using the Divergence Criterion," J.Bosch et al, *Trans.IChemE, Part B (Process Safety and Environmental Protection)*, **82**, No.B1, 18-25 (2004).

A general runaway criterion based on the divergence of the system has been developed. The criterion has been applied to polymerization reactions. The runaway limits (or parametric sensitive regions) have been found and compared with previous criteria. The results show that the new criterion is able to distinguish between runaway and non-runaway behavior for these types of systems. A considerable advantage over existing criteria is that it can be calculated on-line using only temperature measurements, and, hence, it constitutes the core of an early runaway detection system that is being developed.

"Improving Incident Investigation," D.R.Groover, *Chem.Eng.* **111**, No.6, 81-83 (June 2005).

Optimizing environmental, health, and safety (EHS) performance can be enhanced through proper responses to EHS events. A consistent methodology, supported by software tools, can not only get the job done right but also can convey the proper message both internally and externally. While incident investigation is reactive by its very nature, the information collected during the investigation, and any trend analysis that is conducted as numerous events are evaluated over time, permit a more in-depth understanding of the primary causes of such incidents. More effective modes of intervention can then be instigated.

"CFD Simulations to Study Short-Stopping Runaway Reactions in a Stirred Vessel," D.Dakshinamoorthy et al, *J.Loss Prev.Process Ind.* **17**, No.5, 355-365 (September 2004).

The conventional approach of using a completely mixed flow model is inadequate for developing satisfactory operating protocols to prevent runaway reactions. This study describes the use of a computational fluid dynamics (CFD) based model to understand the role of imperfect mixing on short-stopping of a runaway reaction in a fully baffled stirred reactor. The computational model and the results discussed are useful for understanding the effect of the mixing process on the short-stopping process and for developing operational protocols for preventing runaways in stirred reactors.

"Estimating Rates of Spreading and Evaporation of Volatile Liquids," J.Barry, *Chem.Eng.Prog.* **101**, No.1, 32-39 (January 2005).

Guidelines are presented on how to calculate how fast a pool of spilled liquid will spread across a surface, evaporate, and potentially form a flammable mixture with the air.

AND MORE PAPERS

"The Incorporation of Hazard Reduction as a Chemical Design Criterion in Green Chemistry," J.C. Warner, *Chem. Health & Safety* **12**, No.2, 9-13 (March/April 2005).

Green chemistry seeks to incorporate hazard reduction as an integral part of the design process. Designing safer chemicals requires an understanding of what makes a chemical dangerous. Hazard is an overarching term that encompasses several categories including toxicity, physical hazards, and global hazards. Each of these categories has subcategories. Overlap among them is unavoidable. A framework for designing safer chemicals is described. Components of the framework include mechanism of action, Structure-Activity Relationships (SAR), toxicokinetics/toxicodynamics, and bioavailability.

"Screening the Chemical Reactivity Hazards Using a Small Closed Pressure Vessel Test," W.A.Mak et al, *J.Loss Prev.Process Ind.* **17**, No.5, 347-353 (September 2004).

A mini-autoclave test has been evaluated in view of its potential use as a screening tool for chemical reactivity hazard determinations. This is a temperature controlled reaction system enabling the small-scale determination of the stability or reactivity of materials. It is a useful tool to assess the relative effect of conditions and compositions. The results of the test can be used to select and define test conditions for larger scale experiments, and to enable a safety assessment on the defined larger scale experiments.

"Evaluating Thermal Explosion Hazards by Using Kinetics-Based Simulation Approach," A.S.Kosoy and I.Y.Sheinman, *Trans.IChemE, Part B (Process Safety and Environmental Protection)*, **82**, No.B6, 421-430 (November 2004).

Analysis of possible development of runaway at production, storage, and use of a chemical product, and subsequent choice of measures that can prevent an accident or mitigate its consequences are important tasks in reaction hazard assessment. A kinetic model evaluated from calorimetric data gives a reliable basis for implementing the analysis by means of numerical simulation. This paper discusses some features of the approach as applied to typical problems such as determination of critical conditions of thermal explosion, and self-accelerating decomposition temperature (SADT) for solid and liquid reactive chemicals.

"Comparison of the Thermal Decomposition Behavior for Members of the Hydroxylamine Family," L.O.Cisneros, W.J.Roers, and M.S.Mannan, *Thermochimica Acta* **414**, 177-183 (2004).

Adiabatic calorimetry was used to study the thermal stability of members of the hydroxylamine (HA) family. The study included aqueous solutions of HA free base, HA hydrochloride, HA sulfate, and HA o-sulfonic acid in concentrations typically used in industry. The catalytic effect of metal surfaces such as carbon steel, stainless steel, and titanium were included in the study. In the study, HA was shown to be the most reactive chemical with higher maximum temperature, pressure, non-condensable pressure, and lower time to maximum rate. All decompositions were catalyzed by stainless steel. A violent reaction occurred with solid HA sulfate that generated significant temperature and pressure rises, destroying the test cell.

"Addressing the Hazards of Data Omission from MSDSs," J.C.Mulligan, *Chem.Eng.Prog.* **101**, No.4, 36-39 (April 2005).

According to the U.S. Chemical Safety Board, the lack of data about the fire, explosion, and reactivity hazards posed by chemicals has led to several fire and explosion incidents. These deficiencies in hazard communications included not providing the customer with an MSDS, not training personnel so that they are able to understand MSDS data, not providing data in a format workers can understand, inclusion of incorrect data on the MSDS, and lack of adequate data to describe flammability and reactivity. Information on solid substances is particularly sketchy. This paper describes methods to determine dust flammability and reactivity data for inclusion on MSDSs.

"Sustainability in Chemical Engineering," *Env.Progress* **23**, No.4, 261-357 (December 2004).

This entire issue of *Environmental Progress* is devoted to 12 papers covering sustainability issues in the process industries. ■

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