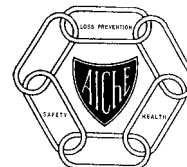


Safety & Health News

AIChE

AMERICAN INSTITUTE OF
CHEMICAL ENGINEERS

SAFETY AND HEALTH
DIVISION
www.shdiv.aiche.org



A Supplement to *Process Safety Progress*

Winter 2003/2004

SAFETY FORUM HEAVY METAL

Heavy metal - no, not rock music, but a brief review of the characterization of health effects of metals. Metals, including the metalloids such as arsenic, boron, and silicon, can serve as the prime examples confirming the writings of the 16th Century Swiss physician Paracelsus who made it clear that "all things are poison and nothing is without poison - the dose makes the poison." He distinguished between the acute and chronic toxic effects of metals and was one of the first practitioners of the medical arts to use chemical medications rather than the popular magic potions.

Heavy metals can serve as models in discussions with non-chemically trained people about the benefits of chemicals, and, yes, the hazards of exposure to toxic amounts. In short, they can serve to explain that the dose does make the poison. The lower molecular weight metallic materials, such as sodium, potassium, calcium, and magnesium, which act primarily in cationic form, are not part of this brief discussion although they are obviously critical for a number of important biological responses.

The nutritionally essential metals for humans include cobalt, chromium III, copper, iron, molybdenum, selenium, and zinc. Manganese is frequently cited as essential to nutrition, but the data are based solely on studies in non-human species.

Metals and metalloids with possible beneficial effects are boron, nickel, silicon, and vanadium.

Metals with no known beneficial effects include aluminum, antimony, arsenic, barium, beryllium, cadmium, lead, mercury, silver, strontium, thallium, and tin.

Why are some of these beneficial metals key

to human health? Cobalt is a necessary ingredient for making red blood cells. Copper helps to defend the body against damage from free radicals. Iron helps the body transport oxygen and certain chemical messengers. Selenium helps preserve the elasticity of body tissues. Zinc plays a role in sexual maturation and regulation of hormones; it also helps some proteins to attach as necessary to DNA. But all of these metals will show certain toxic effects at some dosage level above that required for human health.

A small group of metals and metalloids, including boron, manganese, nickel, silicon, and vanadium, are not known to be essential to human health. However, they have been shown to have biologically functional attributes in plant and animal studies. These metals are toxic at certain levels, and nickel is indicated to be a human carcinogen via inhalation.

Arsenic, cadmium, lead, and mercury, and their inorganic compounds, are likely to be the most toxic metals. There are no known beneficial effects to human health with these substances.

Arsenic, beryllium, cadmium, chromium VI, and nickel are listed by the National Toxicology Program as human carcinogens in at least one form and by at least one route of exposure.

The toxicity of metals and their derivatives is a complex subject. For example, organic salts of metals such as mercury can be particularly toxic. But the issues under discussion here are clear. **The dose does make the poison. Chemicals are essential to human life.** Information about the broad class of metals (including metalloids) provides confirmation of these two points.

Sam West

Safety & Health News is published quarterly by the Safety and Health Division of the American Institute of Chemical Engineers (AIChE). It is distributed to members of the Division as a supplement to *Process Safety Progress*. Publication is funded by the Safety and Health Division, by the Center for Chemical Process Safety (CCPS) of AIChE, and by AIChE.

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 2003

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

Scott W. Ostrowski, 1st Vice-Chair
ExxonMobil Chemical Company
P. O. 4900
Baytown, TX 77522-4900
281-834-5344
scott.w.ostrowski@exxonmobil.com

Walter Silowka, 2nd Vice-Chair
Air Products & Chemicals, Inc.
Corporate Engineering Dept.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
610-481-6808
silowkw@apci.com

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

Albert I. Ness, Secretary/Treasurer
Rohm and Haas Company
P. O. Box 584
Bristol, PA 19007
215-785-7567
ANess@rohmmaas.com

DIRECTORS

Gary Pilkington (2001-2003)
Abbott Laboratories
Dept. 05-SL, Bldg. AP52S
200 Abbott Park Road
Abbott Park, IL 60064-6212
847-937-3091
gary.pilkington@abbott.com

Ronald J. Willey (2001-2003)
Northeastern University
Dept. of Chemical Engineering
360 Huntington Avenue
Boston, MA 02115
617-373-3962
willey@neu.edu

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

PROGRAM COORDINATORS

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

Ephraim A. Scheier
BP Amoco Corporation
Room WL4-753
P. O. Box 3092
Houston, TX 77253-3092
281-366-2573
ephrain.scheier@bp.com

AWARDS COMMITTEE

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

PUBLICATIONS COMMITTEE

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

MEMBERSHIP COMMITTEE

Walter L. Frank (see Past-Chair)
John F. Murphy (see Program
Coordinators)

CONTINUING EDUCATION COMMITTEE

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

Peter N. Lodal
Eastman Chemical Company
Building 18
P. O. Box 511
Kingsport, TN 37662
423-229-2675
pnlodal@eastman.com

Robert W. Ormsby
5802 Wire Grass Trail
Valrico, FL 33594
813-661-1448
ormsby@tampabay.rr.com

GOVERNMENT RELATIONS

Randy Freeman
ABS Consulting
16855 Northchase Drive
Houston, TX 77041
281-877-6407
rffreeman@absconsulting.com

EDITOR - PROCESS SAFETY PROGRESS

Theodore A. Ventrone
Morris Hall
M-116
One Bishop's Drive
Lawrenceville, NJ 08648
609-620-0072

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

WEBMASTER

Daniel A. Crowl (see Publications
Committee)

*serves also as LIAISON TO THE
AIChE BOARD OF DIRECTORS

SAFETY AND HEALTH DIVISION UPDATE

KRIS CHATRATHI, CHAIR

At the end of 2003, my term as Chair of the Safety and Health Division will be concluded. Scott Ostrowski, the current First Vice-Chair, will become the Chair at the beginning of 2004.

As you are aware, the AIChE national organization recently has had a few disappointing years financially, and 2003 was a particularly challenging one. Membership is declining, much like other engineering organizations. Aggressive actions are being taken to cut costs. For example, the Institute is looking to sublease 75% of its New York office space, and to cut staff by 50%. Outsourcing of publications is under consideration, which can have an impact on *Process Safety Progress*, the Division magazine. On the other hand, the Safety and Health Division is financially stable with adequate reserves, and its membership, although showing some decline in recent years, has generally stabilized.

If you are a Division member who is interested in taking a more active role in the governance of the organization and contributing to the ongoing health of the Division, I urge you to attend the Annual Executive Committee Meeting, which will be held during the AIChE Spring National Meeting in New Orleans, April 26-29, 2004. Please feel free to introduce yourself to Scott Ostrowski and express your interest. He will be glad to get you involved as a member of a committee or to run as a candidate for Director 2005/2007. Other officers of the Division, as listed on page 2, will also be glad to help you get more involved in the activities of the Division.

The 38th Annual Loss Prevention Symposium will be held as part of the AIChE Spring National Meeting in New Orleans. Because of high interest and the availability of quality presentations, the Symposium has been enlarged from its usual six sessions to seven for 2004. Details of these sessions are shown on page 9 of this Newsletter. The session topics are: (1) Fire, Explosion, and Reactive Hazards; (2) Loss Prevention Aspects of Large Storage Tank Design; (3) Safety Instrumented Systems/Layer of Protection Analysis; (4) and (5) Advances in Consequence Modeling I and II; (6) Engineering Solutions to Facility Security Challenges; and (7) Case Histories and Lessons Learned.

Forty-two papers from around the world - USA, China, Belgium, Kuwait, Canada, United Kingdom, the Netherlands, and Saudi Arabia - have been scheduled for presentation in these

seven sessions. The papers come from a variety of sources, including government, industry (oil, chemical, pharmaceutical), universities, consulting companies, equipment manufacturers, and consensus-building organizations. With a high level of technical content and a description of current best practices, the 38th Annual Loss Prevention Symposium is a "must attend" event for process safety practitioners. The annual Division Banquet is also scheduled during this meeting.

The value of participating in the Safety and Health Division activities and attending events, such as the Loss Prevention Symposium, is hard to quantify in accounting (dollar) terms. However, the value can be described in qualitative and/or anecdotal terms. The first and obvious benefit is the gaining of technical knowledge. As a practicing engineer, the only way for you to assess whether or not your ideas and methods are good and appropriate is to test these ideas in a forum with other engineers doing similar work. The Safety and Health Division provides you the opportunity to learn what the best methods are and to test your engineering solutions in front of the best engineers in the country. Besides being exposed to the best engineers, you will have an opportunity to build friendships and relationships that will be of value to you in good times and bad times. During good times, when your company is growing, the friends you make will help you get to the right solutions to your engineering problems faster. During bad times, when your company is downsizing, the same friends will be able to help you with career advice and assistance.

You can do someone a favor by handing the membership coupon on page 12 to a colleague who is not a member of the Division. Non-members of AIChE can join the Division and then join the Institute at the appropriate grade level within a year.

As a final note, I would like to thank all of the people who have extended their friendship to me and enriched my life over the past 15 years during which I have been a member of the Safety and Health Division. As Chair of the Division, I have had much help from the other officers, and I indeed thank them. I also wish Ted Ventrone the best as he retires after more than 20 years as editor of *Process Safety Progress*.

Kris Chatrathi

TED VENTRONE RETIRES FROM EDITOR'S POST AT *PROCESS SAFETY PROGRESS* DAN CROWL AND JOE LOUVAR BECOME CO-EDITORS

After 21 years of dedicated service, Ted Ventrone, founding editor of *Process Safety Progress (PSP)*, a quarterly publication of AIChE, is retiring. The December 2003 issue will be the last under his editorial direction, a legacy of more than 8,000 pages that helped to define the discipline of process safety in all of its aspects.

Dr. Dan Crowl, the Herbert H. Dow Professor for Chemical Process Safety in the Department of Chemical Engineering at Michigan Technological University, and Dr. Joe Louvar, a research professor at Wayne State University, will take over as co-editors starting in 2004.

At the time of his appointment as editor of *PSP* in 1982, Ted had already completed a 42-year career in industry, and was working as a loss prevention and safety consultant. He devoted the next two decades to the periodical, building it to one of the definitive resources in the field.

A 1937 graduate of Rhode Island State College (now the University of Rhode Island) with a B.S. degree in chemical engineering, Ted began his career with Factory Insurance Association (now Industrial Risk Insurers). During World War II, he spent five years in the U.S. Army Corps of Engineers, where he rose to the rank of Major. During that period, he acquired a wife, Genevieve Scanlon, to whom he has been married for 61 years.

After 11 years with Factory Insurance, he accepted the post of loss prevention manager in the Organic Chemicals Division of American Cyanamid Company at Bound Brook, NJ. He then had increasing responsibilities in the loss prevention and process safety fields with that organization.

Ted is a Fellow of AIChE. He is well known by Safety and Health Division members for his many significant contributions to the Loss Prevention Symposia. He was honored with the Norton H. Walton/Russell L. Miller Award of the Division in 1993.

The Safety and Health Division Executive Committee honored Ted at a dinner in July near his home as illustrated by the pictures in the next column.

The unique appointment of co-editors to succeed Ted, a first for an AIChE periodical, will bring together a blend of perspectives and expertise. Both Dan Crowl and Joe Louvar have



Ted and Gen Ventrone.



From left: Dick Schwab, Stan Grossel,
Dennis Hendershot, Ted Ventrone,
Walt Frank, Gen Ventrone.



Dick Schwab and Ted Ventrone.

served as Chair of the Safety and Health Division and each were recipients of the Norton H. Walton/Russell L. Miller Award. ■

(photos courtesy of Dennis Hendershot, Rohm and Haas Co.)

THE CCPS PAGE CENTER FOR CHEMICAL PROCESS SAFETY

ORMSBY NAMED STAFF CONSULTANT

Bob Ormsby is now a CCPS Staff Consultant with the concept book on Human Factors as his first assignment. Bob is well known to members of the Safety and Health Division for his many activities in the work of the Division. He served as Division Chair in 1995 and received the Walton/Miller award in 1998.

Bob retired recently from Air Products & Chemicals, Inc., Allentown, PA, where he was the Safety Director for the Chemicals Group. He earned his BS degree in chemical engineering from Penn State, and an MS degree from Lehigh. He now resides in Florida. ■

CCPS STAFF CHANGES

Karen Person joined the CCPS/DIERS/DIPPR staff on November 1. She has been with AIChE for over a year, originally in the Washington office, and more recently in the student program. She is a 2001 chemical engineering graduate of the University of Mississippi. Among her many roles, she will serve as AIChE Staff Liaison to the Safety & Health Division.

Marty Clancy, who served as the Database Administrator for CCPS and who was heavily involved in the Process Safety Incident Database development, has moved to the Customer Service team for AIChE.

Iliia Killeen of the AIChE staff will now be involved in the work on developing the CCPS Conferences, replacing Kim Punter who has moved to another engineering organization. ■

18TH ANNUAL CONFERENCE

The 18th Annual CCPS International Conference and Workshop convened on September 23-25, 2003, at the Marriott Camelback Resort in Scottsdale, AZ. The overall topic was "Managing Chemical Reactivity Hazards and High Energy Release Events." About 225 people attended.

John Henshaw, Assistant Secretary of Labor for OSHA, gave an excellent keynote address on the partnering approach OSHA envisions with CCPS and industry. A panel of Henshaw, Carolyn Merritt of the Chemical Safety Board, Craig Matthiessen of EPA, John Shrivs of Environment Canada, Ron DeCort of the UK Health and Safety Executive, and Don Abrahamson of Occidental

Chemical discussed future directions in reactivity hazard management. The topic was then debated among the panelists and the audience. Mike Broadribb of BP and Dusty Ferrell of Georgia Pacific each shared important lessons learned from chemical reactivity incidents experienced in their respective companies. ■

SAFETY MESSAGES

The CCPS *Process Safety Beacon* program, started in 2001, is designed to provide safety messages for manufacturing personnel. Each month, a one-page color document is issued electronically to deliver process safety messages to plant operators and other manufacturing personnel.

Three recent issues covered the following topics:

- Aug. 2003 Mixing Chemicals
- Sept. 2003 Combustible Dusts
- Oct. 2003 Transferring Liquids

Past issues can be found at:
www.aiche.org/ccps/safetybeacon.htm.

For further information about these useful data sheets and about sponsorship opportunities, contact CCPS at **215-591-7319** or at ccps@alche.org.

UPDATE ON MAJOR PROJECTS

"Guidelines for Handling Flammable and Reactive Particulate Solids" will be undergoing peer review by the end of this year. "Guidelines for Maintenance and Mechanical Integrity" and the concept book "Safe Vent Header design" are both proceeding well and are scheduled for publication in mid-2004. A new project to produce a concept book on "Human Factors" was launched. ■

For further information about CCPS, contact:

Scott Berger, Director
Center for Chemical Process Safety
American Institute of Chemical Engineers
3 Park Avenue
New York, NY 10016-5991
215-591-7237 e-mail: scotb@alche.org



CALL-FOR-PAPERS

The 19th Annual International Conference and Workshop organized by CCPS is scheduled for **June 29 - July 1, 2004**, at the Caribe Royale Resort in Orlando, FL. The conference will consist of plenary sessions and workshops.

The featured theme is "**Emergency Planning: Preparedness, Prevention, and Response.**"

Sessions will include scenario development and planned response; prevention, which will include inherent safety, facility siting, training, physical and cyber security measures, level-of-protection analysis, and transportation mode selection; storage location, siting, and design; and response to incidents, including community involvement, utilization of consequence modeling, and lessons learned from case histories and incident investigations.

Papers addressing these issues are solicited. Proposals may be submitted by e-mail either in the body of the message or as a WORD document attached to the e-mail. The abstract should be 200-300 words. All contact information should be included. The abstracts should be sent to ccpsicw@aiche.org. They must be received no later than **January 15, 2004**.

The latest information about the conference can be found at www.aiche.org/ccps/icw.

Exhibit and event sponsorship opportunities are available and are described at the web site. For more information on presenting your paper or participating as a sponsor or exhibitor, contact Karen Person at **215-591-7319** or karep@aiche.org. ■

CCPS NEWS ITEMS

- The partnership arrangement with OSHA, EPA, ACC, and SOCMA has come to fruition, enabling CCPS to provide *Essential Practices for Managing Chemical Reactivity Hazards* for free on the Internet. This will help companies of all sizes to improve their chemical reactivity hazard management programs. The free book can be accessed at: www.aiche.org/ccps/resources.htm.
- A workshop on building and improving safety culture was held during the Technical Steering Committee Meeting in September in Scottsdale, AZ. Also at this meeting, there was a discussion about the formation under AIChE of a Reactivity Management

Roundtable. Such a group has been meeting independently. If approved by the AIChE Board of Directors, it would operate under the auspices of AIChE.

- The Process Safety Incident Database is welcoming new participants to share important information about incidents. Companies input data that are put into anonymous format. Companies can then review a wide range of incident data input by other participants. This CCPS project, which operates on a "split-the-bill" basis, has reached a major milestone, enabling participation that is easier and at a considerably lower cost than before. For information, contact ccps@aiche.org.

LOSS PREVENTION ON CD-ROM II

The Second Edition of the Loss Prevention Symposium CD-ROM has been completed. 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. It includes, of course, all of the papers that were in the First Edition.

New for the Second Edition are an index of all papers published in *Process Safety Progress* to date, an index of the papers presented at the annual Safety in Ammonia and Related Facilities Symposiums, and an index of the papers presented at the biennial Process Plant Safety Symposiums. Also, an index of all CCPS books published through 2002 is included. The CD-ROM is fully indexed for ease in searching the literature.

This is a joint project of CCPS and the Safety and Health Division so that sales benefit both organizations. The list price is \$199.00. Division members who own the First Edition (Publication G-49) should clip the \$20 coupon from inside of the CD case cover and use it for a discount when ordering the Second Edition, which is Publication **G-77** (ISBN 0-8169-0871-0).

An order form with the correct mailing address, together with additional information, can be found at: www.aiche.org/pdflibrary/pubs/book02.pdf.

This new CD-ROM is a must-have item as an invaluable aid for all engineers involved in process safety activities. ■

SAFETY NOTES

- The leaders of the Trilateral Occupational Safety and Health Working Group met in Mexico City on August 26 to review and discuss results achieved by individual working groups over the past year. The group is headed by the top occupational safety and health officials in the United States, Canada, and Mexico. The meeting included discussion on the rights of migrant workers in the U.S., a workshop on the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), and a seminar to share the best practices of each country in the construction industry.
- Preliminary toxicity studies on nanomaterials, presented at the ACS Meeting in New Orleans, suggest that there may be some areas of concern as larger scale production methods become available. Single-walled carbon nanotubes showed signs of toxicity when suspended in mouse serum and sprayed into the lungs of laboratory mice. Inhaled nanoparticles made from PTFE (Teflon®) had adverse effects on rats.
- The UK Chemical Reaction Hazards Forum has a web site that contains incident reports on chemical reaction hazards. The Forum is composed of a group of process safety professionals from the UK chemical industry that are involved in a mutual exchange of information, expertise, and ideas. The web site is: www.crhf.org.uk/index.html.
- The American National Standards Institute (ANSI) has approved the new American Society of Safety Engineers (ASSE) updated "Practice for Occupational and Educational Personal Eye and Face Protection Devices (Z87.1-2003). This new standard addresses general requirements, descriptions and types, testing, marking, selection, care, and use of personal eye and face protectors. This standard covers a variety of environments including chemical handling.
- OSHA and EPA recently compiled information to increase awareness of hazards associated with Delayed Coker Unit (DCU) operations during crude oil refinery processes. The result of that compilation is a new Safety and Health Information Bulletin that targets the most significant hazards involving the coke drums—large cylindrical metal vessels that can measure 120' tall and 29' in diameter. The bulletin, available at the OSHA web site, includes preventive actions to minimize risks, and also discusses effective emergency response programs and procedures.
- The number of workplace fatalities fell by more than 6% in 2002 to the lowest level ever recorded according to an announcement on September 17 by the Bureau of Labor Statistics of the Department of Labor.
- The Board of Certified Safety Professionals (BCSP) was accredited in June by the American National Standards Institute (ANSI) under ISO/IEC 17024, "General Requirements for Bodies Operating Certification Systems of Persons." It is among the first five certification bodies in any field to have met this standard in the U.S.
- A new study examined whether silver-mercury dental amalgams are adversely associated with cognitive functioning through using a cross-sectional sample of healthy working adults who were not occupationally exposed to mercury. Persons were evaluated for any reduced cognitive functioning. They also underwent a neuropsychologic test battery. No measure of exposure was significantly associated with the test results. The study does not absolutely lay the issue to rest, but it is at least reassuring.
- Starting in September, paint manufacturers are placing labels on consumer paint products to warn of potential lead dust exposure during remodeling of older buildings. Lead-based paints have not been sold for architectural use in the U.S. since 1978.
- The critical role that OSHA and its partners played in protecting workers at the World Trade Center after 9/11 is chronicled in a new publication "Inside the Green Line." ■



GREEN ENGINEERING

In May, a multidisciplinary group of 65 engineers met in Florida to establish a set of green principles for engineers to use in the design or redesign of products and processes. The conference was organized by Engineering Conferences International with AIChE, ASME, and SAE providing technical cosponsorship. The attendees included chemical, mechanical, electrical, civil, and environmental engineers.

A draft set of principles to implement green engineering, as indicated below, was established.

1. Engineer processes and products holistically, use systems analysis, and integrate environmental impact assessment tools.
2. Conserve and improve natural ecosystems while protecting human health and well-being.
3. Use life-cycle thinking in all engineering activities.
4. Ensure that all energy inputs and outputs are as inherently safe and benign as possible.
5. Minimize depletion of natural resources.
6. Strive to prevent waste.
7. Develop and apply engineering solutions while being cognizant of local geography, aspirations, and cultures.
8. Create engineering solutions beyond current or dominant technologies; improve and invent technologies to achieve sustainability.
9. Actively engage communities and stakeholders in development of engineering solutions.

Process safety engineers will note that the principles of inherent safety and life-cycle consideration are important characteristics in the set of green engineering principles. ■

KLETZ NAMED TO TAMU STAFF

Professor Trevor A. Kletz of Cheadle, Cheshire, UK, was named an adjunct faculty member in the Chemical Engineering Department at Texas A&M University, effective August 1. Dr. Kletz is internationally well known throughout the process industries as a gifted communicator on safety matters. He has wide knowledge of both industrial practice and the theory behind process safety issues. He is a Fellow of the Royal Academy of Engineering, the Institution of Chemical Engineers, the Royal Society of Chemistry, and AIChE.

He retired from ICI after 38 years of service. During his last 14 years there, he was heavily involved in safety issues. He then joined Loughborough University of Technology, at first full-time, and later as a Visiting Fellow. He has written ten books and over 300 articles. ■

OBITUARY

Eugene S. DeHaven died in May 2003 in Lafayette, CA, the town where he lived. He was involved for many years prior to retirement in various process safety and loss prevention matters with Dow Chemical Company. Gene was one of the founders of the Safety and Health Division, and served as its first Chair in 1979. He was the recipient of the Norton H. Walton/Russell L. Miller Award, presented by the Division, in 1988. Gene was a Fellow of AIChE. He was a graduate in chemical engineering from the University of California at Berkeley.

AMMONIA SAFETY Call for Papers

The 49th Annual Safety in Ammonia Plants and Related Facilities Symposium is scheduled for **September 20-23, 2004**, at the Hyatt Regency Denver Hotel, Denver, CO. These annual symposiums are dedicated to safety in plants that manufacture ammonia and related chemicals, such as urea, nitric acid, ammonium nitrate, and methanol. Subjects include hazardous incidents, safety developments, design issues, technological advancements, and maintenance improvements. Proposals for papers are solicited. The proposal should include the following information:

- Author(s)' name and full contact information including company name, address, telephone, fax, and e-mail;
- Speaker's name and full contact information;
- Title of paper; and,
- Brief description of paper.

The proposal should be sent by **January 9, 2004**, to Reinhard Michel at:

michelr@tkt-uhde.thyssenkrupp.com. ■

You are likely to be an engineer if:

- the sales people at the local computer store can't answer any of your questions;
- you take a cruise so you can go on a personal tour of the engine room;
- choosing to buy flowers for your wife or upgrading your RAM is a moral dilemma;
- you still own a slide rule and know how to use it;
- your laptop computer cost more than your car.



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

■



PAPERS PAPERS PAPERS

"The Safety Ethic: Where Can I Get One?" R.H.Hill, Jr., *Chem. Health & Safety* **10**, No.3, 8-11 (May/June 2003).

It is difficult to find a uniform understanding or definition of safety ethics. This paper describes a search to identify the elements of a strong safety ethic and includes several sources that suggest and support each element. The rationale for each of the elements is presented along with some interpretive guidelines so that each part of the safety ethic can be understood.

"Study on Decomposition of Hydroxylamine/Water Solution," Y.Iwata, H.Koseki, and F.Hosoya, *J.Loss Prev.Process Ind.* **16**, No.1, 41-53 (January 2003).

The risk evaluation of the decomposition of hydroxylamine/water solutions was studied experimentally by using Differential Thermal Analysis (DTA), mini-closed pressure vessel test (MCPVT), pressure vessel test (PVT), and the steel tube test. In addition, the decomposition hazard of HA/water solutions was studied in the presence of metal ions and iron powder. The intensity of the thermal decomposition increased significantly when the HA concentration exceeded 80% in the MCPVT. The thermal decomposition of the 70% solution was very violent in the PVT. HA/water solutions of greater than 80% could detonate in the steel tube test.

"A Simple Model for Predicting the Release of a Liquid-Vapor Mixture from a Large Break in a Pressurized Container," V.M.Fthenakis, U.S.Rohatgi, and B.D.Chung, *J.Loss Prev.Process Ind.* **16**, No.1, 61-72 (January 2003).

This paper presents a simple, accurate model for determining the amount and composition of a liquid-vapor release from a pressurized tank that develops a large break above the level of the liquid. Most models used in the chemical industry assume that there is a thermal- and mechanical-equilibrium between the liquid and the vapor phase (homogeneous models). While this assumption is valid for releases through long pipes and nozzles, this paper indicates that it overestimates the total amount released during rapid discharges through large breaks in a vessel when there is insufficient time for the mixture to become homogeneous. An analytical non-homogeneous thermal equilibrium model that accurately determines the void fraction

of the mixture at the time of release and the quantity of a release from a pressurized vessel is derived. The model is used to determine emissions of nitrogen oxides and nitric acid in an actual rupture of a railcar tank. The results agreed with actual observations.

"Database-Supported Documentation and Verification of Pressure Relief Device Design in Chemical Plants," O.Koper and F.Westphal, *J.Loss Prev.Process Ind.* **16**, No.1, 73-79 (January 2003).

Results of a multi-year analysis of the pressure relief devices located in several plants at major chemical sites are summarized. The analysis consisted of a systematic evaluation of existing safety valves and rupture disks, including the identification of the service conditions and design cases, as well as the sizing calculations of the individual devices and the associated piping. An essential part of the verification program was the recommendation of measures to find the most economical yet technically correct method to correct any deficiencies. About 4000 safety devices were evaluated. Results of the analysis were recorded in a novel database to capture the sizing information and to maintain correct pressure relief device sizing in the future.

"Design Safety Instrumented Systems with Relevant Data," M.Menezes and S.Brown, *Chem.Eng.* **110**, No.7, 54-58 (July 2003).

Laboratory-based data can be too optimistic; some data from the field are too pessimistic. Users design safety instrumented systems to bring the risk of identified process hazards to within tolerable levels, using application-specific risk models, user inspection schedules, and safety data for the devices under consideration. A key problem is ensuring the relevance of the available data. This problem can be minimized by the "best practices" recommended in this paper. The results are improved safety and availability, and minimized life-cycle cost. Transmitters are key components of safety instrumented systems. The paper focuses much of the discussion on these items. In selecting transmitters or other devices, diversity and performance diagnostics should be utilized combined with the best practices defined here.

AND MORE PAPERS

"Prediction of Reactive Hazards Based on Molecular Structure," S.R.Saraf, W.J.Rogers, and M.S.Mannan, *J.of Hazardous Materials* **98**, No.1-3, 15-29 (March 17, 2003).

There is considerable interest in the prediction of reactive hazards based on molecular structure. Calorimetric measurements to determine reactivity can be resource consuming. Thus, computational methods to predict reactivity present an attractive option. This paper reviews some of the commonly used theoretical hazard evaluation techniques, including the oxygen-balance method, ASTM CHETAH, and calculated adiabatic reaction temperatures (CART). A study to correlate and predict calorimetric properties of pure compounds is discussed. Quantitative structure-property relationships (QSPR) based on quantum mechanical calculations can be used to correlate calorimetrically measured onset temperatures T_o , and energies of reaction $-\Delta H$, with molecular properties. To test the feasibility of this approach, the QSPR technique is used to correlate Differential Scanning Calorimeter (DSC) data, T_o , and $-\Delta H$ with molecular properties for 19 nitro-compounds.

"Theoretical and Experimental Investigation into the Explosive Boiling Potential of Thermally Stratified Liquid-Liquid Systems," B.Fabiano et al, *J.of Hazardous Materials* **93**, No.1, 107-121 (July 1, 2002).

The occurrence of a rapid phase transition, or so-called explosive boiling, when a cold volatile liquid comes into contact with a hot liquid or a hot surface is a potential hazard in industry. This study was focused on the explosive boiling potential of thermally stratified liquid-liquid systems that result from a runaway reaction. The experimental results showed that under the analyzed conditions, the cold phase was superheated but did not evaporate explosively as the limits of superheat of the phase were not achieved. The response of the cold phase seemed to be completely controlled by the interface temperature between the hot and the cold phase. In general, based on the order of magnitude of temperature differences, the occurrence of explosive boiling under runaway conditions appears unlikely for these types of systems.

"SACHE: 17 Years of Promoting Teaching of Safety to Chemical Engineering Students," J.F.Louvar and D.C.Hendershot, *Chem.Health & Safety* **10**, No.5, 8-10 (September/October 2003).

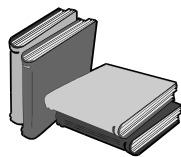
The Center for Chemical Process Safety (CCPS) of AIChE began the Safety and Chemical Engineering Education (SACHE) program in 1985. The objectives are to encourage the incorporation of safety content into the chemical engineering curriculum, to develop safety content for chemical engineering courses, and to provide opportunities for faculty members to learn about safety from industrial experts. There are now more than 120 member schools. The 17-year history of SACHE is reviewed.

"Man and the Workplace: Assessing His Reproductive Health," S.M.Schrader, *Chem.Health & Safety* **10**, No.5, 11-16 (September/October 2003).

The work of the reproductive toxicologist is to identify chemicals or physical agents which may disrupt the male reproductive functions. There is not really a list of reproductive toxicants affecting either the male or female. Groups of chemicals such as heavy metals, pesticides, and certain solvents containing bromine or chlorine may be suspect if a man has sufficient exposure and is experiencing fertility problems. The paper describes the significant problems in identifying and testing for specific chemical exposures.

"Thermal Decomposition of Acetic Anhydride-Nitric Acid Mixtures," R.Andreozzi, R.Marotta, and R.Sanchirico, *J.of Hazardous Materials* **90**, No.2, 111-121 (March 1, 2002).

Acetic anhydride-nitric acid mixtures are used for nitration of organics. The behavior of these mixtures at varying molar ratios is studied by means of adiabatic and scanning calorimetry. A simplified kinetic model is developed to simulate the thermal decomposition of the investigated system under adiabatic conditions. The use of this model allows satisfactory prediction of the temperature profiles in the reactor, whereas calculated pressures are generally overestimated due to some model inadequacies to account for the absorption of gaseous decomposition products into the reacting solution. ■



BOOKS BOOKS BOOKS

Wiley Guide to Chemical Incompatibilities, 2nd edition, R.P. Pohanish and S.A. Greene, 1278 pp, ISBN 0-471-23859-7, John Wiley & Sons, New York, NY, 2003, \$125.00.

This book, the successor to *Wiley's Rapid Guide to Chemical Incompatibilities*, lists about 9,500 common chemicals using more than 12,000 chemical and trade names. A two-page guide indicates to the reader everything necessary to navigate the contents. A brief introduction describes the evolution of the work. Most of the book contains chemical information. In addition to listing information about compatibilities of chemicals with chemicals, many entries include compatibility with common container materials, construction materials, and coatings. Every entry has a CAS Number.

On the Practice of Safety, 3rd edition, F.A. Manuele, 488 pp, ISBN 0-471-27275-2, John Wiley & Sons, New York, NY, 2003, \$94.95.

This book covers the safety profession in general rather than being specific to the chemical processing industries. Safety management is thoroughly reviewed. Each chapter is a self-contained unit that addresses a specific topic. The

book covers the general fields of safety, occupational health, and environmental affairs. The 24 chapters include the definition of safety, injury potential, a causation model for hazard-related incidents, hazard assessment and risk analysis, acceptable risks, designing for safety, behavior-based safety, the future of safety management, audits, and measuring safety performance. In the chapter on design, the requirement that safety issues be included at the outset is emphasized.

Managing Chemical Safety, D.G. Nelson, 381 pp, ISBN 0-86587-838-2, Government Institutes, Rockville, MD, 2002, \$95.00.

This is a "how to" book of tools for implementing and maintaining a successful chemical safety management program. Three major components are encompassed: employee safety, evaluation of and preparation for hazards, and management support/enforcement. Key OSHA, EPA, and DOT requirements are referenced. A safety-conscious culture can be instilled by defining and maintaining a set of specific safe work practices. Management actions are defined to ensure long-term success. ■



CLIP THIS COUPON AND GIVE IT TO A NON-MEMBER COLLEAGUE. URGE YOUR ASSOCIATES TO JOIN THE SAFETY AND HEALTH DIVISION.

(Winter 2003/2004)

Send to: American Institute of Chemical Engineers
annual

Attention: Customer Service Center
3 Park Avenue
New York, NY 10016-5991
1-800-242-4363

Enclosed is a check payable to AIChE for the

dues including subscription to *Process Safety Progress*. Print version is **\$39.00***, on-line version **\$39.00**, both versions **\$69.00***. (*If outside North America, add **\$50.00** for postage.)

NAME: _____

Member of AIChE? YES _____

ADDRESS: _____

Member No.: _____

NO _____

CHOOSE: PRINT ___ ON-LINE ___ BOTH ___

TELEPHONE: _____

e-MAIL: _____