

American Institute of Chemical Engineers

40th Annual Loss Prevention
Symposium
2006

Held at the 2006 AIChE Spring National Meeting

April 23-27, 2006
Orlando, Florida, USA

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

ISBN: 978-1-60423-515-9

Some format issues inherent in the e-media version may also appear in this print version.

Copyright

Copyright ©2006

This product of the 2006 Spring National Meeting was produced for The American Institute of Chemical Engineers by Omnipress.

Duplication of this product and its content in print or digital form for the purpose of sharing with others is prohibited without permission from The American Institute of Chemical Engineers and Omnipress. Also, copying this product's instructions and/or designs for use on future digital products is prohibited without written permission from Omnipress. Omnipress does not have any copyright or ownership of the actual content (documents/papers).

In no event will Omnipress or its suppliers be liable for any consequential or incidental damages to your hardware or other software resulting from the use of this product.

AIChE has been granted permission for itself and its designated agents to reproduce, sell, or distribute the papers contained herein. Copyrights to these papers are retained by the author(s) and/or employer(s), from whom permission to reproduce must be obtained. Please note that the rights to papers authored by employees or contractors of the U.S government may differ.

American Institute of Chemical Engineers

40th Annual Loss Prevention Symposium
2006

TABLE OF CONTENTS

SESSION 3: GLOBAL CONGRESS JOINT KEYNOTE SESSION

Keynote Address Process Safety in the Global Chemical Industry	1
<i>Gary Veurink</i>	
Keynote Address: Process Safety in the Global Petroleum Industry	N/A
<i>John Mogford</i>	
The Expanding Role of the Loss Prevention Professional – Past, Present, and Future	3
<i>John Murphy</i>	

SESSION 32: LOSS PREVENTION; PAST, PRESENT, AND FUTURE

History of the Loss Prevention Symposia - Forty Years: 1967 - 2006	15
<i>John A. Davenport</i>	
Looking from the Past to the Future: Is Loss Prevention affected by Globalisation?	26
<i>Franz Alfert</i>	
The Current Status of PSM Diligence	27
<i>Carolyn W. Merritt</i>	
Evolution of the Corporate KPC HSE Management System	29
<i>Fadhel A. Al-Ali</i>	

SESSION 54: MECHANICAL INTEGRITY

Flexible Storage Phosphor Plate Computed Radiography For Erosion/Corrosion Profiling	50
<i>Steven A. Mango, Steve Mazur</i>	
Managing On Stream Leak Repairs	60
<i>Jesse Wilson and Mark Frazier</i>	
Beyond Compliance – Taking Your Mechanical Integrity Program to the Next Level	66
<i>Andrew Remson, Randal Montgomery, John Leonard</i>	
Mechanical Integrity Best Practice for Sulphuric Acid Plants	80
<i>Michael Robert Beaumont</i>	
An Analysis of the Gas Pipeline Explosion at Ghislenghien, Belgium	114
<i>Haroun Mahgerefteh and Olufemi Atti</i>	

SESSION 104: FIRE, EXPLOSION, AND REACTIVE HAZARDS

The Dow Chemical Company's Expert System for Fire and Reactivity MSDS Text.....	131
<i>B. Prine, A. Kalos, J.B. Powers, R. Kalnins</i>	
Explosion Consequences of Low Velocity Releases of Dense Flammable Vapor Inside a Chemical Manufacturing Facility with a Complex Ventilation System	143
<i>David D. Herrmann</i>	
Stability of Concentrated Initiator Solutions.....	165
<i>James A. Klein and Gordon R. Mros</i>	
Prediction Of Deflagration To Detonation Transition (Ddt) In Hydrogen Explosions	177
<i>P. Middha, O.R. Hansen, I.E. Stovrik</i>	
A Flame Speed Correlation for Unconfined Gaseous Explosions.....	193
<i>Sergey B. Dorofeev</i>	
Elevated Internal Pressures in Vented Deflagration Tests	211
<i>J. Kelly Thomas1, Massimiliano Kolbe1, Martin L. Goodrich1, and Ernesto Salzano</i>	
Modeling of Properties of Energetic Materials: Influence of Surrounding Temperature and Container Properties on the Time to Self-Ignition	224
<i>B. Roduit</i>	

SESSION 126: HAZARD ASPECTS OF COMBUSTION EQUIPMENT

A Proposed Comprehensive Model For Elevated Flare Flames And Plumes.....	225
<i>David Shore</i>	
Flare Safety and Reliability Enhanced with New Flare Pilot Systems.....	261
<i>John Bellovich, Jim Franklin, and Bob Schwartz</i>	
Proper Flare Safety	269
<i>John F. Straitz III</i>	
The Role of Basic Design Data in Preventing Explosions within Fired Equipment: A Case Study	287
<i>Robert F. Wasileski</i>	
In-Line Flame Arrester Application Limits And Matrix Concept For Process Plant Safety From Flash Back Of Thermal Combustion Units	299
<i>Thomas Heidermann, Michael Davies</i>	
Using LOPA to Verify the Design of a Burner Management System.....	325
<i>John Champion</i>	

SESSION 189: HAZARDS & RISKS ASSOCIATED WITH ALTERNATE ENERGY SYSTEMS

The Hazards and Risks of Hydrogen	337
<i>Daniel A. Crowl, Young-Do Jo</i>	
Safety Considerations for Interfacing Hydrogen with the Public for Vehicles.....	350
<i>David Farese, James Hansel and Peter Steiner</i>	
Hazards and Hazard Mitigation Techniques for Natural Gas and Hydrogen Fueling Operations	358
<i>Carl Rivkin</i>	

LNG and Safety Concerns	372
<i>J.P. Lacoursiere</i>	

Risk Analysis of Hydrogen Gas Transmission Using Natural Gas Infrastructure	384
<i>Young-Do Jo, Kyoshik Park, Daniel A. Crowl</i>	

Experimental Study of Accidental Industrial LPG Releases: Rain out investigation	395
<i>Patrick Bonnet and Jean-Marc Lacombe</i>	

SESSION 213: CASE HISTORIES AND LESSONS LEARNED

A Case Study of a TFE Explosion in a PTFE Manufacturing Facility	405
<i>Ali Reza, Erik Christiansen PhD</i>	

Flammable Liquid Process Tank Fire Investigation	418
<i>James R. Reppermund</i>	

Fired Heater Damage Due to Inadequate Management of Change	425
<i>Lee N. Vanden Heuvel, Randal L. Montgomery, and Donald K. Lorenzo</i>	

SESSION 230: JOINT CASE HISTORIES AND LESSONS LEARNED

CSB Investigation of the Explosions and Fire at the BP Texas City Refinery on March 23, 2005	433
<i>Don Holmstrom, Francisco Altamirano, Johnnie Banks, Giby Joseph, Mark Kaszniak,</i>	

Lessons from Texas City A Case History	444
<i>Michael P. Broadribb</i>	

The Accident in Bhopal: Observations 20 Years Later	464
<i>Ronald J. Willey, Dennis Hendershot, Scott Berger</i>	

SESSION 244: HANDLING OF ULTRA-FINE POWDERS AND PREVENTION OF DUST EXPLOSIONS

Development and Design of Handling Technology for Highly Explosible Powders	479
<i>Peter W. Wypych</i>	

Reducing Dust Emissions from Grain Handling Ship Loaders	487
<i>Craig Wheeler, Tobias Krull, Alan Roberts and Stephen Wiche</i>	

Theory and Practice of Dust Collector Protection	498
<i>John E. Going, Tony Lombardo</i>	

Prevention of Dryer Fires: Problem Analysis & Application of Results	517
<i>Emre Ergun and Joseph A. Senecal</i>	

Surfactants: Do they work for suppression of dust in Iron Ore plants?	528
<i>C.R. Copeland and S.K. Kawatra</i>	

Explosible Dusts, US Codes and Standards of Safe Management Practices	547
<i>David E. Kaelin Sr., Richard W. Prugh</i>	

AUTHOR INDEX