

Process Safety Spotlights 2015

**Topical Conference at the 2015 AIChE Spring Meeting and 11th
Global Congress on Process Safety**

**Austin, Texas, USA
26-30 April 2015**

ISBN: 978-1-5108-0688-7

Printed from e-media with permission by:

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



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

Copyright© (2015) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2015)

For permission requests, please contact AIChE
at the address below.

AIChE
3 Park Avenue
New York, NY 10016-5991

Phone: (203) 702-7660
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Chemical Engineering: Is This the Golden Age?	1
<i>Marvin O. Schlanger</i>	
(39a) CFD Modeling of Large Scale LNG Pool Fires	2
<i>Filippo Gavelli, Bryant Hendrickson, Claudio Marsegan</i>	
(39b) CFD Modeling of LNG Spreading and Atmospheric Dispersion	3
<i>Anh Bui, Tony Liu, Eric Peterson, Morgan Reed</i>	
(39c) Mitigation Effect of High Expansion Foam on LNG Vapor Hazard	14
<i>Bin Zhang, Brian Harding, Yi Liu, M Sam Mannan</i>	
(66a) The Human Factors behind Inherently Safer Design of LNG Liquefaction Terminals	27
<i>David Weimer, Morgan Reed, Eric Peterson</i>	
(66b) The Hazard We Know: Comparing Transportation Risk of LPG and LNG	28
<i>Ryan J. Hart, Delmar (Trey) Morrison</i>	
(66c) Experimental Study on Propane Jet Fire Hazards: Thermal Radiation	29
<i>Bin Zhang, Yi Liu, Delphine Laboureur, M Sam Mannan</i>	
(70aa) Product Failure Rates Vs Site-Specific Failure Rates: Implications for Safety	43
<i>Julia V. Bukowski, William M. Goble, Iwan Van Beurden</i>	
(70ad) Exploring Dependencies of Ignition Locations on Probabilistic Explosion Analysis	61
<i>Benjamin Poblete, Scott Klare, Advait Sane, Bharat Tulsyan, Michael Stahl, John Johnson, Andrew Staszak</i>	
(70ae) Process Safety Near-Miss Management System in Takreer Ruwais Refinery: An Effective Tool for Applying Prevention Strategies	62
<i>Debasish Kakoty, Jassim Jawas</i>	
(70af) How Having Updated Heat & Material Balances Commits to Process Safety	63
<i>Nicholas N. Cristea, Dustin J. Smith, Dick A. Baum, Juan Lopez</i>	
(70ai) Safety Culture and Leadership- Independent of Language	71
<i>Kumar (Chris) Israni, Yaneira Saud, Sandra Lovell, Sarah Acton</i>	
(70c) Best Practice in Application of CAA CAP 437 Guidance for Offshore Helicopter Landing Areas	72
<i>Tim Jones, Chris Robinson, Andrew Grand, Morgan Reed</i>	
(70e) Introducing a Dynamic Calculation Method for Pressure Relief Load and Orifice Sizing	81
<i>Steve Streblov, Jay Riha, Ushma Patel, Mirna Zamora</i>	
(70f) Quantifying Human Error Probabilities through a Bayesian Network Using Expert Opinion and an Auditing Tool: An Application to the Tokai-Mura Accident	104
<i>Paulo Fernando Frutuoso E Melo, Antonio Carlos Ribeiro, Anna Leticia B. Sousa, Juliana P. Duarte</i>	
(70h) Numerical Modeling of Pool Fire inside an Offshore Methanol Storage Tank	114
<i>Tony Liu, Morgan Reed, Eric Peterson, Irfan Shaikh</i>	
(70i) Credibility of Designing Refrigerated Atmospheric Storage Tank Pressure Relief Systems for a Tornado	115
<i>Syed Usman Ahmed</i>	
(70j) Cultura De Liderazgo y Seguridad – Independientemente Del Idioma	129
<i>Yaneira Saud, Kumar (Chris) Israni, Sarah Acton, Sandra Lovell</i>	
(70k) Ensure Compliance to NFPA Standards through Corporate Level Combustible Dust Audits	130
<i>Amy Theis, Richard Kwasny</i>	
(70l) Combining Traditional UOP HAZOP Analysis with Dynamic Simulation a New Process Safety / Risk Assessment Tool	131
<i>Scott M. Wozniak</i>	
(70n) How Close Is My Operation to a Major Accident?	153
<i>Abouzar Yousefi, Manuel Rodriguez Henandez, Jaime Martin Juez</i>	
(70o) An Approximate Model for Discharge Density Associated with Critical Flow	165
<i>Henry Foust III</i>	
(70v) A Multilevel Safety EARLY Warning Method Based on Bayesian Networks with Applications for Petrochemical Process	166
<i>Jinqiu Hu, Laibin Zhang</i>	
(70w) Summary of Macondo Inquiries and Recommendations	167
<i>Robin Pitblado</i>	
(70x) Operational Risk Management Aided By Continuous Monitoring of Barriers	180
<i>Ed Silva, Sergio Saad</i>	

A Spreadsheet Application for Evaluating Two-Phase Emergency Venting Transients Utilizing an Interface to a Thermodynamic Property Package	184
<i>Subin Hada, Robert D'Alessandro, J. Andrew Jones</i>	
(71a) Anatomy of a Potential LNG Incident	194
<i>Fabiana Weber</i>	
(71ab) Application of Risk Prioritization Matrix of Nonconformities in the Offshore Industry	195
<i>Tatiana Cordeiro, Claudia Morgado</i>	
(71ac) Experimental Study on Gas Explosion in an Obstructed Confined Pipe	203
<i>Rafiziana M. Kasmani, Mimi H. Hassim, Siti Zubaidah Sulaiman, Sina D Emami, Kamarizan Kidam, Roshafima, R. Ali</i>	
(71ae) Uncertainty Analysis for LOPA in the Offshore Industry	204
<i>Sungteak Kim, Kwangpil Chang, Eunhyun Park</i>	
(71af) Quantitative Risk Assessment (QRA) with the Inclusion of Human and Organizational Factors and Maintenance	205
<i>Mehmood Ahmad</i>	
(71ag) Implementing SIS Metrics for Life Cycle Management - Part 1: Proof Testing	206
<i>Keith Lapeyrouse, John Harrison</i>	
(71ah) Dust Explosion Kinetics	207
<i>Russell A. Ogle, Sean J. Dee, Brenton L. Cox</i>	
(71ai) Vapor Cloud Hazards of Enclosed Liquid Flammable Processes	208
<i>Kollin Kenady, Eric S. Becker</i>	
(71aj) Comparison of Results of the Classified Areas of a Typical Hydrogen Generation Unit (GHU) Using the Standards NFPA 497 and API RP 505	209
<i>Gisele Nascimento, James Hall Sr.</i>	
(71ak) The Requirements and Tools to Treat Safety Process Risk Caused By Organizational Changes	210
<i>Salvador Ávila Filho, Esiron T. Dantas, Jonas Duarte</i>	
(71am) Using Unrealistically Optimistic Failure Data: Is It Ethical?	222
<i>Loren Stewart, Iwan Van Beurden</i>	
(71an) Dynamic Simulation As a Robust Tool for Optimum Flare Systems Design	232
<i>Faraz Khan, Christopher Ng, Jim Bridgett</i>	
(71ao) Best Practice MOC and Pssr 2014	233
<i>Mike Mike</i>	
(71ap) Application of Risk Analysis in Pilot Plants and Research Labs	234
<i>Kabier Moideenkutty</i>	
(71aq) Integrating Cyber Security Risk Assessments into the Process Safety Management Work Process	235
<i>Harold W Thomas, John Day</i>	
(71ar) Integrating Alarm Management into Your PHA and LOPA Processes	254
<i>Todd Stauffer, Harold W Thomas</i>	
(71as) High Integrity Pressure Protection Systems: Design, Analysis, Justification and Implementation	255
<i>Charles Fialkowski</i>	
(71at) Predicting Far Field Blast Overpressures: An Evaluation of Enhanced Input Parameters for FLACS	256
<i>Meiqian Wang, Morgan Reed, Anh Bui, Eric Peterson</i>	
(71av) The Application of the Bifunctional Environmental Deodorizer for Sulfur and Sour Water in SINOPEC TIANJIN	257
<i>Aijun Wang, Jiliang Chen</i>	
(71aw) Safety-Centered Site Master Planning	258
<i>Steve Clepper</i>	
(71ax) Exothermal test for green plastics materials by DSC	273
<i>Jao-Jia Horng, C.J. Wang, K.Y. Liao, J.M. Tseng</i>	
(71az) The Studies of Flame Propagation Simulation in the Municipal Pipeline	279
<i>Fenglei Han, Gangzhe Liu</i>	
(71b) The Study on the Vulnerability of Urban Oil and Gas Pipeline Network of the Mechanism of Action	286
<i>Su Hu</i>	
(71bb) Application of HAZOP Study On Some Butyl-Octyl Alcohol Plants	287
<i>Jiulai Huang, Junjie Chen, Minbing Sheng, Rangqu Chen, Dong Xue</i>	
(71bc) Critical Success Factors for Effective PHAS	297
<i>Arlyn Poppen, John Herber</i>	

(71bd) Security Risks and Countermeasures of Pesticide Formulations Production Process	323
<i>Wenqiang Wan</i>	
(71be) Incorporate Safety during Process Design	324
<i>Krishnarao Guntu</i>	
(71bf) Study on Application of LOPA in HAZOP on China Refinery Design	325
<i>Mingfeng Cai, Zhigang Wang, Hao Zhou</i>	
(71bg) Field Application of Risk-Based Approach for Fatality Prevention	337
<i>Alfonsius Ariawan</i>	
(71bh) Problems and Resolutions of SIS Engineering Application	338
<i>Ruoqing Wang</i>	
(71c) Developing Process Engineers into Effective HAZOP/LOPA Facilitators	339
<i>Steven T. Maher, Michael A. Nour, Colin Scholtz, Michael B. Saura</i>	
(71d) Investigation of Self-Ignition Risks of Iron Sulfides in the Sour Crude Oil Storage	340
<i>Ping Ping, Dongfeng Zhao, Depeng Kong, Yi Liu</i>	
(71e) Optimal Sectioning of Hydrocarbon Transport Pipeline By Volume Minimization and Environmental Vulnerability Assessment	341
<i>Nancy Alejandra Cano Acosta, John Edgar Fontecha Garcia, Felipe Muñoz Giraldo</i>	
(71f) Assessment of Reliability and Risk at Dynamic Systems: A Discussion of Social-Technical Factors in the Exploration and Production of Oil at Pre-Salt Layer - Brazil	343
<i>Salvador Ávila Filho, Monique N. G. De Abreu, Alessandro R. O. Araujo</i>	
(71g) Experiment Study on Acoustic Emission Detection of Internal Leakage of Gas Ball Valves	354
<i>Guoxing Han, Changhang Xu, Huandi Shi, Piao Gong</i>	
(71h) Why Do We Still Have Blast Walls on Offshore Platforms?	355
<i>Benjamin Poblete, Michael Stahl, Bharat Tulsyan, Andrew Staszak</i>	
(71i) Dynamic Simulation of Discharge Process Safety and Optimization for Multi-stage Ground Flare	356
<i>Anfeng Yu, Peng Wang, Jiedong Zhang, Wenyi Dang</i>	
(71k) Process Safety in Gas/Oil Transport Implementing Best-in-Class Procedure Management Practices - a Case Study	366
<i>Blair Morgan, Todd Muscroft</i>	
(71l) Predicting Thermal Behavior of Chemicals from Molecular Structure	367
<i>Nadia Baati, Annik Nanchen, Francis Stoessel, Thierry Meyer</i>	
(71m) Audit Management Best Practice – Seek and Ye Shall Find	375
<i>Mike Bearrow</i>	
(71n) Screening Tool for Runaway Reaction Characterization. Optimizing Efforts for Emergency Relief Systems Design	392
<i>Jordi Dunjó, Georges Melhem</i>	
(71o) Facility Siting Challenges	393
<i>Sam Sanati</i>	
(71p) Process Safety in the Midstream Sector Under the Shale and Tight Oil and Gas Boom	394
<i>Sebastian Diaz</i>	
(71q) Lessons Learned during Air Tightness Testing of Shelter-in-Place Buildings at Chemical Facilities	395
<i>Gabriel A. Shelton</i>	
(71r) A Simplified PSM Guidance for Smaller Facilities Using a Risk Based Approach	396
<i>Swarup Bade, Lakshmana Tangirala</i>	
(71t) Unlock the Value of Operational Data	397
<i>Mei-Li Lin, Joseph Stough</i>	
(71u) How to Play a Better Central Role By Blending PSM System into HSE System	398
<i>Liu Bin</i>	
(71v) Heat Exchanger Design Parameters Effect on Low Pressure Side Maximum Pressures during a Tube Failure	408
<i>John Burgess, Dustin J. Smith</i>	
(71w) Research on Security Access Model of Enterprises in Petrochemical Ports	420
<i>Haoyi Wang, Dongfeng Zhao</i>	
(71x) Introduction to Safety Instrumented System Management	426
<i>Eloise Roche</i>	
(71y) Safety Integrity Level Sil Assessment about Deepwater Bop System	427
<i>Suhua Geng</i>	
(71z) Lessons on Achieving Cost Effective ISA 84 SIS Lifecycle Sustainability	428
<i>Carolyn Presgraves</i>	

The Application of the Bifunctional Environmental Deodorizer for Sulfur and Sour Water in SINOPEC TIANJIN Company	429
<i>Aijun Wang, Jiliang Chen</i>	
Dust Explosion Incident Analysis, Prevention and Control	433
<i>Anka Ge, Lijing Zhang</i>	
(86a) The Psychology of Decision Making in Process Hazard Analysis	448
<i>Paul Baybutt</i>	
(86b) Advanced Procedure Research Study - Applying Human Factor Principles to Procedure Presentation and Design	466
<i>Elliott Lander, Camille Peres</i>	
(86c) Examination of Events That Occur during an Alarm Flood - Their Impact on Safety and Proper Corrective Action	475
<i>Darwin Logerot, Steve Ferrer, Dustin Beebe</i>	
(113a) Procedural Safeguard Reliability	486
<i>Sean J. Dee, Russell A. Ogle, Sunil D. Lakhiani</i>	
(113b) Changing Demographics: Preserving Safety and Increasing Performance	498
<i>Denise Brooks</i>	
(113c) Human and Organizational Factors Assessment and Their Use As Potential Safety Barriers	568
<i>Mehmood Ahmad, Marco Pontiggia, Micaela Demichela, Maria Chiara Leva</i>	
(139a) Safety Case VS SEMS: Are They Really All That Different? an Operator's Perspective	586
<i>Kumar (Chris) Israni, Brent Dunagan</i>	
(139b) A Modern Well HAZOP Approach	595
<i>Yaneira Saud, Dennis Butts</i>	
(139c) To Safely Go Where No Man Has Gone Before: Exploring and Producing with Process Safety	607
<i>Mike Broadribb</i>	
(161a) Human Factors Considerations: Midstream Process Safety Integration	620
<i>Denise Brooks</i>	
(161b) Overcoming the Process Safety Challenges in Midstream Pipeline Operations	659
<i>Juan E. Contreras</i>	
Hazardous Material Transportation Perceived Risks & Risk Management	681
<i>Brad A. Fuller</i>	
(168d) Analysis of the Capabilities of Cybersecurity Defenses	693
<i>Michael Firstenberg</i>	
(205a) Fire from the Cascading Failure of an Oxygen Supply System	694
<i>Delmar (Trey) Morrison, Vijay Kumar, Sean J. Dee, Brenton L. Cox, Mohammad Al-Shamary, Abdulqader Al-Qabandi</i>	
(205b) Lessons Learned from an Incident at a Cryogenic Gas Processing Facility	715
<i>Adrian Pierorazio</i>	
(205c) 1996 Amines Plant Explosion	727
<i>Jerry J. Forest</i>	
(205d) U.S. Chemical Safety Board's Final Investigation Report on the Chevron Richmond Refinery Pipe Rupture and Fire	735
<i>Lauren Grim, Mark Wingard, Steve Cutchen, Dan Tillema, Amanda Johnson</i>	
(205e) Bhopal 30 Years Later	738
<i>Ronald J. Willey, Daniel A. Crowl</i>	
Author Index	