



5th Annual Symposium, Mary Kay O'Connor Process Safety Center  
"Beyond Regulatory Compliance: Making Safety Second Nature"  
Reed Arena, Texas A&M University, College Station, Texas  
October 29-30, 2002

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**A Cure for Corporate Alzheimer's**

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**ABSTRACT**

In 1983, DuPont sponsored the HCN Transportation and Safety Seminar. Attendees were representatives from hydrogen cyanide producers, shippers, and users from around the world. This was the beginning of the HCN Industry Safety Conference. Each year since 1983 the conference has been held and incidents are shared. Special presentations are also made on HCN safety related topics.

The Conference Board realized that although conference presentations are published for attendees, the information often remains unknown or unavailable to others from their respective companies. The "world's experts" on hydrogen cyanide are also retiring and some of the experience and knowledge is being lost. Finally, a review of incidents over the last 20 years indicated our industry is not learning from the experiences of others. Not only are the same types of accidents are happening, but the personnel involved are often experienced.

The HCN Industry Safety Conference entered into a contract with Mary Kay O'Connor Process Safety Center (MKOPSC) to address these needs. Our goal was to improve availability of presentations from the conference, increase safety communication between member companies, and maintain a confidential database of hydrogen cyanide incidents.

These goals are met as follows:

1. Conference agendas can be viewed, printed, or searched.
2. Conference presentations can be searched, viewed, or downloaded.
3. Requests for help and ideas on safety related topics can be posted.
4. The key contact of member companies can submit written requests for data searches of the incident database.
5. A discussion board allows safety questions to be posed to many companies as one time.

## A Cure for Corporate Alzheimer's

Dale N Harstad

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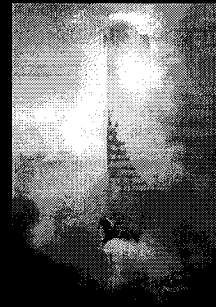
Steven F. Smolen

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You Remember What Happened  
On September 11, 2001?



But do You Remember What  
Happened on September 24, 2001 ?



## New York Times September 25, 2001

✦ This news story is actually so big that it could **only be overshadowed by a news story as big as a war story**... 29 dead (28 died at Flixborough), 10 missing, 2,500 injured, 800 hospitalised, many (I heard an estimate of 50) of whom will die from their injuries... 20,000 homes, apartments and offices damaged, three hospitals, schools, a university campus and a soccer stadium are unusable. The explosion registered 3.4 on the Richter Scale. This disaster is on a catastrophic scale...

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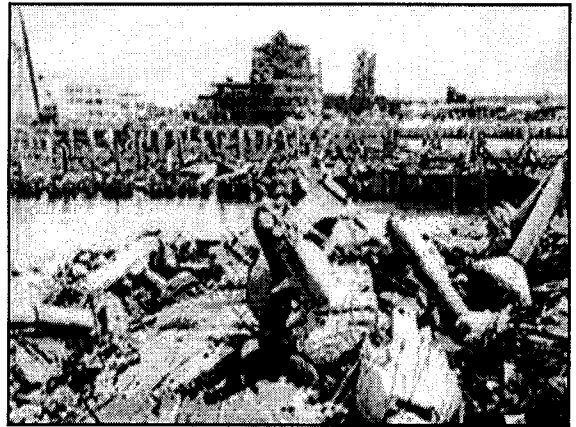
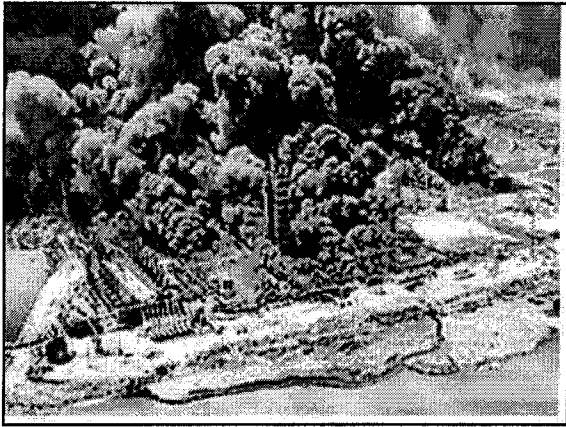
## Oppau

- ✦ Location: Oppau, Germany
- ✦ Company: BASF
- ✦ Date: September 21, 1921
- ✦ Killed: 430
- ✦ Injured: unknown
- ✦ Financial: N/A
- ✦ Type of Plant: Fertilizer
- ✦ Trigger: Blasting Powder being used to break up a 50:50 mixture of Ammonium sulfate and Ammonium nitrate

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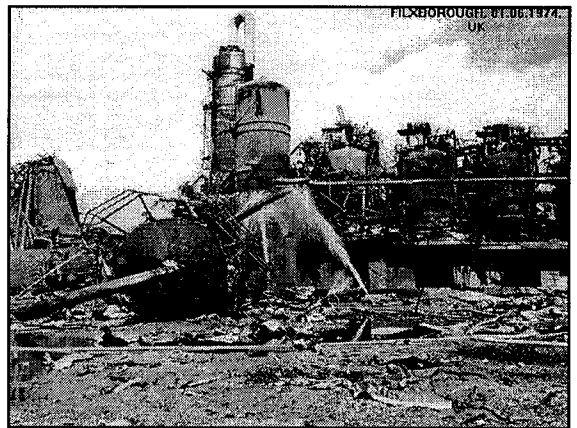
## Texas City

- ✧ Location: Texas City, Texas, USA
- ✧ Company: Monsanto
- ✧ Date: April 16, 1947
- ✧ Killed: 552
- ✧ Injured: about 3000
- ✧ Financial: N/A
- ✧ Type of Plant: petrochemical
- ✧ Trigger: fire on ship at dock – ammonium nitrate

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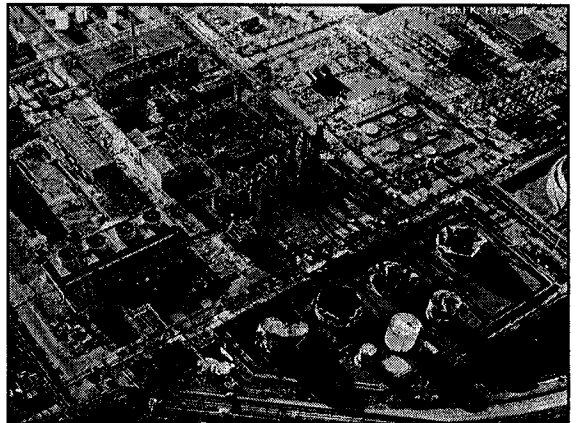
## Flixborough

- ✧ Location: Flixborough, UK
- ✧ Company: Nypro
- ✧ Date: June 1, 1974
- ✧ Killed: 28
- ✧ Injured: 104
- ✧ Financial: \$635,900,000
- ✧ Type of Plant: cyclohexane oxidation (→Nylon)
- ✧ Trigger: Vapor Cloud Explosion

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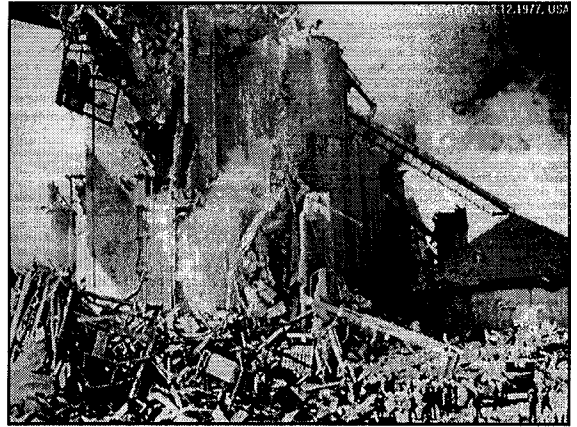
## Beek

- ✧ Location: Beek, NL
- ✧ Company: Dutch State Mines (DSM)
- ✧ Date: November 7, 1975
- ✧ Killed: 14
- ✧ Injured: N/A
- ✧ Financial: \$114,700,000
- ✧ Type of Plant: petrochemical
- ✧ Trigger: propylene

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## Westwego

- ✧ Location: Westwego, La, USA
- ✧ Company: Continental Grain
- ✧ Date: December 23, 1977
- ✧ Killed: 35
- ✧ Injured: 9
- ✧ Financial: N/A
- ✧ Type of Plant: Grainery
- ✧ Trigger: Corn dust explosion in grain elevator

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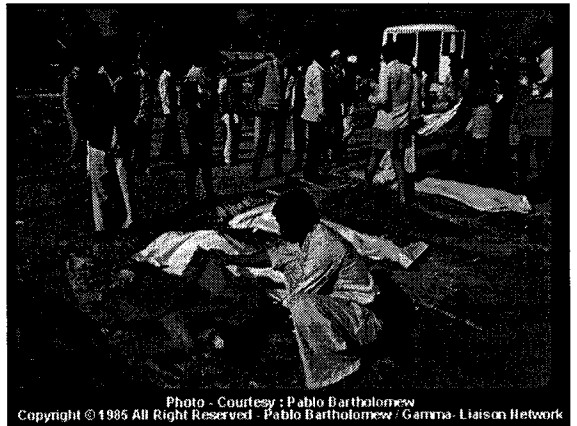
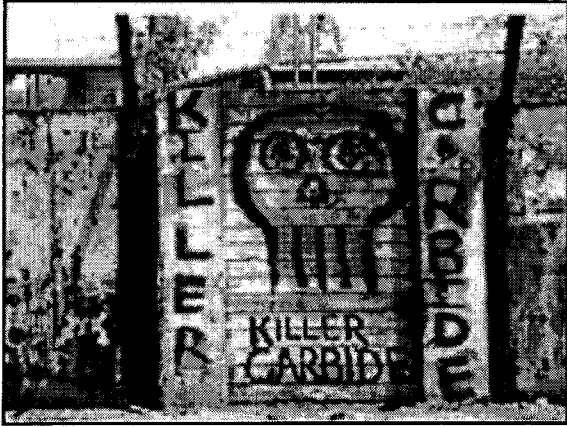


Photo - Courtesy : Pablo Bartholomew  
Copyright © 1985 All Right Reserved - Pablo Bartholomew - Gamma- Liaison Network



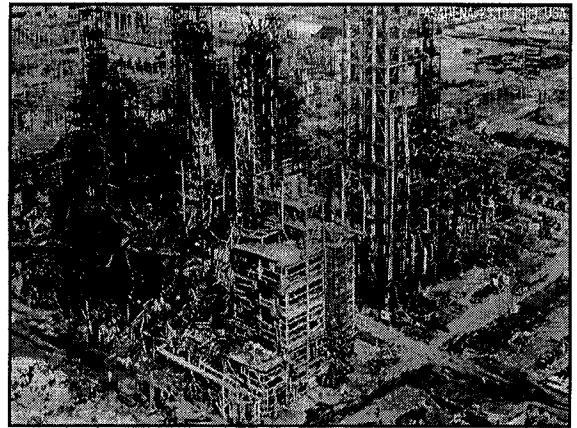
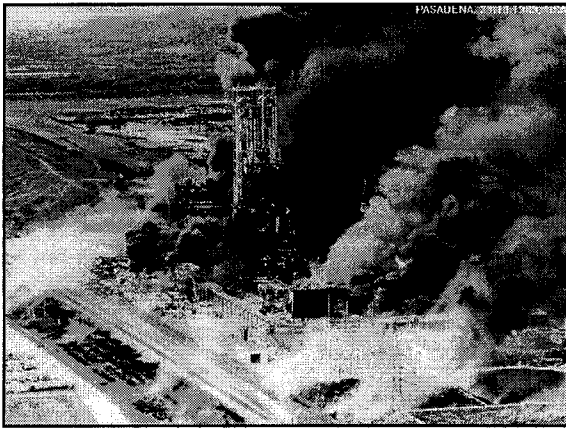
## Bhopal

- \* Location: Bhopal, India
- \* Company: Union Carbide
- \* Date: December 3, 1984
- \* Killed: 4000 – 20,000
- \* Injured: 100,000 + asymptomatic
- \* Financial: (\$470,000,000 settlement)
- \* Type of Plant: pesticide
- \* Trigger: Release of MIC

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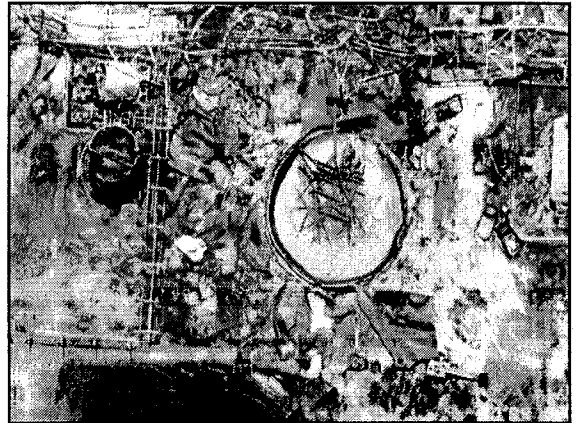
## Phillips

- \* Location: Pasadena, Texas, USA
- \* Company: Phillips 66
- \* Date: October 23, 1989
- \* Killed: 23
- \* Injured: 130-300
- \* Financial: \$623,500,000 – 1,770,000,000\*
- \* Type of Plant: polyethylene
- \* Trigger: isobutane

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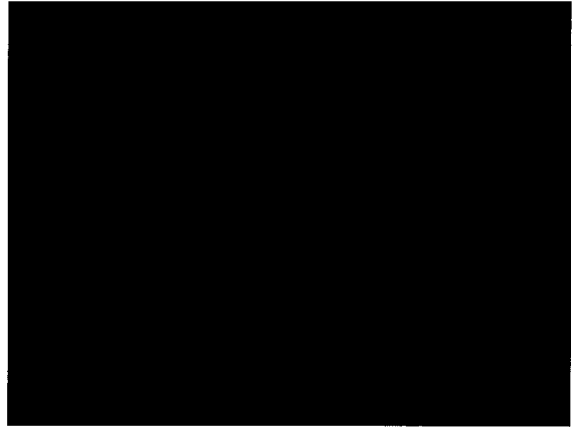
## Arco

- ✖ Location: Channel View, Texas, USA
- ✖ Company: Arco Chemical
- ✖ Date: July 5, 1990
- ✖ Killed: 17
- ✖ Injured: 5
- ✖ Financial: (\$3,481,300 in fines alone)
- ✖ Type of Plant: Propylene Oxide
- ✖ Trigger: storage tank explosion

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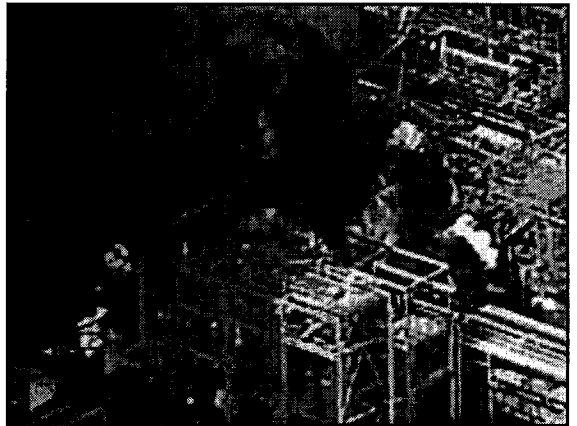
## Phillips

- ✖ Location: Pasadena, Texas, USA
- ✖ Company: Phillips Petroleum
- ✖ Date: June, 1999
- ✖ Killed: 2
- ✖ Injured: 4
- ✖ Financial: \$204,000 fine (proposed \$2.5M)
- ✖ Type of Plant: K-resin
- ✖ Trigger: reactor explosion

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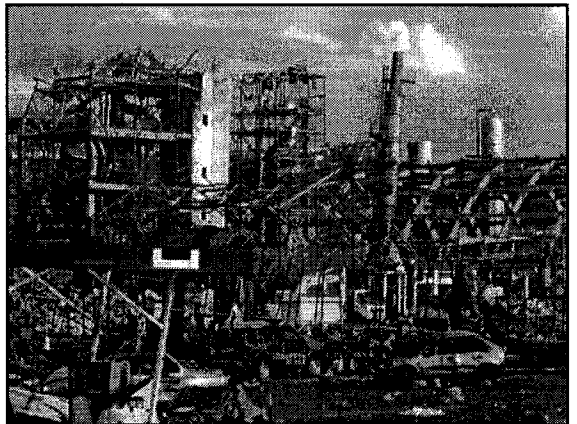
## Phillips

- ✖ Location: Pasadena, Texas, USA
- ✖ Company: Phillips Petroleum
- ✖ Date: March 28, 2000
- ✖ Killed: 1
- ✖ Injured: 71
- ✖ Financial: ???
- ✖ Type of Plant: K-resin
- ✖ Trigger: reactor explosion

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## TOULOUSE

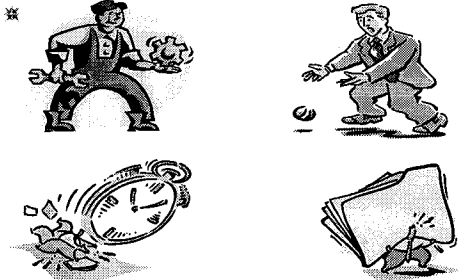
- ✧ Location: Toulouse, France
- ✧ Company: Total-Fina-Elf.
- ✧ Date: September 24, 2001
- ✧ Killed: 30
- ✧ Injured: 2500+
- ✧ Financial: ???
- ✧ Type of Plant: petrochemical
- ✧ Trigger: ammonium nitrate

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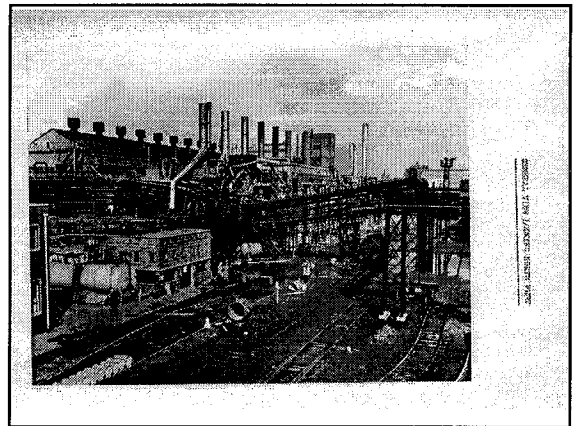
## Somebody Else !!!!!!!!!!!



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## Cassel Works

- ✧ Location: ICI Cassel Works Billingham, UK
- ✧ Company: ICI
- ✧ Date: March 31, 1962
- ✧ Killed: none
- ✧ Injured: none
- ✧ Financial: N/A
- ✧ Type of Plant: HCN Plant
- ✧ Trigger: polymerization

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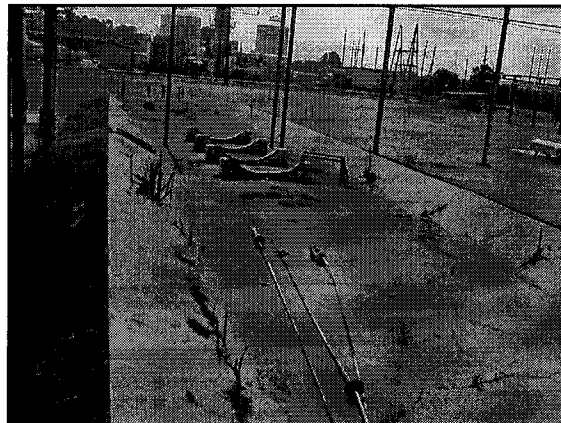
## Belle

- ✖ Location: Belle, West Virginia, USA
- ✖ Company: DuPont
- ✖ Date: June, 1975
- ✖ Killed: 0
- ✖ Injured: 0
- ✖ Financial: N/A
- ✖ Type of Plant: HCN
- ✖ Trigger: HCN Polymer contamination caused by steaming level instrument legs

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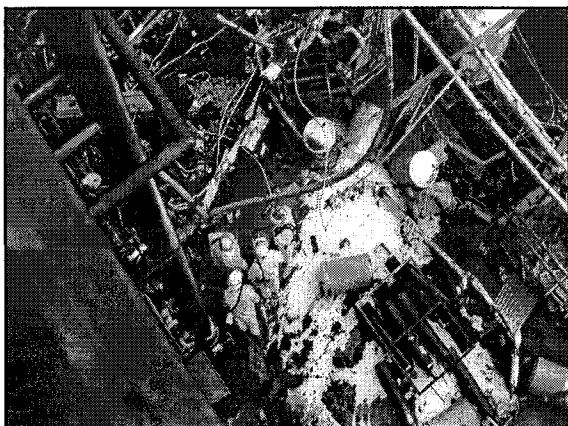
## Memphis

- ✖ Location: Memphis, Tennessee, USA
- ✖ Company: DuPont
- ✖ Date: May, 1982
- ✖ Killed: 0
- ✖ Injured: 0
- ✖ Financial: \$100,000
- ✖ Type of Plant: HCN
- ✖ Trigger: Storage tank was contaminated with base (NH<sub>3</sub>)

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## Chocolate Bayou

- ✖ Location: Alvin, Texas, USA
- ✖ Company: Monsanto
- ✖ Date: January 13, 1992
- ✖ Killed: 0
- ✖ Injured: 2 first aid
- ✖ Financial: \$50,000,000 – 150,000,000\*
- ✖ Type of Plant: DSIDA
- ✖ Trigger: vessel overpressure

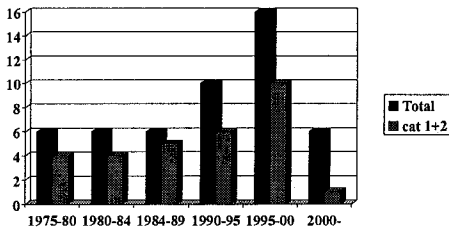
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## HCN Industry



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## Cost of Major Process Safety Incident

- ✳ **Saves lives and reduces injuries**
- ✳ Reduces the risks and costs of major accidents
  - ◆ \$80 million in property damage per incident (average in USA for major incidents for past 10 years)
  - ◆ Business interruption losses, often as much as 4 times property damage
  - ◆ Regulatory fines in excess of \$ 1 million
  - ◆ Litigation costs up to five times the regulatory fines

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## Cost of Major Process Safety Incident

- ✳ **Eliminates costs to investigate accidents and implement corrective actions**
  - ◆ One company saved \$5 million per year by reducing injuries
  - ◆ and fatalities to 50% of the industry average
  - ◆ plus \$3 million in worker's compensation costs

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## Vision Statement

- ✳ Free and open exchange of safety information on Hydrogen Cyanide and related chemicals.

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## Goal and Objective

- ✳ Repository of Conference Presentations
  - ◆ HCN Incidents
  - ◆ Safety Presentations
- ✳ Repository of Safety Incidents

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## How Did We Get Here?

1. Lack of corporate memory (Web,DB)
2. Confidentiality of information (Web,DB)
3. Misuse of information by public (Web,DB)
4. Less "open" sharing of information at conference due to fear of misuse. (Web,DB)
5. What will the government will demand - should we take a leadership role ? (DB)

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## How Did We Get Here?

- ※ 6. Who will be administrator/ librarian for "data base" and web ? (Web,DB)
- ※ 7. What is the cost ? (Web,DB)
- ※ 8. What is the time/timing ? (Web,DB)
- ※ 9. What should "it" look like ? (Web)
- ※ 11. Validation (DB)
- ※ 12. Accessibility (DB)
- ※ 13. Annual status/statistics ? (DB,Web)

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## Available Options

- ※ Status Quo - unacceptable
- ※ E- mail – tried & failed

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## The Cure

- ※ 1 Teaspoon of website
- ※ Followed by a good dose of database

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## Today's Situation

- ※ Fully functional Website for Safety Presentations
- ※ Migrating Existing Incident Database to MKO Library

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## Website Update

- Remember our Goal was a:
- ※ Repository of Conference Presentations
    - ◆ HCN Incidents
    - ◆ Safety Presentations

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## Website Update

What we currently have:

- ✱ Repository of Conference Presentations

Plus the following:

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## Website Update

- ✱ Announcements
- ✱ Directory
- ✱ Future Conferences
- ✱ General Discussion Board
- ✱ E-mail
- ✱ Search Engine

Plus

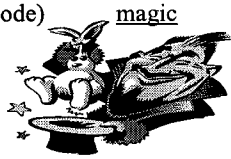
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## Website Update

- ✱ Account Management
- ✱ Support
- ✱ Survey (testing mode)
- ✱ Statistics (testing mode)
- ✱ Abstracts (testing mode)



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## Website Statistics

- ✱ Counts by Group
  - ◆ Board Member – 5051
  - ◆ Key Contacts – 2069
  - ◆ Guest - 1333

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## Website Statistics

- ✱ Counts per Section
  - ◆ Home Page – 1194
  - ◆ Slideshows – 5338
  - ◆ Directory – 353
  - ◆ Discussion Board – 959
  - ◆ Past Conferences – 1476
  - ◆ Announcements – 892
  - ◆ e-mail – 553
  - ◆ Search – 456

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## Website Statistics

- ✱ Other
  - ◆ Users – 111
  - ◆ Slideshows – 65
  - ◆ Discussion Posts - 14

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## Database Update Further Modifications: 1

- ✳ Presentations last year were a reminder that the seriousness of a release incident can be manifest in ways other than the impact on an individual.
- ✳ Even if nobody affected, all of the factors below are important in categorisation of incident severity and associated business damage.
  - ◆ Environmental impact (real or perceived)
  - ◆ Effect (even if only psychological) on the local population
  - ◆ Relationships with authorities
  - ◆ Adverse publicity

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## Database Update Further Modifications: 2

- ✳ The database did not contain data to allow such issues to be evaluated. Further questions have therefore been added:
  - ◆ Did the release result in a toxic emergency being declared?
  - ◆ If so were people required to retire to a toxic refuge?
  - ◆ If so was alarm audible to public?
  - ◆ Was there a concern about environmental impact?

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## Database Update Further Modifications: 3

- ✳ These may not be the best questions!
- ✳ Difficult to formulate meaningful yes/no type questions especially when different regulatory frameworks involved (eg different reportable quantities).
- ✳ No attempt has been made to integrate the severity based on these factors with the exposure severity to give an overall "Severity" category.

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## Database Update Guidelines - 1

- ✳ Company Anonymity
  - ◆ No company names
  - ◆ Dates in 5-year blocks
  - ◆ Two geographical regions only:
    - USA
    - Europe + Rest of World

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## Database Update Guidelines - 2

- ✳ Referencing & identification
  - ◆ Each incident has unique reference number.
  - ◆ Each company will have the reference numbers to its own incidents only.

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## Database Update

- ✳ Protocol was approved last year
- ✳ MKO developing a process flow diagram
- ✳ Guidelines for the Entry of Data into the Release Incident Database have been written.

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## Database Update

- ✱ Facilitators have been recruited
  - ◆ Dale Harstad – Sterling
  - ◆ Harvey Openshaw –
  - ◆ Steve Smolen – Solutia
  
- ✱ Migration will begin in August/September

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## Recommendation

- ✱ Website – maintenance mode
- ✱ Database – stay tuned while we migrate to Mary Kay O'Connor

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## One Last Question

What would you like to see next ?????



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## Sources

- ✱ <http://www.dct.tudelft.nl/part/explosion/gallery.html>
- ✱ <http://www.dct.tudelft.nl/part/explosion/>
- ✱ [http://www.disaster-timeline.com/images/dtl\\_ver2.pdf](http://www.disaster-timeline.com/images/dtl_ver2.pdf)
- ✱ <http://www.hse.gov.uk/nid/land/comah/level3/5a58d98.htm>
- ✱ <http://slp.icheme.org/incidents.html>
- ✱ Bridging the Safe Automation Gap – PART 1: SAFETY CULTURE, ORGANIZATION, AND ANALYSIS by Angela E. Summers, Ph.D., P.E. –2001 MKO Symposium
- ✱ Cyanide Release Incidents Database – Presentation by J H Openshaw to the 2002 HCN Industry Conference Breckenridge, Colorado, USA
- ✱ The Business Case for Process Safety presented at 2001 CCPS symposium, copyrighted by 2001 American Institute of Chemical Engineers

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