

EUROPEAN PROCESS SAFETY CENTRE

Cefic Annual Responsible Care Conference

Manchester, 22-24 October 2008



Evaluating Process Safety

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European Process Safety Centre (EPSC)

- **Network funded by 40+ mainly European based (petro)chemical multinationals to develop best practice in major accident/process safety**
- **Objectives:**
 - Information/know how exchange
 - Legislation (esp. Seveso II & ATEX)
 - participation & co-ordination of EU funded projects
- **Outputs:**
 - Internal reports & books
 - User groups & public conferences
 - EU projects & working groups
- **Major topics 2008:**
 - Process Safety Indicators/Learning from Accidents
 - Post Buncefield Activities
 - Fostering Senior Management Involvement in Process Safety (with EFCE)
 - LOPA Experience & Development



Process Safety meets high standards in chemical industry

- **Continuous improvement over the recent decades**
- **Only 25-30 incidents/year reportable in Europe under Seveso II (EU MARS database)**
- **No significant reduction over the last few years**



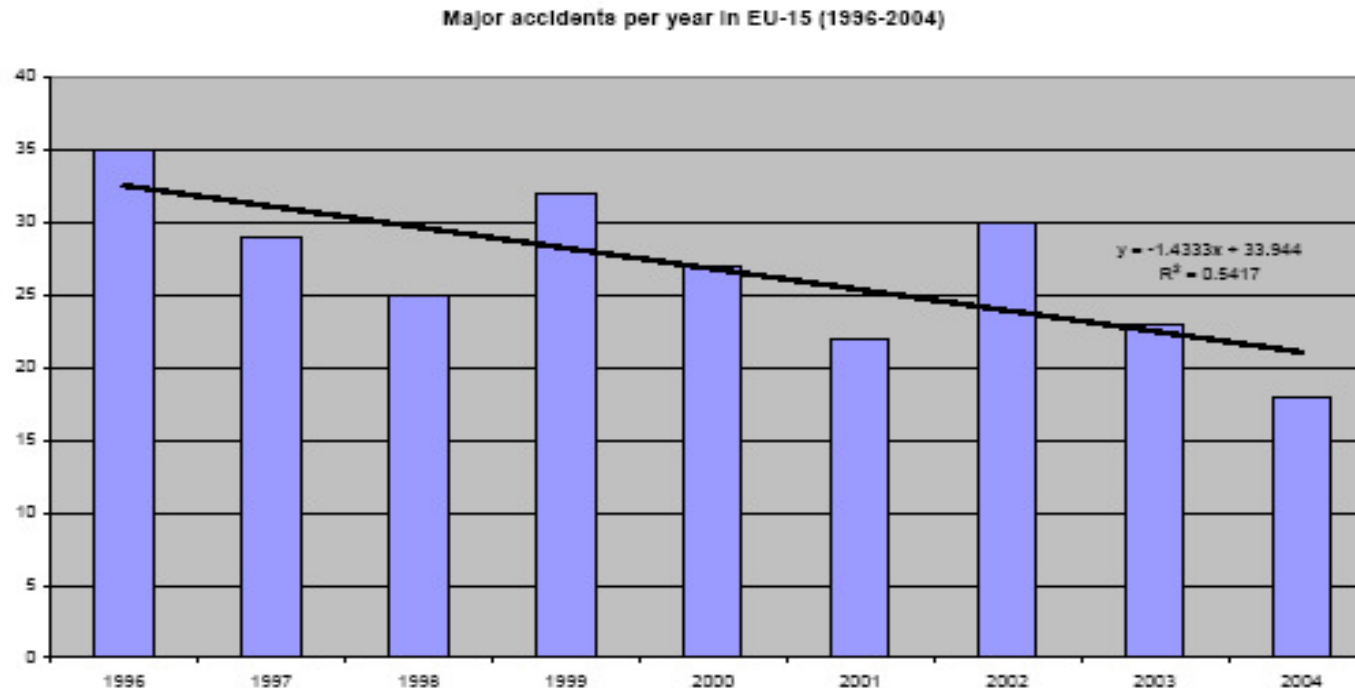
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Trend of Major Accidents in EU-15 (1996-2004)

Reporting in EU's Major Accident Reporting System (MARS)



- *Slowly declining rate (acc/year), though with significant spread*
- *Average: ca. 3 accidents per 1000 establishments per year*

— Plateau'd since 2004 !

However, serious incidents still happen and hurt chemical industry in general

- **Seveso, Flixborough, Bophal, Basle, ...**
- **Toulouse 2001**
- **Texas City 2005**
- **Buncefield 2005**
- **Cologne 2008**
- **...**



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Process Safety incidents typically are „low probability - high consequence“ events which ...

- **are difficult to evaluate statistically (“stochastic events”)**
- **tend to get less attention by professionals and management (risk approach)**
- **tend to get high attention by other stakeholders (hazard approach)**
- **may jeopardise the existence of companies**

→ Management is of top priority, but difficult



Management needs measurement

(„we can control only what we can measure“)

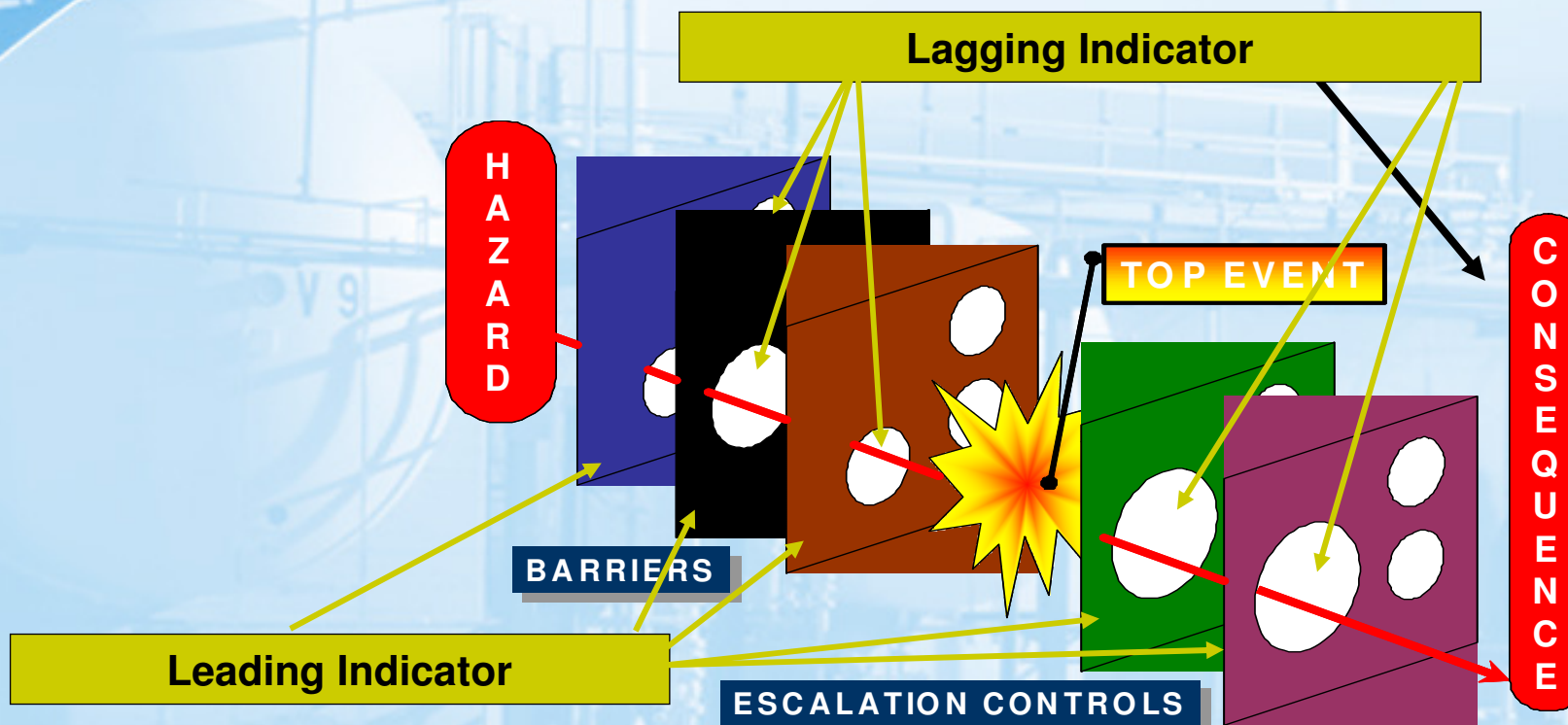
- The Baker Panel accelerated an already ongoing trend in process safety:
 - existing company-internal reporting systems for incidents
 - Reporting of process safety incidents under RC in U.S.A. since 1995
 - EPSC “*Overview Report on Use of Data on Past Incidents on Process Plant*” 1995
 - OECD “*Guidance on Safety Performance Indicators*” 2003/2008
 - EPSC report “*Leading Indicators for Process Safety*” 2004
 - ...

Process Safety Performance Indicators are as complex as process safety itself

- Reactive monitoring: lagging indicators (*outcome*)
 - failures, undesired events (*aim is zero!*)
- Active monitoring: leading indicators (*input*)
 - effectiveness of safeguards (“*aim is never zero*”)



“Swiss Cheese Model” (after J. Reason, modified by Mike Broadribb, BP)



Comprehensive performance measurement needs both leading and lagging indicators

Lagging indicators are identified from investigations of actual incidents

- “Traditional approach”
- Fires, explosions, loss of containment (*above which thresholds??*)
- Failures of safety systems
- Ambiguous:
 - near misses (*reporting is proactive → leading indicator!*)
 - activation of safety systems (*the more you have and report ...*)

Leading indicators measure the area where chemical industry invests most in process safety

- Preventive measures (inspections, management of change, operator competency, training, safety culture, ...)
- Site risk assessment



What can we learn from Occupational Safety?

- Safety can already be improved by simple qualitative evaluation and reporting of numbers
- The dramatic improvement in occupational safety is largely due to the use of one simple metrics worldwide (Lost Time Accident Frequency)

→ Is a simple metrics possible for process safety, too??

- Requirements/*Problems*
 - Selection of a limited set of indicators → *which ones??*
 - Comparability (normalisation) → *which denominator??*
 - Clear message → *will never be the full truth!!*



Texas City/Baker Report put U.S. Chemical Industry once more in driver seat

- **Process Safety incidents are reportable under Responsible Care since 1995**
 - Extended “lagging” reporting according to CCPS-system will start 2009
- **CCPS has developed detailed metrics 2007/2008**
 - **Lagging indicators: *fire/explosion; releases; injury/fatality; community/environment impact***
 - Incident Severity Levels (“*points*”); rate adjusted metrics (e.g. *incidents/man hours*)
 - **Leading indicators: *mechanical integrity; action items follow up; management of change; training & competency; safety culture***
 - **Near misses**



Europe is not behind in performance, but in reporting

- Reporting of process safety incidents is not yet mandatory under Responsible Care in Europe
- Reporting of process safety incidents by U.S. Chemical Industry under RC since 1995 and adoption of the CCPS System 2009 may influence public discussion in Europe, too.
- EU/OECD seminar on Process Safety Indicators Oct. 2008
 - *many tailor made systems or simple metrics??*

Any further significant incident will increase pressure and may eventually lead to regulation



EPSC activities

- **Report on leading indicators 2004**
- **Cooperation of some EPSC member companies with CCPS**
- **Workshop at Technical Steering Committee (TSC) Oct. 2007**
- **Position paper suggesting cooperation with Cefic Dec. 2007**
- **International Conference “Learning from Accidents” Oct. 2008**

- **“Process Safety Metrics Sharing Group”**
 - **mandated by TSC April 2008, first meeting August 2008 (chair: Ulrich Hansen, Henkel)**
 - **Purpose: “sharing member companies systems of defining, recording & tracking of PS incidents”**
 - **Focus at first on lagging indicators**



EPSC “Process Safety Metrics Sharing Group”

- **Planned activities:**
 - Input in revision of CCPS system
 - Cooperation with Cefic
 - Exchange of know-how/experience with company systems of lagging indicators
 - Evaluating possibilities for harmonisation on different levels (companies, states, EU)
 - Developing arguments/position towards authorities etc.

- **Results could be:**
 - Evaluation of different systems (including CCPS!!) ✓✓
 - Guidance for setting up a company system ✓
 - Statement on options as well as limits for harmonisation (✓)
 - Suggestion for a harmonised system (???)



*EPSC is aware of the importance and sensitivity of this issue
and ready to support Cefic*



Thank you for your attention!