Introduction to Natech risk:
Concepts, gaps and JRC activities

Elisabeth Krausmann
Chemical leaks threaten Prague as floods hit Dresden

ENERGY NEWS

Hurricanes Destroyed 109 Oil Platforms: US Government

China quake hits chemical industry

16 May 2008
A NATECH accident is a chemical accident caused by a natural hazard, such as floods, earthquakes, landslides etc.

Chemical accidents include accidental oil and chemical spills, gas releases, and fires or explosions involving hazardous substances from fixed establishments (e.g. petrochemical, pharmaceutical, pesticide, storage depot), and oil and gas pipelines.
Natech accidents

At least 40% of surveyed EU MS and OECD Member Countries have experienced one or more Natech accidents

**Hurricane Sandy (USA, 2012)**
- multiple hydrocarbon spills (>1.3 million lt); 42 billion lt of sewage spilled

**Tohoku earthquake and tsunami (Japan, 2011)**
- major nuclear accident; fires and explosions in refineries, petrochemical and other facilities

**Hurricanes Katrina/Rita (USA, 2005)**
- 113 off-shore platforms destroyed, 163 severely damaged; release of 30 million lt oil on- and offshore; hike in global oil price

**Summer floods (Czech Republic, 2002)**
- release of 80 t of chlorine & several dozen tons of other hazardous chemicals, including dioxins

**Kocaeli earthquake (Turkey, 1999)**
- multiple fires in a refinery producing 1/3 of Turkey’s oil-related output
Complex and difficult response environment:

1) Simultaneous releases from single or multiple sources over wide areas.

2) Unavailability of lifelines needed for accident mitigation (water, power).

3) Competition for scarce resources (simultaneous response efforts to cope with the natural and technological events).

4) Hazmat releases (toxic, fires, explosions) can hamper emergency response by endangering rescue personnel and disaster victims.

5) Non-functional or inappropriate standard civil protection measures.

→ targeted prevention, preparedness and response needed
Natech risk-reduction situation:

• Legislation, codes and standards for chemical-accident prevention rarely address Natech risk explicitly *(BUT: Seveso III, regional acts!)*.

• There is little knowledge on the dynamics of Natech accidents.

• There are hardly any methodologies and tools for Natech risk assessment and no guidance for industry on how to assess Natech risk.

• Emergency response plans do not consider the characteristics of Natech accidents (loss of utilities).

• There are no Natech risk maps to identify areas in danger.

*... from a JRC survey on the status of Natech risk reduction in EU MS and the OECD*
Expected increase in Natech risk:

→ more hazards
  (climate change, industrialisation)
→ higher vulnerability
  (urbanisation, interconnectedness)

... in a situation where Natech risk assessment methodologies & tools and guidelines for Natech risk management are missing.

Priority work areas*:

→ Implement and enforce regulations for Natech risk reduction
→ Develop methods, tools and guidance for Natech risk management
→ Develop dedicated Natech emergency management plans
→ Develop Natech risk maps
→ Raise awareness and improve risk communication
→ Train stakeholders on Natech risk reduction

*From a JRC survey on the status of Natech risk reduction in EU MS and OECD
Objective:
→ Support the EU Member States and operators in the identification and reduction of Natech risk

Stakeholders:
→ EU Member States, candidate and neighbour countries, third countries; European Commission Services; OECD, UNEP/OCHA, UNISDR

Activities:
→ Accident analysis and guidance on Natech RR
→ Risk analysis tools
JRC activities

Accident analysis and guidance

- Identification of vulnerable equipment (*fixed, pipelines, offshore*), scenarios and consequences (*earthquakes, floods, lightning, hurricanes*)
- Site surveys for Natech damage assessment (*Japan, China*) & statistical analysis
- Lessons learned & recommendations

Natech accident database: eNatech
http://enatech.jrc.ec.europa.eu

Risk analysis tools

- Framework for Natech risk assessment and mapping: RAPID-N
http://rapidn.jrc.ec.europa.eu
<table>
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<tr>
<th>No</th>
<th>Date</th>
<th>Country</th>
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<td>Heavy rainfall</td>
<td>Aurul Mine</td>
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RAPID-N
Rapid Natech Risk Assessment Tool

Recent Natural Hazards

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<td>2015/03/05</td>
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<tr>
<td>2015/03/03</td>
<td>50km NW of Slipubulan, Indonesia</td>
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RAPID-N: Rapid Natech Risk Assessment Tool
1. Industrial accidents caused by natural disasters can create major secondary disasters affecting the population, the environment, the economy and the supply chain.

2. Natech risk is a risk class of global relevance and requires a targeted risk management approach.

3. Natech risk reduction is hampered by the scarcity of methodologies and tools to analyse and map Natech risk, and a lack of guidance on Natech risk management.

4. Natech risk is expected to increase in the future due to the presence of more hazards (both natural and technological) and the increasing vulnerability of society.