



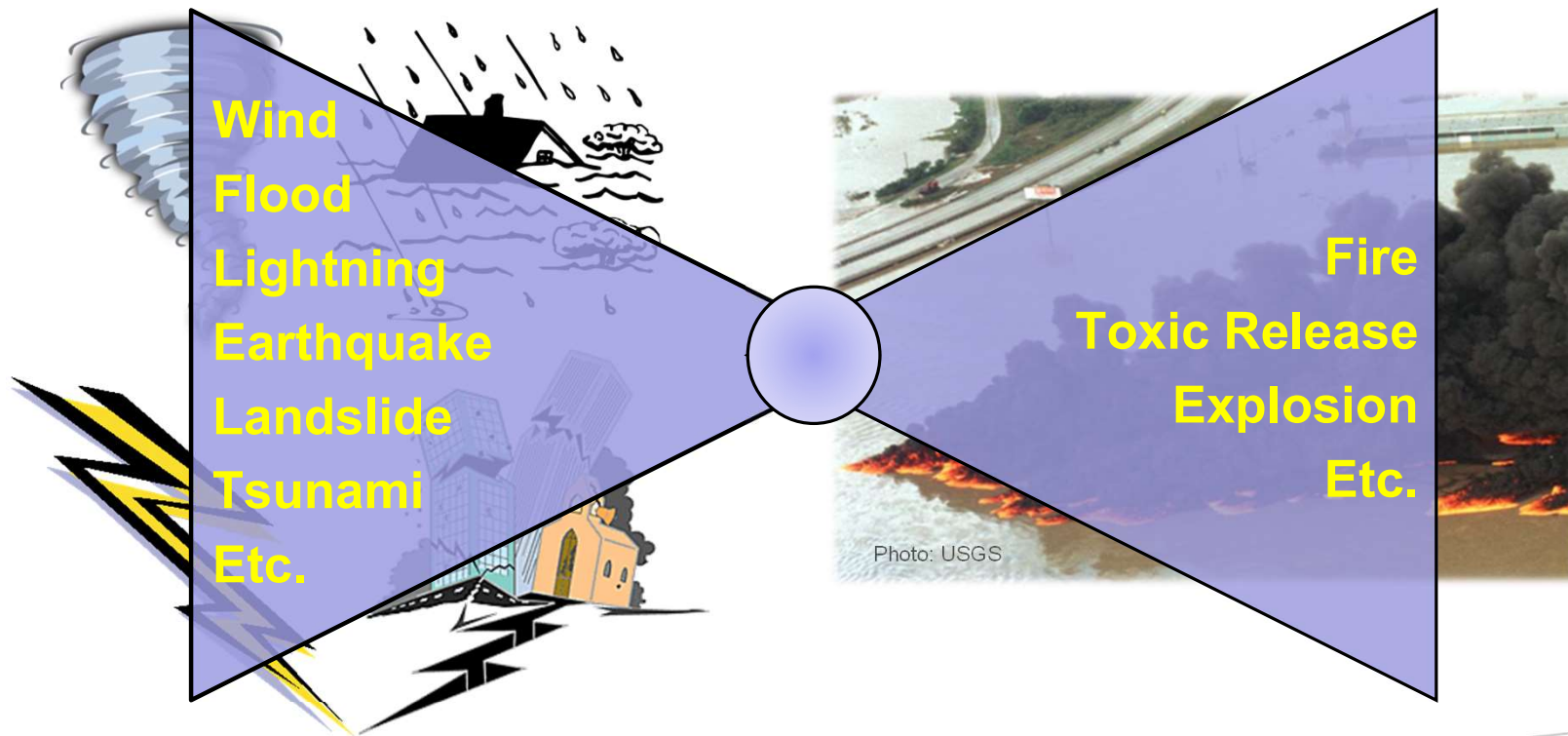
Cascading effects: Natech risk and governance responses

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Natural hazard triggered TECHNOLOGICAL accident



Is Natech risk a real problem?



- About 2-6% of accidents in industrial accident databases were caused by natural hazards
- There is a reporting bias towards severe accidents - the real number of Natechs is higher
- **Natech accidents often have more severe consequences than conventional accidents**

Example: Cyanide release, heavy rain/snow melt, 2000

- Tailings dam breach due to increased water burden in the reservoir
 - Release of 100,000 m³ of cyanide and heavy metals into a river (50-100 tonnes of cyanide)
 - Toxic load caused major animal kills
 - Considered worst environmental disaster after Chernobyl
- Transboundary impact
 - Pollutants transported into several rivers before reaching the Black Sea. About 2000 km of the Danube's catchment area was affected in Romania, Hungary and former Yugoslavia.



Example: Chlorine release, flood, 2002

- River Elbe flooded a storehouse containing chlorine at a general chemicals manufacturer
 - 80 tonnes of chlorine released into the air and the floodwaters
 - No injuries but significant economic damage to agriculture
- Wake-up call in Europe on the dangers of Natech risks



Which factors drive Natech risk?



Risk governance

- Natech risk cuts across different domains and stakeholder groups
- Act of God mindset
- Lack of territorial approach
- Lack of free communications flow

Characteristics of Natech risk

- Loss of safety barriers and lifelines by natural hazard impact
- Lack of multi-hazard risk analysis methodologies & guidance

Socio-economic factors

- Exposure and vulnerability (human development, urbanization, etc.)
- Economic pressures (low priority (HILP), not considered self-financing, etc.)
- Lack of data (overlooked; confidential; loss of media attention)
- Risk perception/tolerance
- **Climate change**

Natech risk management in the EU - 1



- Natech is a technological risk (although the trigger is a natural event)
 - Technological risks have a risk owner who is responsible for managing Natech risk
 - **Technological risk management focuses on prevention**
- In the EU, the Seveso III Directive requires consideration of Natech risks
 - Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances
 - **Consideration of natural hazards in the safety document (Rec. 15; Annex II, 4.iii)**
 - *“... detailed description of the possible major-accident scenarios and their probability or the conditions under which they occur... including in particular: iii. natural causes, for example earthquakes or floods“*
 - Accident reporting requirement to EC in case of cross-border consequences (Annex IV, 5)

Natech risk management in the EU - 2

- National initiatives under Seveso: Examples
 - **Germany:** Assessment of scenarios for chemical accidents triggered by floods and high winds, snow and ice loads (TRAS 310, 320)
 - **France:**
 - Identification and status of Seveso facilities in flood zones
 - Zoning laws for hazardous industry in earthquake areas (specific structural resistance requirements)
 - **Italy:** Guidelines for managing Natech events at high risk establishments due to earthquake (UNI Standard)
- All EU Member States are a party to the UNECE Convention on the transboundary consequences of industrial accidents



Photo © Kansas Wing of the Civil Air Patrol

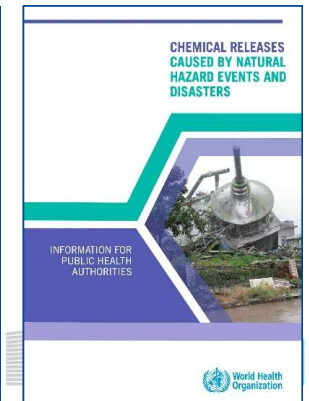
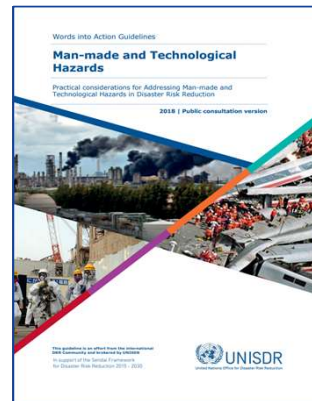
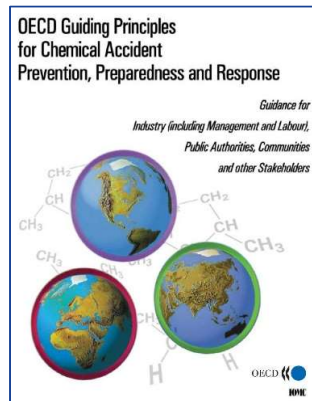
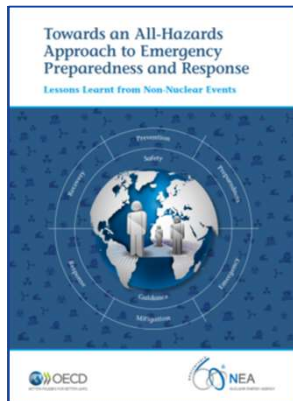
International cooperation

OECD

- OECD Natech project Steering Group
- Natech Addendum to OECD Guiding Principles
- OECD NEA Flagship Report: Lessons Learned from Non-Nuclear Accidents

UN, WHO

- UNDRR Sendai Words into Action Guidelines
 - Man-made/Technological hazards
 - National Disaster Risk Assessment
- Global Assessment Report (GAR) 2019
- WHO Chemical releases caused by natural hazard events and disasters – Information for public health authorities



Thank you

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