

國立臺北大學自然資源與環境管理研究所  
101 學年度第一學期 『環境災害與風險管理』

課程講義 (五) : 人為災害與技術災害  
Anthropogenic Hazards / Technological Hazards

S.: Smith, K. and D. N. Petley *Environmental Hazards – Accessing Risk and Reducing Disaster*, 5th Edition, Routledge, London, 2010.

[http://www.world-nuclear.org/info/fukushima\\_accident\\_inf129.html](http://www.world-nuclear.org/info/fukushima_accident_inf129.html)

<http://zh.wikipedia.org/wiki/博帕爾事件>

<http://suite101.com/article/iaea-ines-scale-for-nuclear-accidents-and-nuclear-disasters-a360085>

<http://140.121.160.124/gc/992/Gc992-3c.pdf>

- NATURE OF TECHNOLOGICAL HAZARDS (S. Chp.13)
  - “Man-Made” Accidents *c.f.* ‘Social’ Hazards => Deliberately harmful use of technology
  - Definition of Technological Hazards: *Accidental failures of design or management relating to large-scale structures, transport systems or industrial processes that may cause the loss of life, injury, property or environmental damage on a community scale.*
  - Technological Accidents: Structures (Fire & Collapse), Public Transport, Industry
  - Arising Factors of Technological Hazards:  
Defective Design, Inadequate Management, Sabotage or Terrorism.
  - Transportation of Hazardous Material: PRTR (Pollutant Release and Transfer Register)
  - NIMBY => Safety Distance (?) => Buffer Zone, Landuse Planning
  
- MAJOR TECHNOLOGICAL DISASTERS
  - Bhopal Disaster: Bhopal India
    - ⇒ Dec. 03, 1984; official record: 3,800 deaths; general belief: 6,400 deaths
    - ⇒ Methyl isocyanate (MIC 異氰酸甲酯) => Phosgene (光氣)
    - ⇒ Emergency Planning and Community Right-to-Know Act
    - ⇒ Emerging Technology, Emerging Chemicals => Emerging Pollutants
  - Chernobyl Disaster: Chernobyl (the former Ukrainian Republic of the Soviet Union)
    - ⇒ Apr. 26, 1986; official record: 30 deaths (28 from radiation)
    - ⇒ Nuclear Power Plant: RBMK light water graphite reactor (石墨沸水管反應器)
  - Exxon Valdez Oil Spill: Alaska’s Prince William Sound
    - ⇒ Mar. 24, 1989; spilled almost 11 million gallons of crude oil (total 53 million gallons)
    - ⇒ 阿瑪斯號貨輪油污事件 (2001 年 1 月 14 日) : 墾丁國家公園龍坑生態保護區
  - Fukushima Nuclear Disaster ([http://www.world-nuclear.org/info/fukushima\\_accident\\_inf129.html](http://www.world-nuclear.org/info/fukushima_accident_inf129.html)):
    - ⇒ Following a major earthquake, a 15-metre tsunami disabled the power supply and cooling of three Fukushima Daiichi reactors, causing a nuclear accident on 11 March 2011.
    - ⇒ The accident was rated 7 on the INES scale, due to high radioactive releases in the first few days. Four reactors are written off - 2719 MWe net.
  
- CONTEXT HAZARDS
  - Context Hazards: 『蝴蝶效應』災害、『漸進型』、『廣泛型』、『糾雜型』…

- Global environmental change can be regarded as an environmental hazard.
- Chronic ('elusive') hazards and Rare ('new') hazards
- The El Niño Southern Oscillation (ENSO)
  - ⇒ Disasters associated with El Niño: floods, droughts, wildfires and diseases
- The North Atlantic Oscillation (NAO) and The Thermohaline Ocean Circulation
- Global Warming: Water resource, diseases, sea-level rise
- Transboundary Air Pollution => Fine Particulate Matters (PM<sub>2.5</sub>)
- Asteroid and Comet Impact (Rare Hazards)

## 博帕爾事件 (維基百科)

博帕爾事件發生於1984年12月3日凌晨，印度中央邦的博帕爾市(Bhopal)美國聯合碳化物(Union Carbide)屬下的聯合碳化物(印度)有限公司(UCIL)，設於博帕爾貧民區附近一所農藥廠發生氰化物洩漏事件。當時有二千多名博帕爾貧民區居民即時喪命，後來更有兩萬人死於這次災難，二十多萬博帕爾居民因而永久殘廢，現時當時居民的患癌率及兒童夭折率，仍然因這些災難遠比其他印度城市為高。

由於這次大災難，世界各國化學集團改變了拒絕與社區通報的態度，亦加強了安全措施。但亦因這事件，很多環保人士以及民眾，都反對將化工廠設於鄰近民居的地點。新化工廠的設置，都會引發民眾的抗爭。

而美國聯合碳化物集團，經過在美國和印度多番訴訟，亦因這次慘劇要向印度政府賠償四億七千美元，亦要出售該集團持有的聯合碳化物(印度)有限公司百分之五十股權，用以興建治療受影響居民的醫院和研究中心。不久，美國聯合碳化物集團本身亦被人狙擊，雖然狙擊失敗，但董事局仍將美國聯合碳化物分拆成若干公司，包括永備電池集團(Energizer)。而美國聯合碳化物集團在2001年2月，成為美國陶氏化工(Dow)集團的全資附屬公司。

