



Bhopal Gas Tragedy

Group 8

Agenda

1. General Information

- a. Background Information
- b. Categorization
- c. Reason
- d. Disaster Specifications

2. Before the Accident

3. Disaster as in Numbers (Statistical Information)

4. Humanitarian Aid and Relief

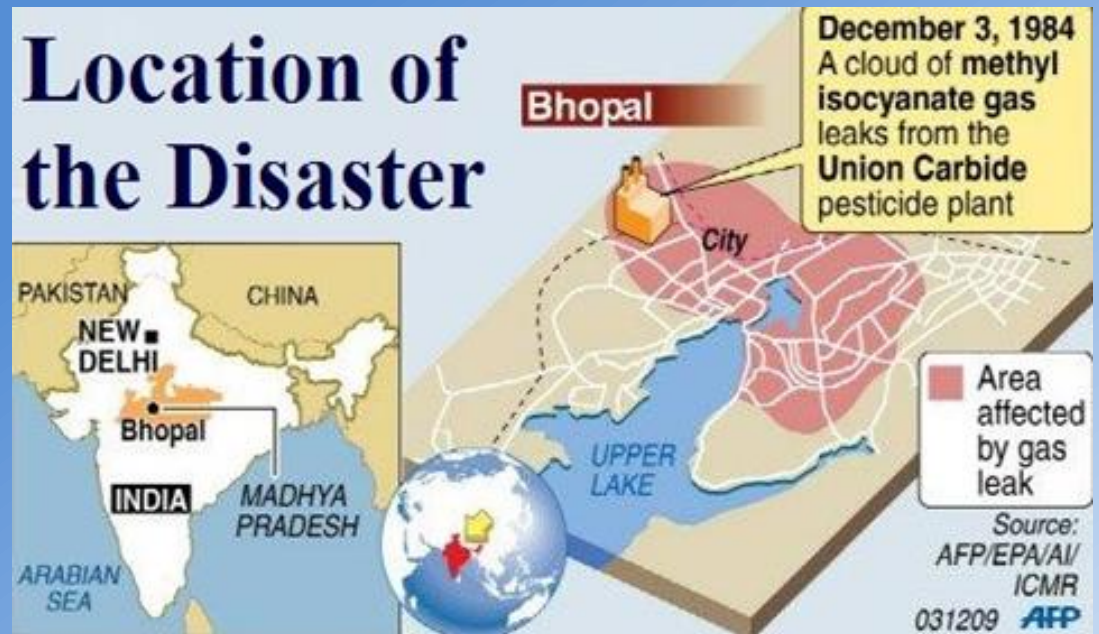
- a. First Response
- b. Global Help and NGO's
- c. Long Term Improvements

5. Results and Lessons Learned

- a. What was right?
- b. What was wrong?
- c. Lessons Learned

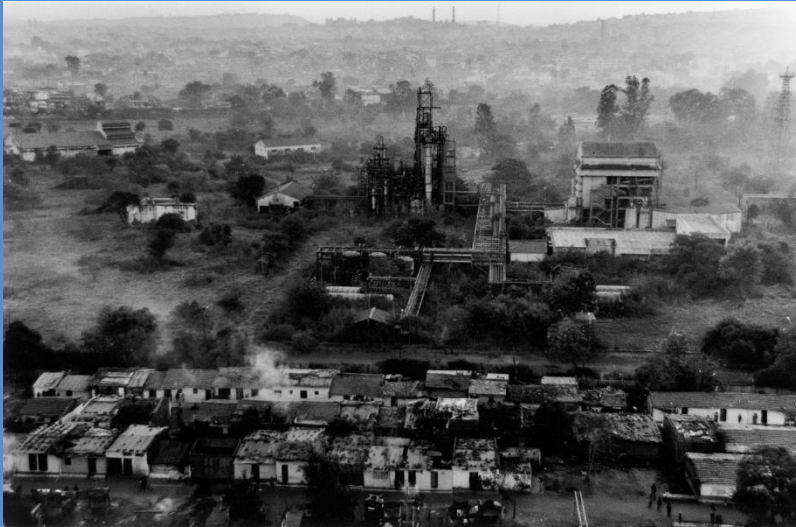
Background Information

- 3rd December 1984
- Bhopal, state of Madhya Pradesh in India[1]
- Poisonous gas leak [methyl isocyanate (MIC)]



- Union Carbide India Limited (UCIL)
Pesticide Production Plant

Background Information



Bhopal => 800.000 inhabitants[2]

Surrounded by Hills & two large lakes

Large slums around the factory [2]

Railway station

Union Carbide = India's first petrochemical producer

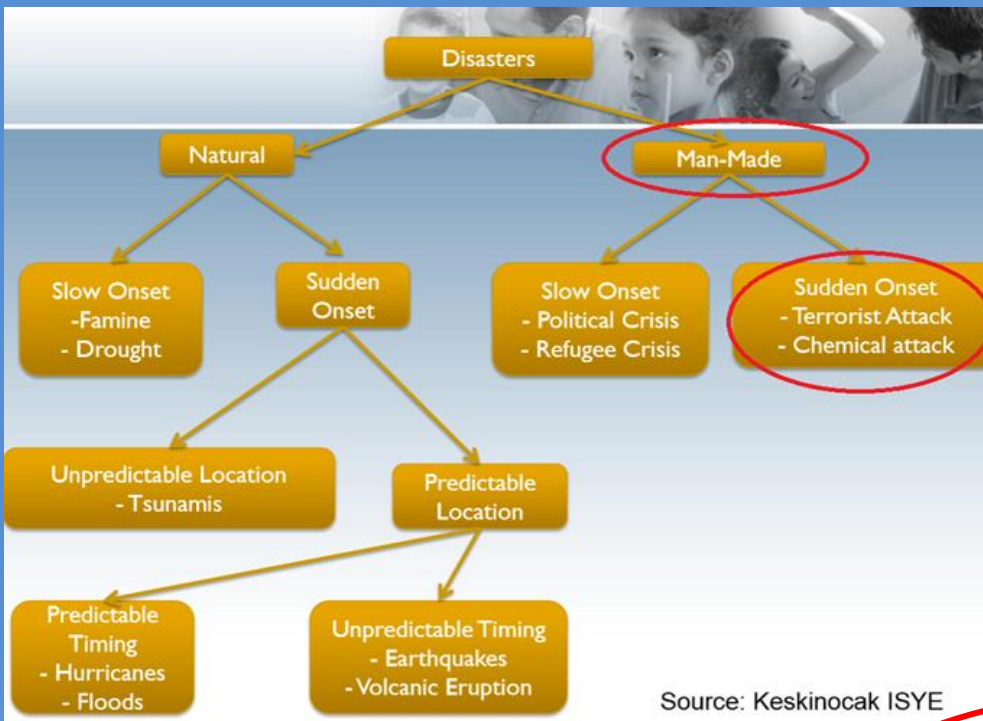
The management covered: [2]

- leak accidents,
- real threat to health,
- exceeding toxic emissions.



Characterization

IE 481 in class categorization



IFRC categorizes disasters into 10

- Hurricanes, cyclones, typhoons
- Floods
- Drought
- Earthquakes
- Volcanic Eruption
- Epidemic
- Famine and food insecurity
- Man-made disaster (terrorist attacks, wars)
- Population movement
- Technological disaster (bioterrorism, nuclear accidents..)

Characterization

Definition and Characteristics According to (IFRC)

Technological Hazards: Industrial Accidents [3]

Non-natural disastrous occurrences that include:

- | | |
|-------------------------------|------------------------|
| ✓ Accident release | ✓ Pollution |
| • Explosions | • Acid rain |
| ✓ Chemical explosion | ✓ Chemical pollution |
| • Nuclear explosion/Radiation | ✓ Atmosphere pollution |
| • Mine explosion | |

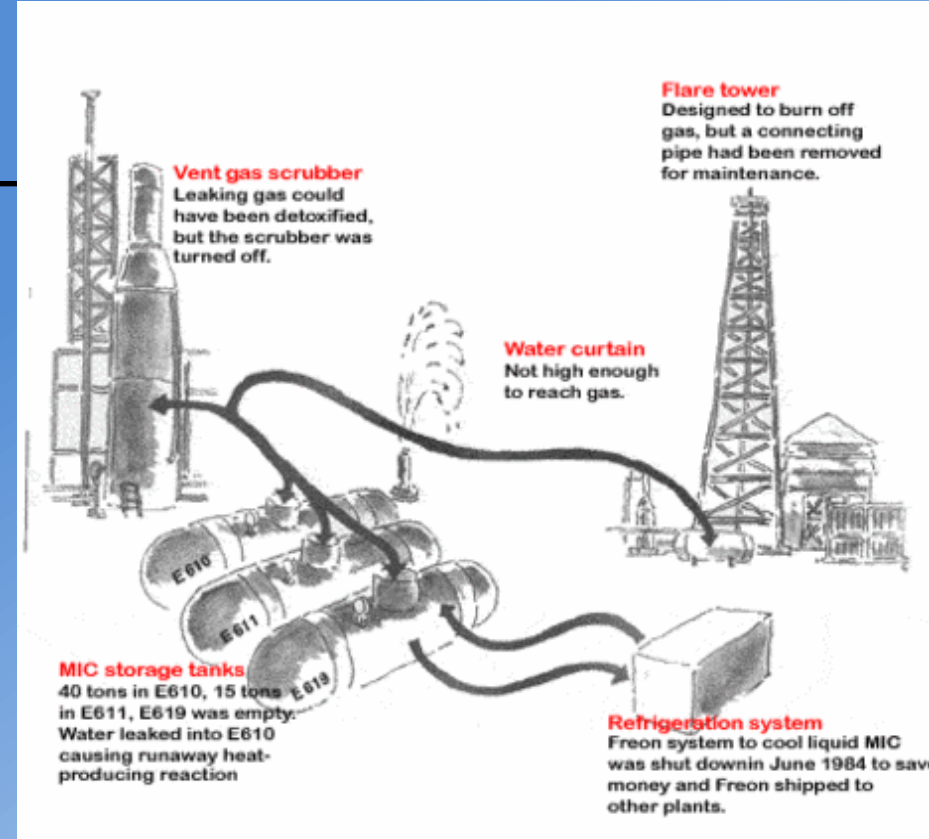
Reason

Valves and lines were in poor condition [4]

A tank contained 42 tons of MIC

Water pipe was missing its slip-blind plate

Water leaked to the tank



Water + iron (non-stainless steel) + Chemical Gasses

= HIGH TEMPERATURES

Inside-tank temperature over 200 °C => **PRESSURE**

Emergency venting of MIC tank released toxic gases

About 30 metric tons of MIC into the atmosphere in 45 to 60 minutes [5]

Reason

Or sabotage...

Disaster Specifications

!World's Worst Industrial Disaster!

The cause is under debate

NGO' involved with Lawsuit as well as Health and care

First Lawsuit outside America against an American Company

A book is written about this disaster

Before the Accident

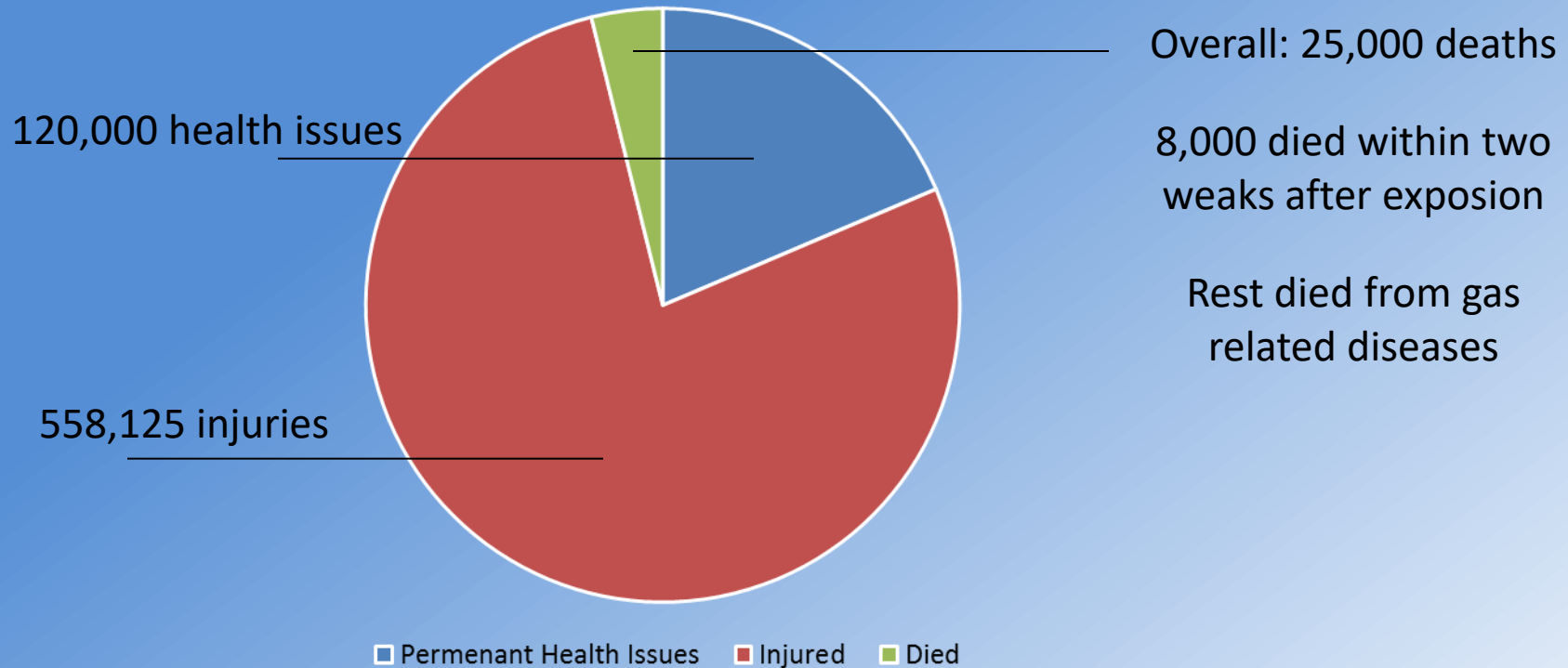
Demand for pesticides had fallen + production continued => build-up of stores of unused MIC

1976	Two trade unions complained of pollution within the plant
1981	a worker was splashed with phosgene. which resulted in his death 72 hours later
January 1982	leak exposed 24 workers. None of the workers had been ordered to wear protective masks.
February 1982	A MIC leak affected 18 workers
August 1982	A chemical engineer came into contact with liquid MIC, resulting in serious burns
October 1982	A MIC leak. the MIC supervisor and two other workers were severely exposed to the gases
1983- 1984	there were leaks of MIC

Sad Statistics

Over 500,000 people were exposed to MIC:

Among people who were exposed to gas



Sad Statistics

- More than **2,000** animal died
over **50,000** were severely damaged.
- **1,25** beds per **1,000** victims.
(World Bank suggests 1,0 per 1,000)
- After Bhopal **50,000** people needed alternative jobs,
ONLY less than **100** of the gas victims were employed.

Humanitarian Aid and Relief First Response

At least 14 different NGOs were immediately engaged:

Sambhavna Trust: medical care for gas affected patients and those living in water-contaminated area.

Indian Red Cross (IRC): Mobile medical units distributed medical supplies including antibiotics, vitamins and other medicines.

Eklavya and the Delhi Science Forum: first disaster reports were published.

International Campaign for Justice in Bhopal (ICJB): coordinates international activities.

Bhopal Group for Information and Action (BGIA)

Individual Activist: include Rashida Bee and Champa Devi, Abdul Jabbar .



[11]



[10]

Humanitarian Aid and Relief First Response

- Get information from UCIL about the composition of the cloud.
- Can't reach WHO or American institutions as it was Sunday.
- The first information came by a telex from Greenpeace in Germany.
- UCIL flew in cylinders, masks and cortisone drops from Calcutta and Delhi.
- The Indian government air-freighted medicine and personnel.
- Government fixed compensation for the victims.



[8]



[9]

Global Help & NGO's Long Term Improvements

New Law Regulations :

The Factories Act, 1948, as amended in 1976 and 1987;
The Water (Control and Prevention of Pollution) Act, 1974;
The Air (Prevention and Control of Pollution) Act, 1981;
The Environment (Protection) Act, 1986;
The Public Liability Insurance Act, 1991 as amended in 1992.

New Agencies:

The Disaster Management Institute in Bhopal (DMI) in 1987,
The Environment Protection Agency
International Medical Commission on Bhopal (IMCB)
Chingari Trust, medical care for children born with malformations and brain damages.

Global Help/Improvements:

Industrial Hazards and Human Rights

Students for Bhopal

Diagnosis, treatment and health education by DOTS centre sponsored by WHO



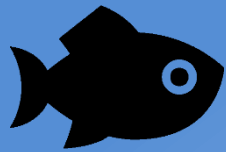
Results & Conclusion

- a. What was right?
- b. What was wrong?
- c. Lessons Learned

What was right?



Air, water, vegetation and foodstuffs were safe within the city



Poultry was restricted



The State Government established of hospitals, clinics and mobile units

What Was Wrong?

- ★ Early medical effort was forgotten and replaced by bureaucratic, politics and personality clashes.
- ★ UCIL paid 470M \$ even though they asked a total compensation of 3.3 billion dollars.
- ★ The Indian government and UCC deny permanent injuries were caused by MIC.
- ★ Medical staff were unprepared for the thousands.
- ★ Doctors not qualified for treatment of MIC gas inhalation.
- ★ Indian Government closed plant and failed public data.
- ★ It was forbidden to publish data on health effects.
- ★ Plant was used as a dumping area for hazardous chemicals.
- ★ Mass funerals were dumped into the Narmada River.



Lessons Learned & Conclusion

- Expanding industrialization in developing countries without safety regulations
- Double standard for multinational corporations
- National governments and international agencies should focus on techniques for corporate responsibility and accident prevention.
- Governments should not allow industrial facilities within urban areas.
- Industry and government support local communities so they provide medical and services to reduce morbidity, mortality and material loss.
- Public health infrastructure considered in choosing sites for hazardous industries.
- Bhopal had four hospitals but not enough physicians and beds.
- Emergency plans should be provided or practiced.



References

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- [2] Ingrid Eckerman, "The Bhopal Saga, Causes and Consequences of the World's Largest Disaster", University Press, August 2004
- [3] <https://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/definition-of-hazard>
- [4] "Bhopal trial: Eight convicted over India gas disaster". *BBC News*. 7 June 2010. Archived from the original on 7 June 2010. Retrieved 7 June 2010.
- [5] <http://bhopal.org/what-happened/union-carbides-disaster>

- [6] Varma, Roli; Daya R. Varma (2005). "The Bhopal Disaster of 1984". *Bulletin of Science, Technology and Society*. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1142333/>
- [7] <http://bhopal.org/about-us/sambhavna-clinic/>
- [8] <http://www.indianredcross.org/>
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- [10] Media release – 23 April 2004 (23 April 2004). ["Bhopal Victims Warn U.S. Government and Dow Chemical of Impending Catastrophe"](#). Greenpeace. Retrieved 25 October 2012.
- [11] <http://www.thehindu.com/news/bhopal-gas-tragedy-rallies-protests-mark-26th-anniversary/article929402.ece>
- [12] <http://dropdownow.org/page/4/>