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Introducing & Managing Chemical Safety And Security Practices In India

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Indian Chemical Industry

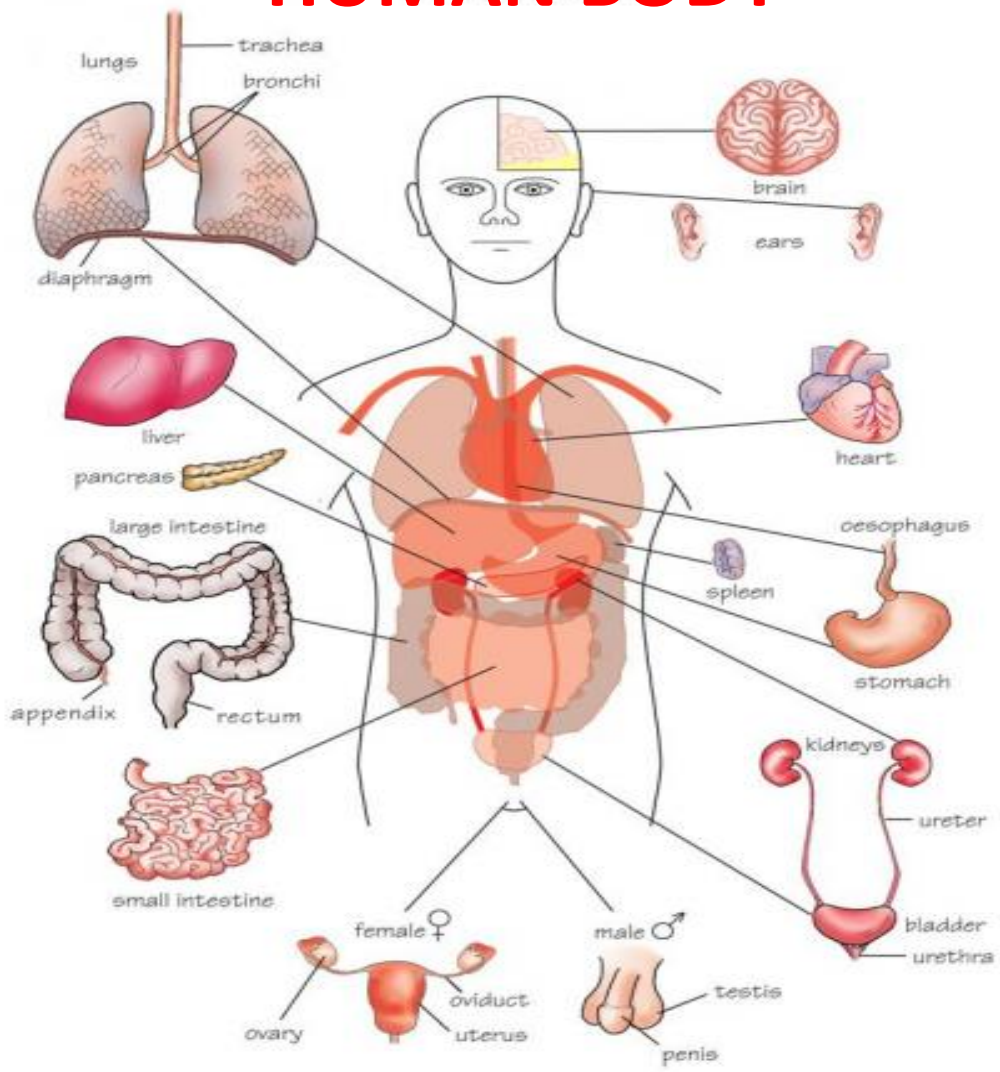
- Chemical Industry is an important constituent of the Indian economy. Its size is estimated at around US$ 100 billion approx., which is equivalent to about 3% of India's GDP. The total investment in Indian Chemical Sector is >US$ 60 billion and total employment generated is about 1 million.
- The Indian Chemical sector accounts for >13% of total exports and 9% of total imports of the country. Per capita consumption of products of chemical industry in India is about 1/10th of the world average.
- Over the last decade, the Indian Chemical industry has evolved from being a basic chemical producer, becoming an innovative industry. With investments in R&D, the industry is registering significant growth in the knowledge sector comprising of specialty chemicals, fine chemicals and pharmaceuticals.

Indian Chemical Industry

- Global Size - US$ 3.5 Trillion
- Third largest in Asia
- Sixth largest in world &
- Twelfth largest by volume globally
- Employs approx. 1 Million workforce
- Likely to be 2 Million by 2020

A CHEMICAL PLANT

HUMAN BODY



A CHEMICAL PLANT

Human Body – A Mobile Chemical Plant

- Evolved & Developing
- Extremely Useful
- Complicated & Sophisticated
- Lot To Learn
- Dangerous & Disastrous

Safety & Security

"Instead of Managing a disaster when it has already taken place, there must be a planned emphasis for complete mitigation of a disaster".

Indian Chemical Council propagates Safety & Security to be a culture in Chemical industry as a top most priority.

- The culture of **Safety & Security Consciousness and accountability** in an organization and education has also been developed around the world in the chemical industry.
- The development of a "**Culture of Safety & Security**" results in safe and healthy environments of society.

CWC & OPCW

- **India was the FIRST country outside Europe to be selected for 'Associate Programmes' run by the OPCW.**
- **Department of Chemical & Petrochemicals & National Authority-CWC, Govt. of India actively oversee and participate in the events across the country for awareness and implementation of CWC organised by ICC.**
- **Under the auspices of OPCW, ICC organised a two days seminar on CWC & Chemical Safety Management, in April – 2011 at Vadodara, Gujarat.**

Large-Scale Emergencies & Sensitive Situations

Many large-scale events OR natural calamities can affect the industry and disrupt the operations severely. Some of the most common large-scale emergencies and sensitive situations include:

- **Fire & Flooding,**
- **Power Failures**
- **Explosion**
- **Deflagration**
- **Detonation**
- **Gas/dust explosion**
- **Unconfined Vapour-cloud Explosion (UVCE)**

Security Breach

- Intentional or unintentional security breaches in the industry, either by personnel or by outside agents, pose a serious risk for institutions. Possible breaches include, theft or diversion of high-value equipment or dual-use chemicals or materials that may be utilized for illegal activities, accidental or intentional release or exposure to hazardous materials and unauthorized manufacturing experimentation.

Toxic Chemical Exposure

- One of the least predictable, most dangerous risks in chemical industry is the leakages of toxic chemicals. No substance is entirely safe and all chemicals result in some toxic effects. If living systems are exposed to a larger amount of the substance, some chemicals can be more hazardous after a single exposure itself. Others cause an effect after repeated or long-duration exposure, which could be carcinogenic chemicals.

Importance of Chemical Industry

- Chemical industry plays a vital role in supporting good standard of living
- It provides various chemicals needed by other industries
- Almost all products that we use chemicals in some form.
  - Soap and detergents
  - Medicines
  - Cosmetics
  - Fertilisers
  - Synthetic clothing, etc., etc.

Significant Milestones In Improving Safety & Lowering Risk

Indian Chemical Council also disseminates the Responsible Care ethics and guidelines in to the chemical industry in India.

- Finding a way to identify what can go wrong
- Finding a simple set of tools which allow 'quantification' of the severity
- Finding a way to communicate hazards and HSE-related information within the organisation
- Making everyone accountable for knowing what can go wrong, what role they have in preventing it and if it happens, what they need to do to mitigate it.
- Making business leadership understand that they (and not the Safety Department) are primarily accountable for performance
- Board of Directors setting the risk governance criteria in the full knowledge of what it is likely to cost

Safe Plant Operations

- It is possible to operate the chemical process plants safely by–
  - Incorporating HSE in plant and equipment design, preferably inherently safe design
  - Following industry/national/international standards
  - Appointing competent employees
  - Training (including refresher training)
  - Incorporating HSE in operating procedures
  - Incorporating HSE in plant/equipment maintenance
  - Compliance of all applicable statutes
  - Hazard identification, risk assessment, Hazop study, etc.
  - Periodic safety audits
  - Emergency response plan

Key Roles Of The CEO, Board Of Directors & Business Leaders

- Understand the risks for the business
- Recognise their responsibility for performance
- Have dialogue with the Technical Expertise in the company who have assessed the risks
- Challenge the Technical Expertise on improvement programmes – tell them "**what must be done**" not "how it must be done"
- Have them develop relevant, time-bound programmes – and implement them
- Fund the programmes and discipline the organisation
- Follow up with periodic review and reports

Legal Obligations

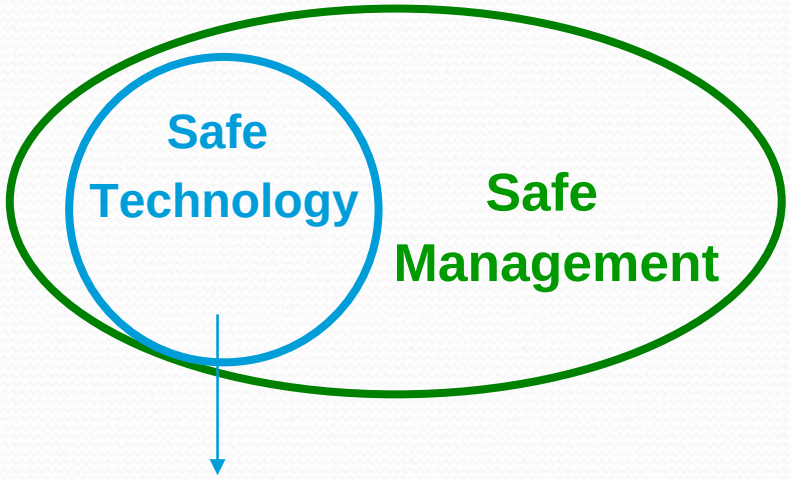
- To ensure safety in the manufacture, storage, handling and use of chemicals, various statutes have been enacted and rules framed.
- Legal provisions are the minimum requirements for safety, health, hygiene and the environment.
- The applicable statutes must be complied with.

An understanding of how safe is the design code ...!

- Design codes are often industry driven and adopted by a wider range of stakeholders
- Design codes feature as Best Practice
- Care needed on how they are applied

Philosophy of Disaster Prevention

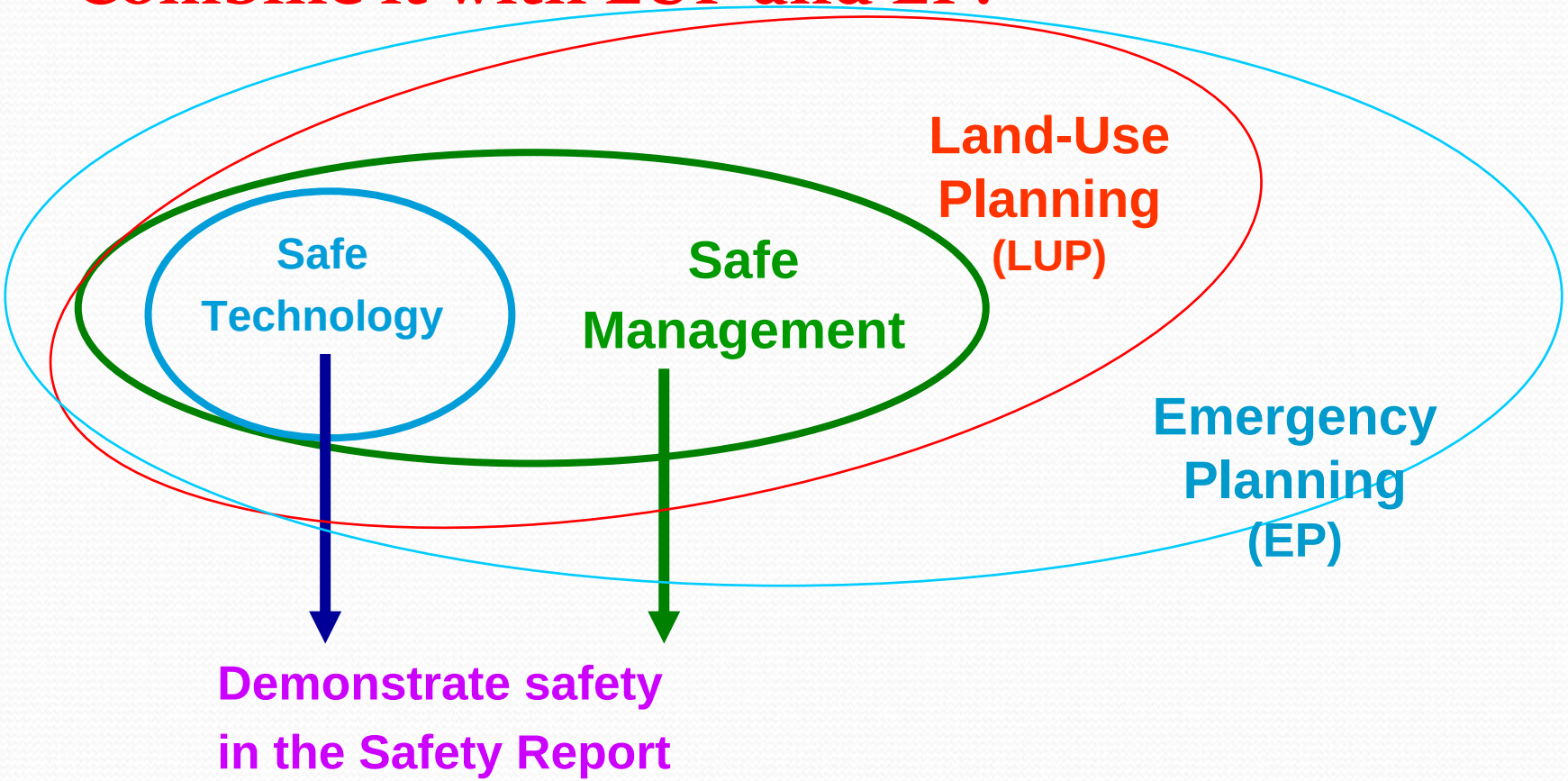
- Integrate technology and the management



Demonstrate safety
in the Safety Report

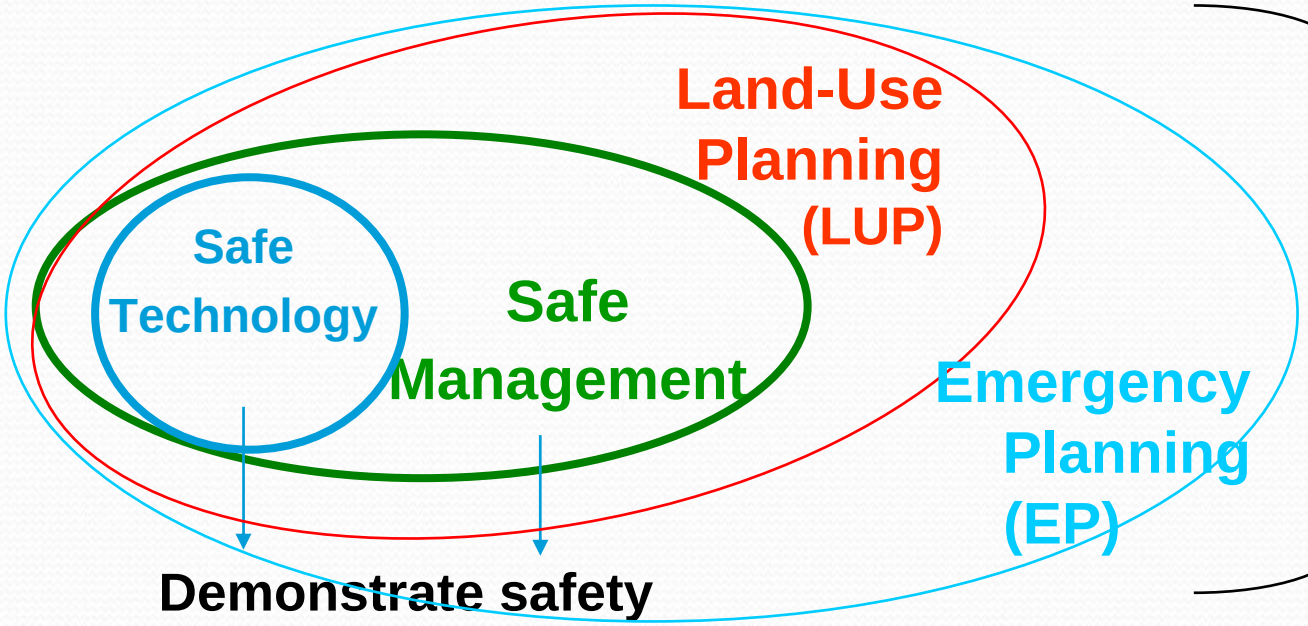
Disaster Prevention

- **Combine it with LUP and EP.**



ICC

I N S P E C T I O N S



Information to the Public

Safety & Security Management System

4. **Implement Administrative Controls.** Administrative controls define an institution's rules and procedures for safe and secure practices and establish the responsibilities of individuals involved. These controls should include general safety rules, plant & laboratory housekeeping procedures, manuals for use of materials and equipment and other documents to communicate rules to all stakeholders.
5. **Identify & Address Particularly Hazardous Situations**. Conducting a risk-based evaluation determines the impact and adequacy of existing control measures, prioritize needs, and incorporate corrective actions based on level of importance and available resources. This information will provide the foundation for a robust safety management system, as well as help prioritize efforts to improve safety and security.

Safety & Security Management System

6. **Evaluate Facilities & Address Weaknesses**. Safety and security must be an important factor, while designing a chemical plant and its divisions. Safety of the plant security of personnel should be a top most priority in order to mitigate the mishaps.
7. **Establish Procedures For Chemical Management**. Chemical management is a critical component in a manufacturing plant. Safety program must include defined procedures for buying and handling the chemicals including, appropriate use of personal protective equipment, as per rules and procedures, especially for spills and emergencies. Storing, inventory tracking, transporting and shipping of chemicals and disposal of chemical waste.

Safety & Security Management System

8. **Employ Engineering Controls And Personal Protective Equipment**. Engineering measures, Personal protective equipment, such as chemical splash goggles and face shields, should supplement engineering controls.
9. **Plan For Emergencies**. In the process of developing an emergency plan most likely incidents that are to occur must be included first. Identifying the decision makers and stakeholders, as well as safety priorities, creating a plan for all types of emergencies identified, and training the staff in the procedures outlined in the plan.

Safety meetings at regular intervals must be a routine.

Safety & Security Management System

10. **Identify & Address Barriers To Following Safety And Security Best Practices.** Good safety and security practices involve having people consistently follow policies and procedures. However, it is often challenging to change behaviors and foster a culture of best practices. The organisation must identify barriers and establish incentives for all personnel to comply with safety and security measures.
11. **Train, Communicate And Mentor.** The best way to create a culture of safety in the workplace is to set a good example every day by following and enforcing safety and security rules and procedures.

It is extremely important to establish a system for training and mentoring the personnel in a chemical plant. Every organisation must establish effective channels for communicating about chemical safety with personnel at all levels.

- **If you feel, managing SAFETY is a costly affair,**

  .....Try an accident !

Thank you…

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