Chemical Management Program
In a Textile Process House
Target 2021- 50 Bn $ business in RMG
Barrier to the dream….  

• **Nimtoli fire:** (June 3, 2010): Fire in chemical storage in residential area
  
  • 117 died and injured hundreds.
  • Fire service officials admitted **90%** of the capital’s chemical traders – **867 out of 994** – did not have **valid licenses** issued by the fire service or the departments of narcotics and explosives.

• **Chittagong Fertilizer Factory:** (August 22, 2016)
  • One of the two 500-tonne tanks exploded at 9:50pm on Monday when workers at the factory were changing shift.
    • nearly 250 people sick.
    • From nearby 300-acre pond, 10 tons of fish died
Statistics

• “About 60 percent of fire accidents in Dhaka are caused by chemical and plastic factories,”
  Enayet Hossain, a spokesman for the Fire Services and Civil Defense Department.
Other Challenges…

• Compliance with local regulation on Chemical Management.
• Comply with current GHS regulation.
• Follow ZDHC requirements.
• Hazardous chemical waste
• Other requirements……

Buyers Expectation & Access to International Market
Benefit of Chemical Management

• Employees health and safety
• Environmental protection
• Save money from less amount of chemical use end energy efficiency
• Good business deal
• Reputation of the company
• Insurance premium
• Neighbor satisfaction from surrounding operation.

EHS+
Hazardous Chemicals

Hazardous Chemicals refers to chemicals with properties such as –

• toxic,
• corrosive,
• explosive,
• combustible,
• combustion-supporting,
• Flammable
• Irritant etc.
Type of Chemical Hazard

• Physical Hazard

• Health Hazard

• Environmental Hazard
Environmental hazard of Chemical

Pathways for chemicals to enter ecological environment

Emissions include:
Gas or liquefied gas, liquid and solid

Gas waste
Liquid waste
Solid waste

Industrial wastes

Hazardous Chemicals

Other wastes

Foreign garbage:
Hazardous waste
Solid waste

Combustion product
Domestic waste
Use process emission

EHS+
Pathways for environmental hazards to enter the human body

- Pollution source
- Pollutant discharge
- Surface water pollution
- Ground water pollution
- Soil pollution
- Air pollution
- Crop and food pollution
- Pollution of aquatic products
- Water resource pollution
- Human exposure
Resource Efficient Chemical Management

Communication and reporting

Legal and other requirements

Performance assessment

Emergency preparedness and response planning

Documenting and planning

Chemical Management Issues and Elements

Material flow accounting

Chemical inventory

Chemical hazards and risk assessment

Chemical risk management action

Legal and other requirements

Performance assessment

Emergency preparedness and response planning

Documenting and planning

Chemical Management Issues and Elements

Material flow accounting

Chemical inventory

Chemical hazards and risk assessment

Chemical risk management action
### Calculating NPO costs

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
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<tbody>
<tr>
<td>100 kg Raw material</td>
<td>Processing cost</td>
<td>Desired final product</td>
</tr>
<tr>
<td>1000 $US</td>
<td>600 $ US</td>
<td>80 kg</td>
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</tbody>
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#### Conventional cost accounting
- 80 kg desired product.
  - Material cost: 1000
  - Processing cost: 600
- Total: 1600

#### Material flow cost accounting
- 80 kg desired product
  - Material cost: 800
  - Processing cost: 480
- Total: 1280

#### NPO costs
- 20 kg NPO
  - Material cost: 0
  - Processing cost: 0
  - Total: 0

### Notes
- With conventional cost accounting NPO costs **are not visible!!**
- With material flow accounting NPO cost **are visible**
Points of loss

....chemicals in the effluent

....chemicals lost during processing

....chemicals wasted during preparation and handling

....chemicals spoilt and damaged during storage

?
Identification & Communication of Chemical Hazards
GHS Label Requirements

Information required on a GHS label:

1-Product identifier
2-Pictograms
3-Signal word
4-Hazard statement
5-Precautionary statement
6-Supplier information
Safe Transportation
Loading and Unloading of Chemicals
Loading and Unloading of Chemicals
Transportation - Internal
Storage and Compatibility Chart
<table>
<thead>
<tr>
<th>Compatibility Chart</th>
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<tr>
<td><img src="image1.png" alt="Image" /></td>
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**EHS+**

| OK | OK Under Condition | Not OK |
Secondary containment - Types
Requirements for warehouse of hazardous chemicals

A: Architectural requirements
B: Fire fighting and gas alarm
C: Use explosion-proof lighting
D: Requirements for chemical containers
E: Leak-proof secondary containers
F: Explosion-proof mechanical ventilation
Requirements for warehouse of hazardous chemicals

G : Requirements for leak-proofing ground
H : Equipped with SDS on site
I : Closed fireproof door (outward opening door)
J : Fire-fighting facilities
K : Explosion-proof switch
L : Warning labels
M : Emergency shower and eye-wash devices
Chemical Waste
Chemical Waste Management

Chemical waste is a kind of hazardous waste. It includes:

- spent chemicals, pesticides,
- used oils, batteries,
- contaminated clothes and materials,
- empty chemical containers

Photo: Anisur Rahman
Chemical Waste Management

To respect the environment

• do not mix hazardous waste with regular waste, even in small quantities.

• do not throw up any chemical in the sink or sewer system.

• eliminate hazardous waste as soon as possible.
Stored in assigned areas:

- With secondary containment,
- Sheltered,
- Locked,
- Visible warning signs (WARNING – HAZARDOUS WASTE),
- Properly ventilated.
Solution: Resource Efficient Chemical Management

- Conduct a common meeting with management on Chemical Safety.
- Start a project to implement chemical safety requirements.
- Develop a team for the project.
- List down all the chemical used in the factory (location, operation & process specific.)
Solution: Resource Efficient Chemical Management

• Collect SDS of all chemicals
• Perform a Risk assessment of all chemicals
• Find out the action plan (SDS posting, labeling, storing procedure, carrying procedure, chemical compatibility, secondary containment, required PPE, equipment's, training for the users etc.)
• Communicate to the management for budget and people
• Implement.
• Manufacturers must **assess** hazards of chemicals.

• Distributors must **transmit** hazard information to employers.

• Employers must **provide** information to workers.
Impossible!