Design Sustainability
For Future Growth

Sanjay Harane
Nagreeka Exports Ltd.
Kolhapur
1) Sustainability
2) Sustainability & CMS
3) CMS Policy
4) How to Implement CMS
5) Benefits of CMS
6) Beyond CMS to Sustainability
Sustainability: Definition

It is the development that meets the need of the present time without compromising the ability of future generations to meet their own needs.

“If you take it from nature, Make sure you return in correct manner.”
Sustainable DESIGN for Industry

Sustainability - Through
- Reduce
- Reuse
- Recycle
- Research (the new culture of design)

Minimum Natural Resources
Safe Process (Storage & Handling)
Eco friendly Raw material
Industry
Product
Minimum Waste – Water, Energy, Effluent, Sludge

Green design 1980
Eco design 2000
Sustainable design Now
2
Sustainability & CMS
The Textile industry is very resource-intensive.
Possibility of Toxic Chemicals

Need to understand chemical we use &
Try to avoid the use of Hazardous chemical groups
Sources of Restricted Substances

- Raw Fibre, Yarn, Fabric, Leather
- Dyes And Speciality Chemicals
- Garment Processing Aids
- Wet Processing
- Trims and Accessories
Solution – Chemical Management System
3
Chemical Management System
CMS - Policy

Commitment from TOP Management
We achieve this by:-

- Developing a chemical compliance team to manage hazards in raw materials, waste and input chemicals.
- Understanding & implementing application methods of chemicals used for each process, as recommended by the chemical supplier.
- Understanding MSDS & technical data sheet of each chemical, especially for its hazard and impact on health & environment.
- Reduce the consumption of chemicals by adoption of clean technology and “green” products
- Random testing of our outputs (finished article and treated effluent, sludge) & inputs (Grieg raw material, input chemicals, inlet water)
- Health & safety training for chemical hazards for all employees
- Compliance to the RSLs of serviced Brands by:
  - Documenting and communicating the RSLs to our employees and raw material suppliers
  - Ensuring correct and complete Declarations from chemical suppliers
  - Regularly updating & communicating the revisions in the RSLs.
4
Implementation of CMS
Implementation of CMS

Steps to Implement Chemical Management System

1. Development of Policy for CMS
2. Formation of Implementation Team
3. Chemical Inventory & Documentation
4. Identify Undesired Outputs (UDO)
5. Identify the areas for wastages
6. Hazard Identification & Risk Assessment
7. Storage and handling of chemicals
8. Training for continual Improvement
1. Developing & implementing safe work procedures for handling of dangerous chemicals.
2. Ensuring chemicals are registered in inventory log & is updated
3. Complete documentation (MSDS, TDS, RSL, compliance certificates)
4. Ensuring availability of PPE for workers & training on use of PPE.
5. Monitor the Performance of team members
# Chemical Management team & Responsibilities

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| **Process Manager** | 1. Optimisation of chemical usage.  
2. To keep a record & understand Technical data sheet of each chemical being used in process |
| **QA Manager**    | 1. Documentation of Test reports of new input chemicals & finished articles for compliance.     |
| **Purchase Manager** | 1. Rationalisation of chemicals in consultation with process manager.  
2. Procuring MSDS, TDS & compliance certificates from suppliers. |
| **ETP Manager**   | 1. Treatment of effluent as per local pollution control norms.  
2. Record of effluent treatment on daily basis. |
| **HR Manager**    | 1. To facilitate need base Training                                                              |
Chemical Management Log

1. List existing chemicals.
2. Map the chemicals department wise
3. Specify all chemicals in inventory table with consumption
4. Check & document availability of MSDS, TDS & RSL conformance
5. Proper storage & handling with correct labelling system
6. Understand chemical hazard & action plan for workers safety & replacement by green chemicals
**Chemical Log**

- Record all the chemicals used in the processes
- Record ancillary chemicals used in facility.

**Typical chemical compliance log format**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>General Data</th>
<th>RSL Data</th>
<th>MSDS Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part-I</td>
<td>Part-II</td>
<td>Part-III</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>J</td>
<td>K</td>
<td>L</td>
</tr>
<tr>
<td>M</td>
<td>N</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>
### Chemical Log

#### Part-I

**General Data**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Chemical Mfgr./supplier</th>
<th>Commercial name of chemical</th>
<th>Category</th>
<th>Chemical Function</th>
<th>Average consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Serial number for the chemical
- Name of manufacturer
- Commercial name of chemical as it appears on MSDS or label
- Dye, Auxiliary, Basic chemical, Maintenance, Sanitary, Laboratory
- Function of the chemical based on the Technical Data Sheet
- Average consumption of the chemical based on last 3 months
## Chemical Compliance Log

### Part-II

**RSL Data**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Supplier compliance to RSL (Yes/No)</th>
<th>Name of RSL (If No)</th>
<th>CAS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
</tbody>
</table>

- **Sr. No.**
- **Supplier compliance to RSL (Yes/No)**
- **Name of RSL (If No)**
- **CAS No.**

Refer the supplier declaration for Brand RSL from chemical supplier.

Name of the restricted substance as per supplier declaration.

CAS number of the restricted substance as per supplier declaration.
### Chemical Compliance Log

#### Part-III

**MSDS Data**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>MSDS Available (Yes/No)</th>
<th>Signal Word</th>
<th>Hazard Identification (Risk-phrase or Hazard-statements)</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
<td>N</td>
</tr>
</tbody>
</table>

**Physical**

- Check section 2 of the MSDS for R-phrases or H-statements. R1 to R19, R30 and R44, OR H-200 series denotes physical hazards.
- R20 to R29, R31 to R43, R45 to R45, R60 to R68 OR H-300 series denotes health hazards.
- R50 to R59 OR H-400 series denotes environmental hazards.

**Target date of completion**

Details of actions with target date for completion.
Proper Documentation

- MSDS
- Brand RSL Manual
- Technical Data Sheet (TDS)

Guides to proper use of chemical in the process

- Legal Permits (Consent to Operate)

Company Should adhere to the guidelines mentioned by the local authority
Implementation of Chemical Management System (CMS)

Reducing Non Productive Outputs (NPO)

INPUT
- WATER
- ENERGY
- CHEMICALS

PROCESS

OUTPUT
- DESIRED FINAL PRODUCT
- NON PRODUCT OUTPUT (NPO)

NPO = 15-30% of Total production cost

INPUT COST + PROCESSING COST + DISPOSAL COST = TOTAL COST
Storage and handling of chemicals

**Storage of chemicals**

- Store chemicals as per MSDS instructions
- Use MSDS for understanding the storage conditions

**Use of MSDS for storage**

**Labelling of chemicals**

- Ensure proper labelling for chemicals in store.
- Use labelling system for hazardous chemicals in store.
Internal Labeling System for Chemical storage

**Name of Chemical**

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Danger/Warning/Non-hazardous</th>
</tr>
</thead>
</table>

**Description of the ‘Danger’ or ‘Warning’**

**Immediate First Aid Measures:**

- Example of Pictogram: Flammable

**Hazard Type**

- P - Physical, H - Health

**PPE to be used:**

- Boot
- Goggles
- Lab coat
- Face shield
Internal Labeling System for Chemical storage

Name of the chemical: Hydrogen Peroxide
Signal Word: Danger
(Harmful if swallowed, Causes serious eye damage)

Hazard Type

<table>
<thead>
<tr>
<th>P</th>
<th>Physical, H-Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

Flammable Oxidizer

Immediate First Aid Measures:
1. In case of skin contact: Take off contaminated clothes & shoes immediately. Wash off with soap and plenty of water.
2. In case of eye contact: Rinse

PPE to be used:

- Shoes
- Goggles
- Apron
- Ear Plugs
- Hand Gloves
- Face mask
Proper Waste Management

Waste water Management
- Waste water Management by effluent treatment plant
- Local waste water discharge regulatory norms

Sludge Management
- Sludge disposal to authorised contractors
- Sludge recycling for other activities (brick making)
Benefits of CMS
Benefits of CMS

- Reduction of Production Cost
- Compliance
- At No Extra Cost
- Increase in Productivity

At No Extra Cost
Benefits of Chemical Management

Yarn/Fabric
- 1. Spinning Oils
- 2. Loom Oils
- 3. Sizing agents

Fiber:
- 1. Pesticides
- 2. Insecticides
- 3. Harvest Aid Chemicals
- 4. Defoliants

Raw water
- 1. Heavy metals
- 2. Contaminants

Chemicals:
- 1. Dyestuffs / Colorants
- 2. Auxillaries
- 3. Biocides

Coating
- 1. Ptg. Aux. & thickeners
- 2. Coating pastes
- 3. Polymer dispersions
Life Cycle of a Textile Product

- Pretreatment
- Coloration
- Finishing
- Effluent & Waste
- Product Manufacture & Accessories
- Residues in product
- Packaging
- Transport and Storage
- Consumer Use
- Disposal

- Fibre
- Spinning
- Weaving
- Knitting

CMS
Training

Training for Technical team
- Awareness on chemical hazards and dangerous processes
- Chemical management system and its benefits.
- Compliance to RSLs

Training for workers
- First aid measures
- Accident release measures
- Emergency control measures
- Safe handling & storage
- Use of PPE
6
Beyond CMS to Sustainability
Sustainability

- Develop Right CMS Policy & Watch Actual Practices
- Know chemicals & Select Right chemicals
- Correct Storage & Handling of chemicals
- Select Correct Process & Maintain Parameters
- Reduce / Reuse / Recycle – Natural Resources
- Waste minimization & Discharge correctly
- Enjoy the Results
Thank you

You can’t change the past but you can change the future, it’s upon you what you want!

Design Sustainability
For Future Growth