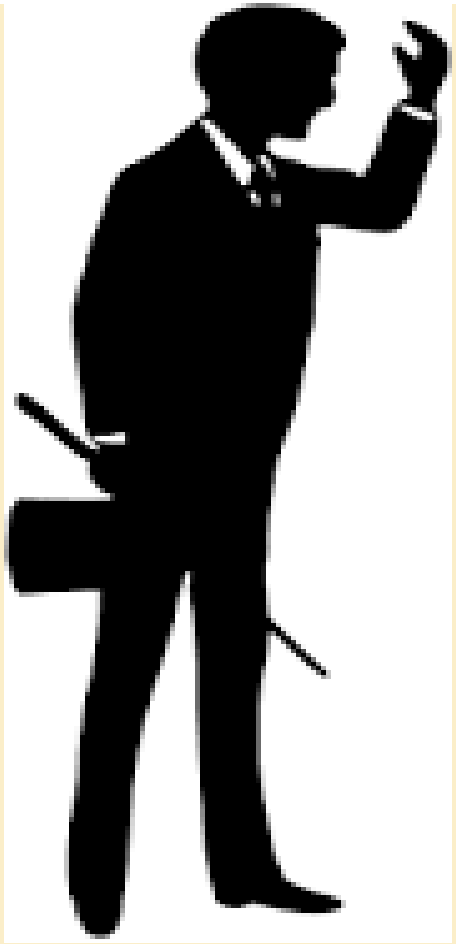
Design Sustainability

For Future Growth

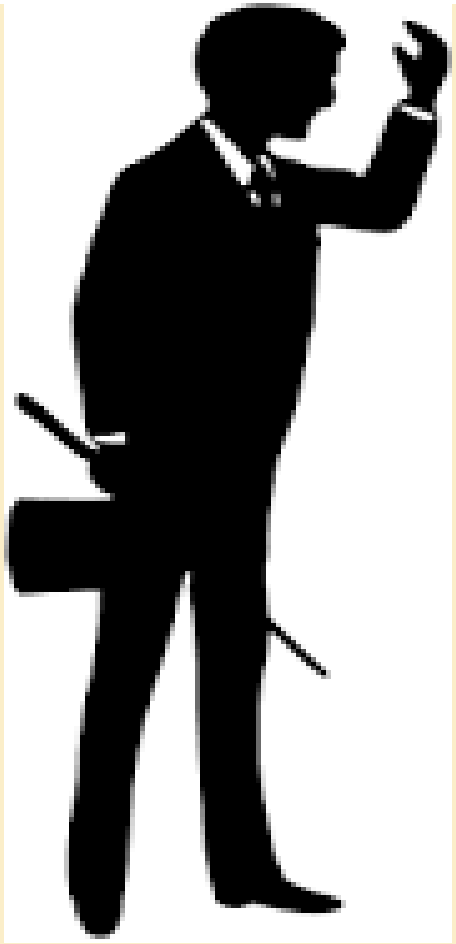
Sanjay Harane

Nagreeka Exports Ltd.
Kolhapur

Contents



Contents



Sustainability : Definition

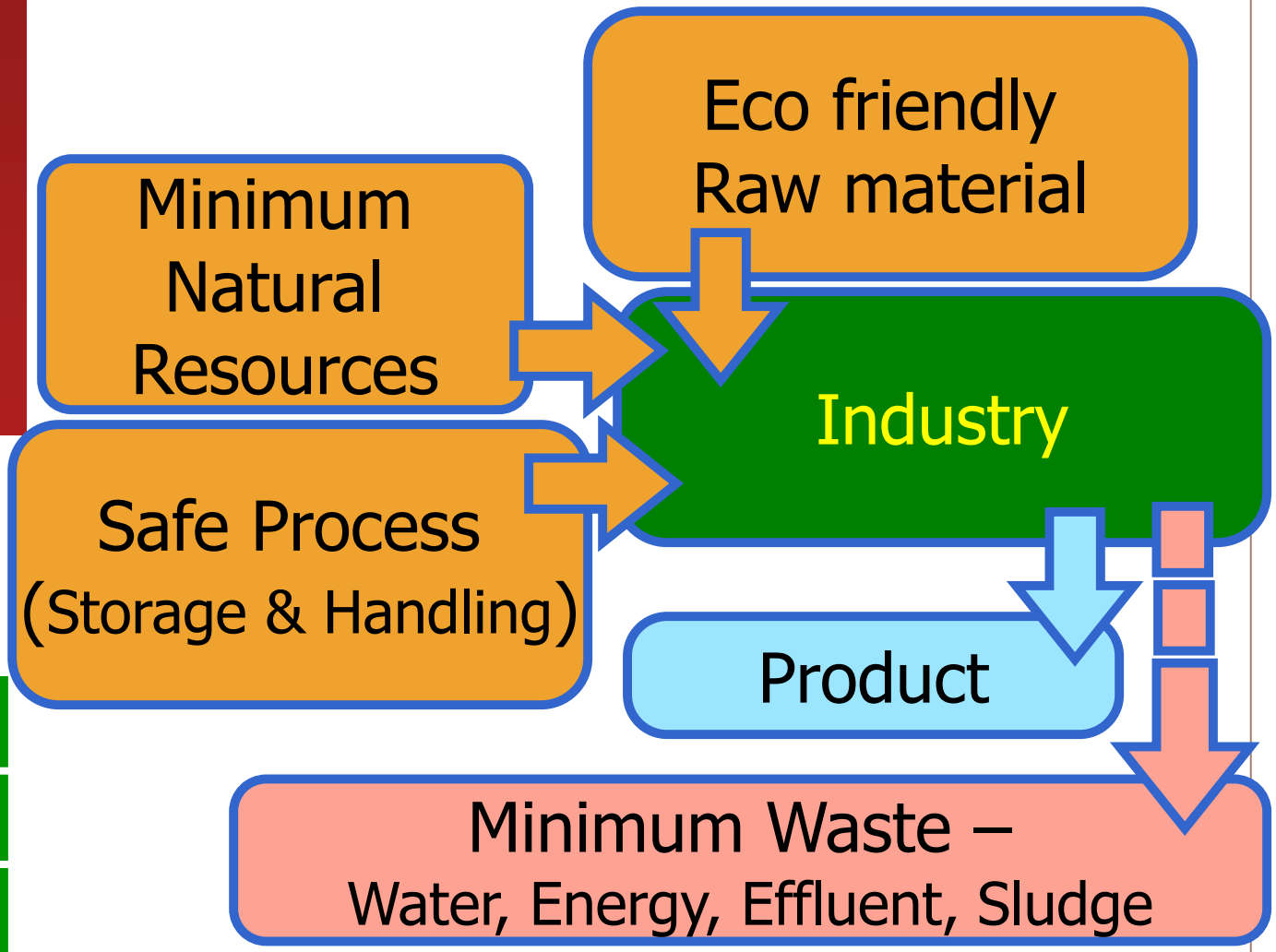
“If you take it from nature,

Make sure you return in correct manner”.

Sustainable DESIGN for Industry

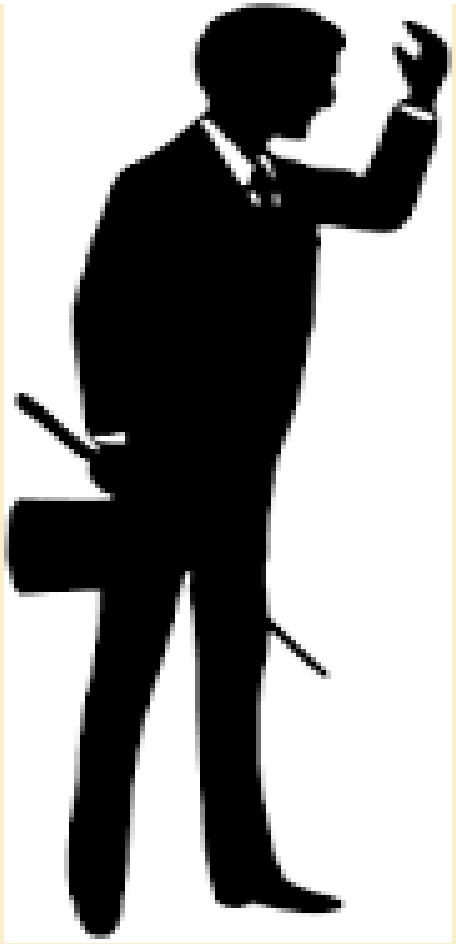
Sustainability- Through

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



Green design	1980
Eco design	2000
Sustainable design	Now

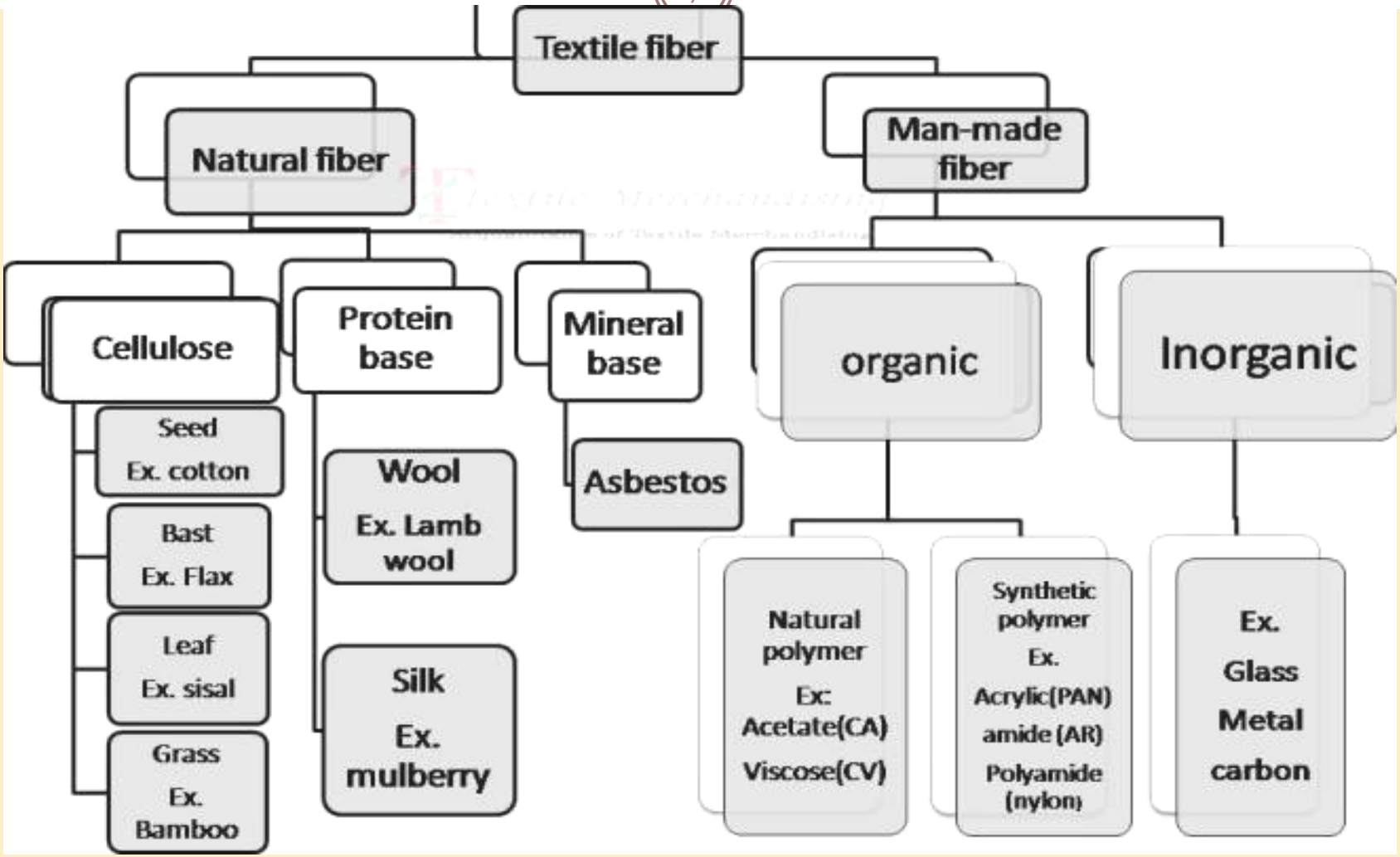
Contents



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

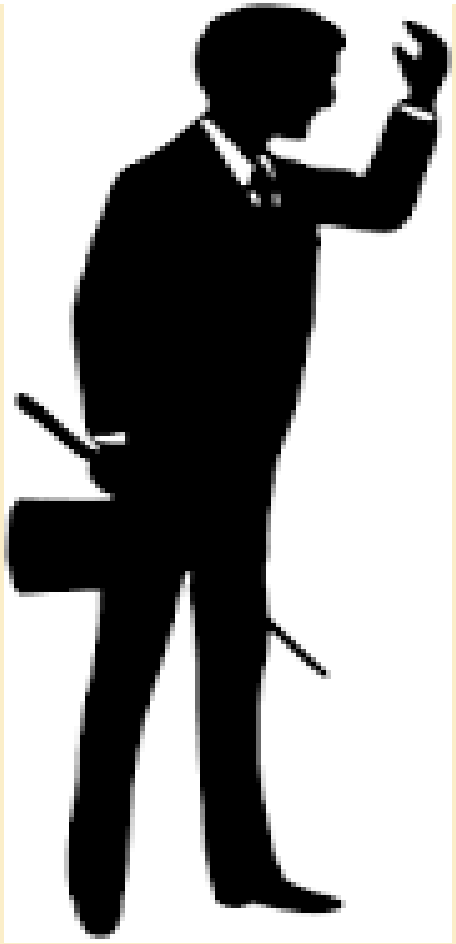
Wet Processing

Trims and Accessories

Sustainability Lenses

Solution –
Chemical Management System

Contents



3

Chemical Management System

CMS - Policy

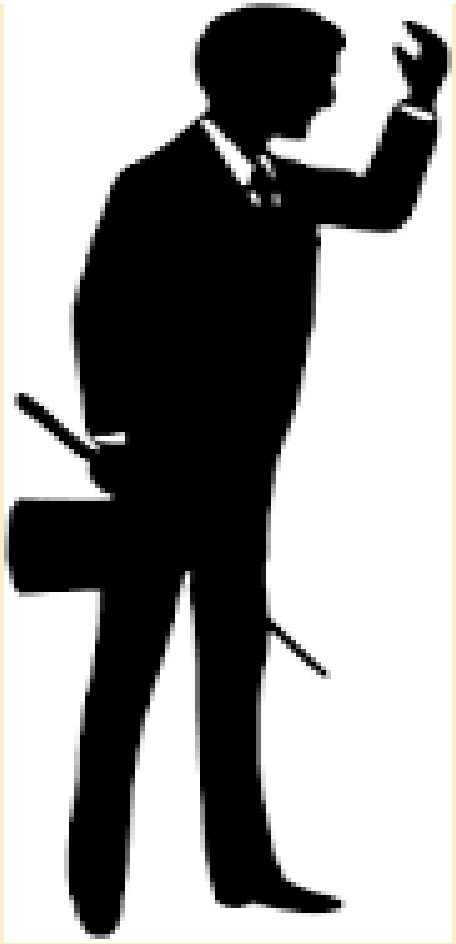
Commitment from TOP Management

Formation of Chemical Management Policy

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.

Contents



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

Chemical Management team & Responsibilities

Chemical Compliance Manager

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

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

Sr. No.	General Data Part-I					RSL Data Part-II			MSDS Data Part-III					
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O

Chemical Log

Chemical Compliance Log

Part-I

General Data

Sr. No.	Name of Chemical Mfgr./supplier	Commercial name of chemical	Category	Chemical Function	Average consumption
A	B	C	D	E	F

serial for th
name of manufac
Comm
Dye, Auxiliar Maintenar and E
f
average consumption of the chemical based on last 3 months

Chemical Log

Chemical Compliance Log

Part-II

RSL Data

Sr. No.	Supplier compliance to RSL (Yes/No)	Name of RSL (If No)	CAS No.
A	G	H	I

refer the supplier declaration for Brand RSL from chemical supplier

name of the restricted sub… as per supp… declaratio…

CAS number of the restricted substance as per supplier declaration

Chemical Log

Chemical Compliance Log

Part-III

MSDS Data

Sr. No.	MSDS Available (Yes/No)	Signal Word	Hazard Identification (Risk-phrase or Hazard-statements)			Action Plan	
	J	K	L	M	N	O	
			Physical	Health	Environmental	Details	Target date of completion

check section or H-stat OR H-200

R20 to ser

R50 to R59 Or H-400 series denotes environmental haza

details of actions with target date for completion

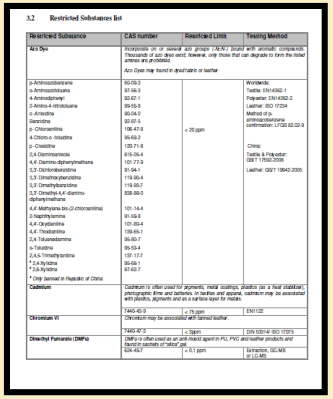
Proper Documentation

MSDS


MATERIAL SAFETY DATA SHEET

DEODORANT BAR

Brand RSL Manual


3.2 Restricted Substances list

Restricted Substance	CAS number	Restricted Limit	Testing Method
Azo Dye	Azo dyestuffs are all dyestuffs containing one or several azo groups (-N=N-) linked with aromatic compounds. Thousands of azo dyes exist; however, only those that can degrade to form the listed amines are prohibited. *Azo Dyes may found in dyed fabric or leather*		
p-Aminoazobenzene	60-09-3		Worldwide:
4-Aminobiphenyl	92-67-1		Textile: EN14362-1
2-Amino-4-nitrotoluene	99-55-8		Polyester: EN14362-2
o-Anisidine	90-04-0		Leather: ISO 17234
Benzidine	92-87-5		Method of p-aminoazobenzene confirmation: LC/MS/MS
p-Chloroaniline	106-47-8	< 20 ppm	
4-Chloro-o-toluidine	95-69-2		
p-Cresidine	120-71-8		China:
2,4-Diaminoanisole	615-05-4		Textile & Polyester: GB/T 17592-2006
4,4'-Diamino-diphenylmethane	101-77-9		
3,3'-Dichlorobenzidine	91-94-1		Leather: GB/T 19942-2005
3,3'-Dimethoxybenzidine	119-90-4		
3,3'-Dimethylbenzidine	119-93-7		
3,3'-Dimethyl-4,4'-diamino-diphenylmethane	838-88-0		
4,4'-Methylene-bis-(2-chloroaniline)	101-14-4		
2-Naphthylamine	91-59-8		
4,4'-Oxydianiline	101-80-4		
4,4'-Thiodianiline	139-65-1		
o-Toluidine	95-53-4		
2,4,5-Trimethylaniline	137-17-7		
* 2-A Nitrotoluene	99-55-1		
* 2-G Xylidine	87-62-7		
* Only banned in Republic of China			
Cadmium	Cadmium is often used for pigments, metal coatings, plastics (as a heat stabilizer), photographic films and batteries. In textiles and apparel, cadmium may be associated with plastics, pigments and as a surface layer for metals.		
	7440-43-9	< 75 ppm	EN1122
Chromium VI	Chromium may be associated with tanned leather.		
	7440-47-3	< 3ppm	DIN 53314/ ISO 17075
Dimethyl Fumarate (DMFu)	DMFu is often used as an anti-mould agent in PU, PVC and leather products and found in sachets of "silica" gel.		
	624-49-7	< 0.1 ppm	Extraction, GC-MS or LC-MS

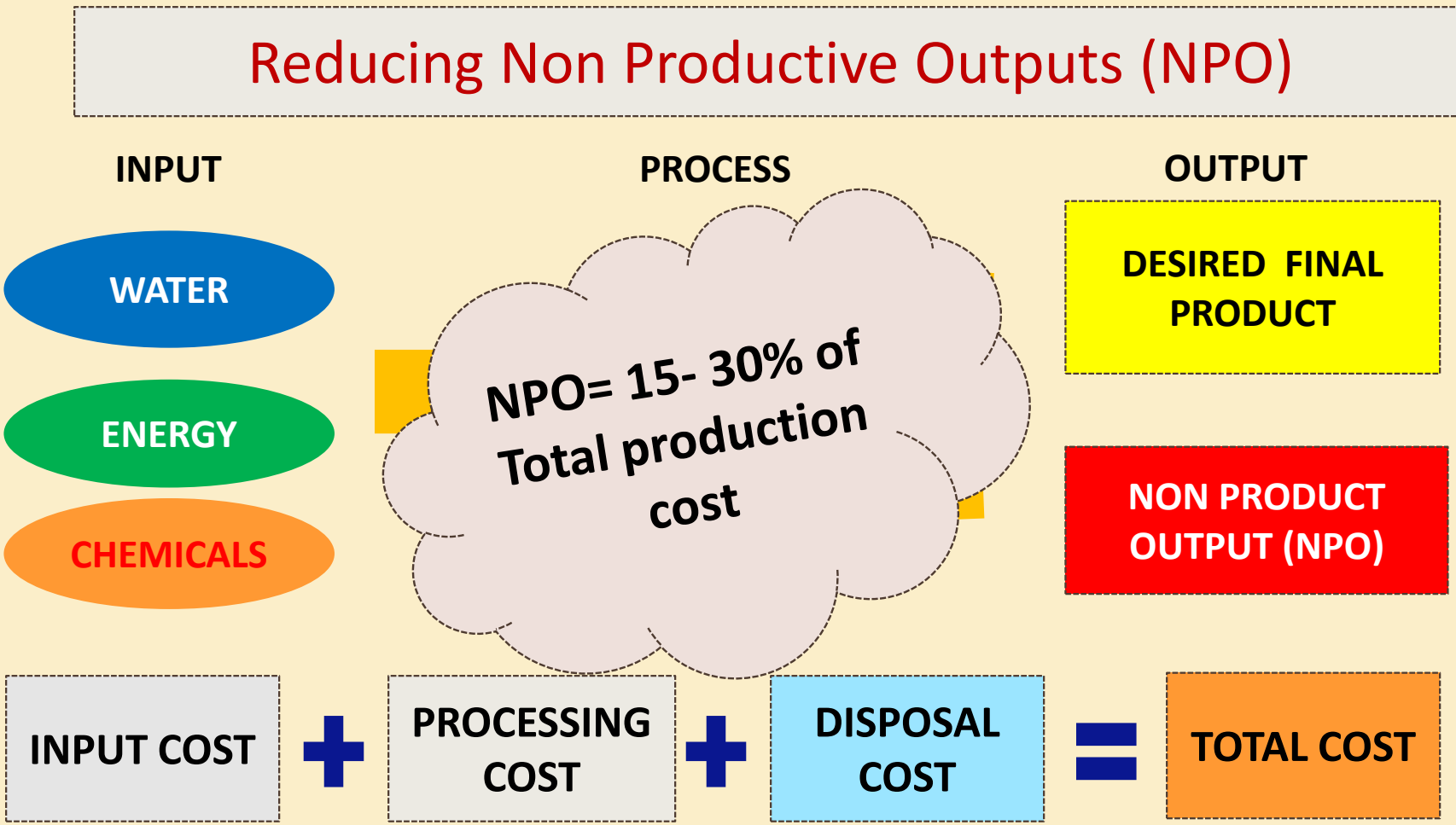
Guides to proper use of chemical in the process

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)

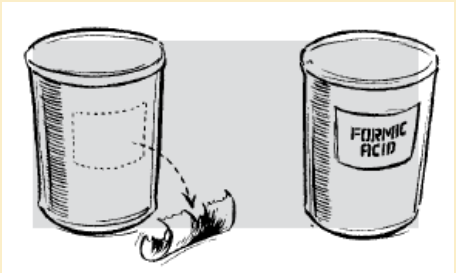


Storage and handling of chemicals

Storage of chemicals

Use of MSDS for storage

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



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

Signal Word	**Danger/ Warning/ Non-hazardous**

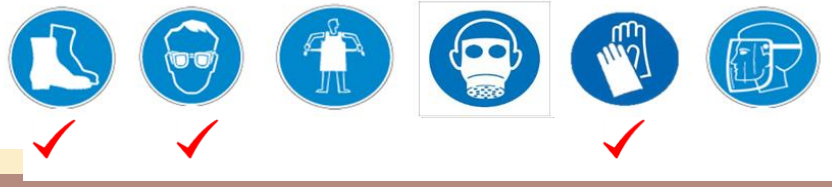
Description of the 'Danger' or 'Warning'

P-Physical, H-Health

Example of Pictogram :Flammable

Immediate First Aid Measures:

PPE to be used:



Internal Labeling System for Chemical storage

Name of the chemical: Hydrogen Peroxide

Signal Word: Danger

(Harmful if swallowed, Causes serious eye damage)

Hazard Type

P ✓

H ✓

Flammable Oxi

P-Physical, H-Health

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 | Protect Gogg | Aprc | Ear Pl | Hand Glove | Face mask

✓ ✓ ✓

Proper Waste Management

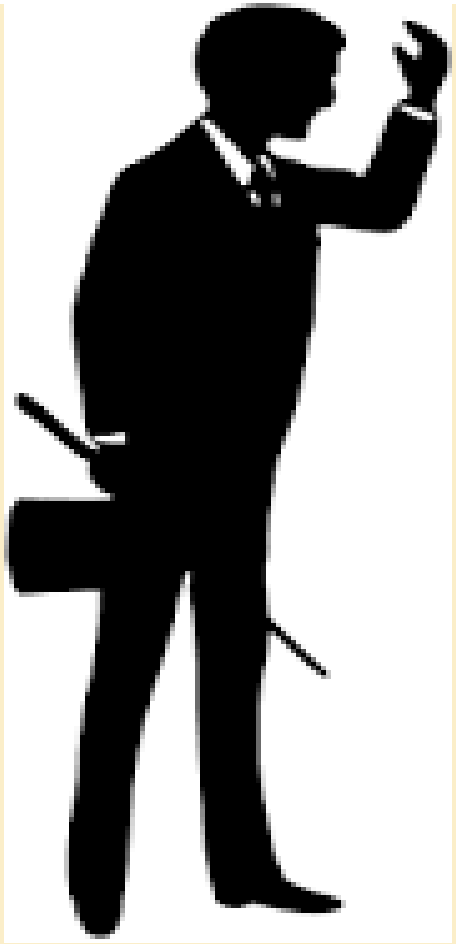
Waste water Management

- 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)

Contents



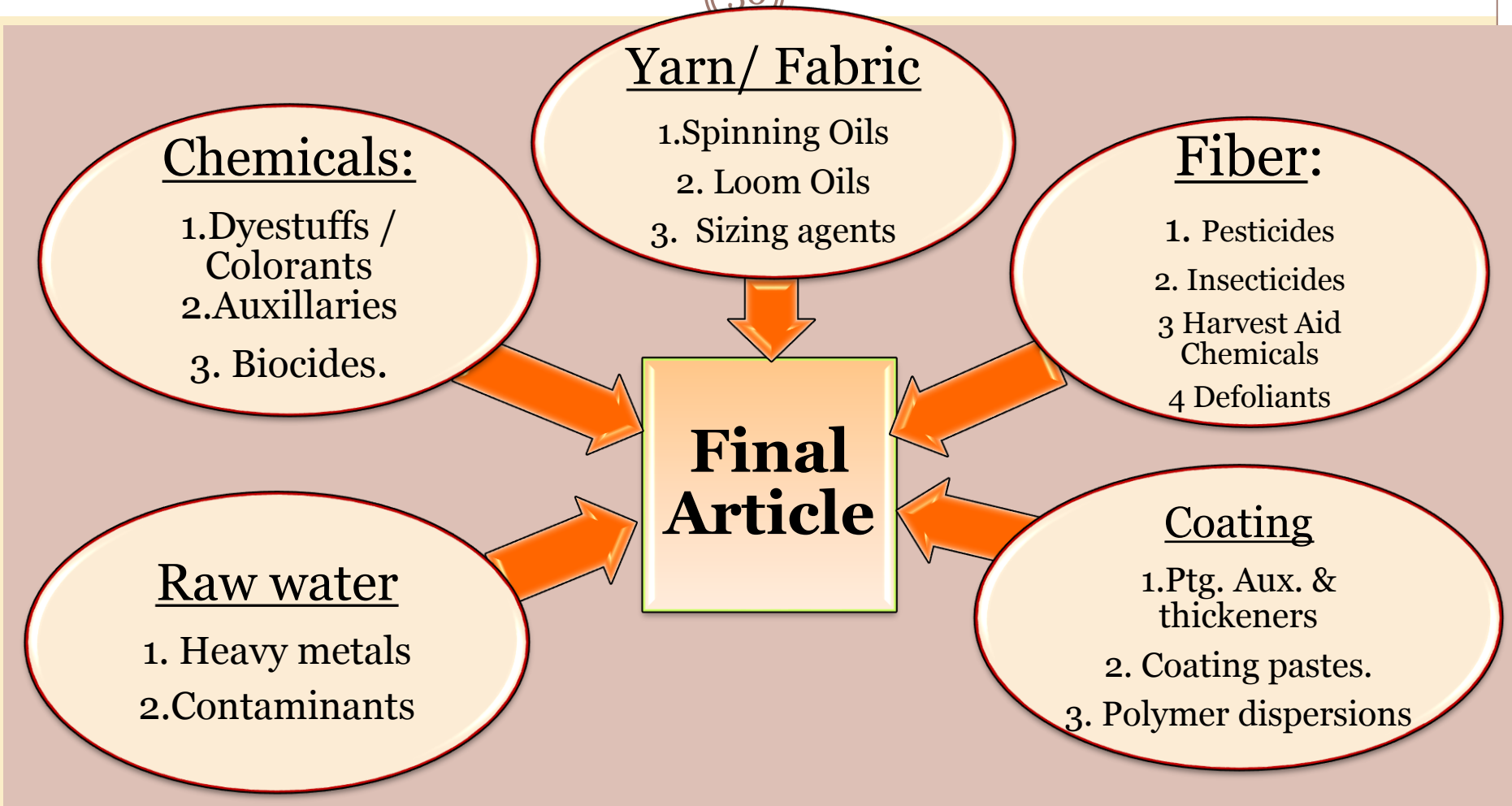
5

Benefits of CMS

Benefits of CMS

At No Extra Cost

Benefits of Chemical Management



Life Cycle of a Textile Product

Fibre

Spinning
Weaving
Knitting

Pretreatment

Coloration

Finishing

Effluent & Waste

Product Manufacture & Accessories

Residues in product

Packaging

Transport and Storage

Consumer Use

Disposal

Training

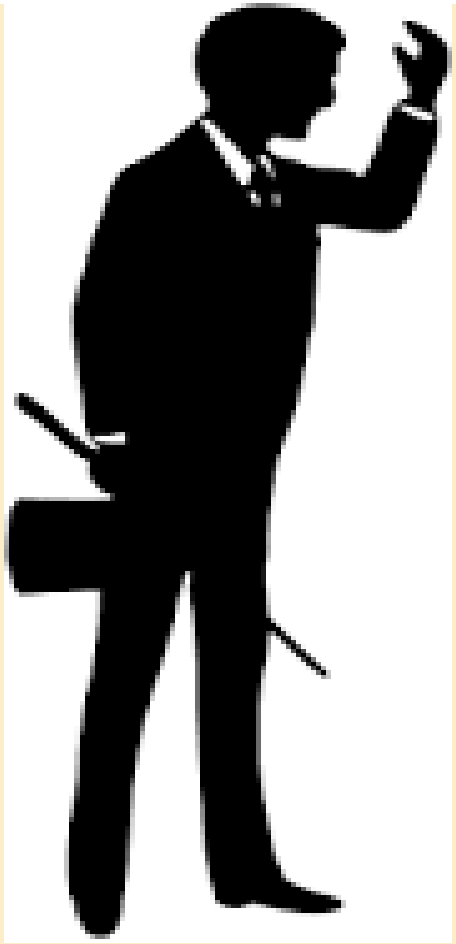
Training for Technical team

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

Training for workers

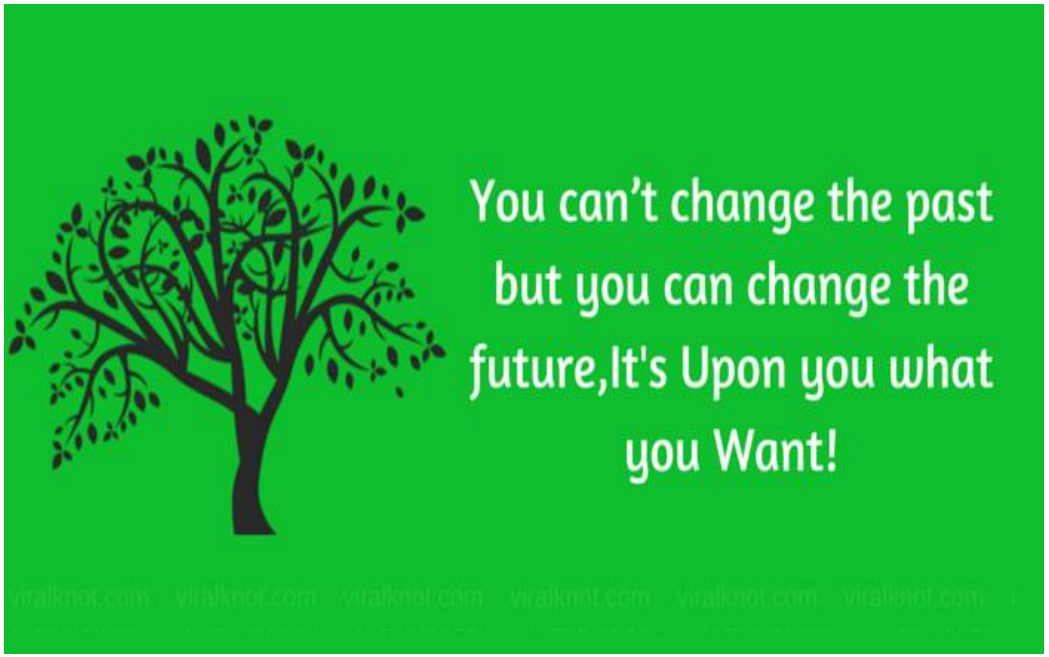
- First aid measures
- Accident release measures
- Emergency control measures
- Safe handling & storage
- Use of PPE

Contents



Sustainability

Thank you



Design Sustainability

For Future Growth