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Occupational Health Hazards due to Chemicals in Textile Industry

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Abstract

The textile industry, the workers were committed into the hazardous area to carry out the working process. The major health and safety issues are exposed to cotton dust, exposure to hazardous chemicals, exposure to noise and ergonomics issues. The garments requires a number of processes such as spinning, colorization, weaving, stitching and finishing. In the form of physical hazards, fire hazards and ergonomical hazards. The textile industry deals with "Non-traditional dusts" which mainly initiate fibers into fragmentation and abrasion. This lack of knowledge about the explosion properties of textile industry.

Keywords: *Physical hazards, Garments, Fragmentation, Abrasion, Exposure.*

INTRODUCTION

About 125 million people are affected from health hazards around the world and more than 107000 people die of asbestosis– related diseases including lung cancer, mesothelioma or asbestosis, due to occupation exposure to asbestos [1]. The major factors of toxicity of fibers are in the fiber sizes, fiber durability, and fiber types[2]. Alternate materials have been studied and developed over a period of time because of the health hazards[3]. Textile processes are commonly proceeded to improve the characteristics such as wrinkle confrontation, shape withholding, using chemical that contain formaldehyde, for example urea-formaldehyde resin. formaldehyde may cause various allergic reaction, and in 2004 it was classified as group-1 chemical ("carcinogenic to humans") by the international agency for research on cancer(IARC).[4].Therefore each country set a limit for formaldehyde content for textile products for infants aged up to 245 months must be less than $\mu g\ g-1$. Acute toxicity test showed that most textile dyes are not particularly toxic. Nevertheless, their persistence and resulting long exposure time is of particular concern for the discharge of waste dye effluent, since these substances may exhibit chronic effects such as mutagenic damage and carcinogenicity towards biota[5]. This study aims at the investigation of the mutagen city of AAs representing cleavage products of azo dyes used in clothing textile.

Material and methods

This study refers to an inventory of textile dyes using available data sources from dye producers, industrial associates, textile labels, seals of quality, official authorities, and scientific institution. By using these techniques such as Determining quantity of formaldehyde in textile, Acetyl acetone and buffer reagents, Formaldehyde standard solution and concentrated estimation and textile products.

Different stages of wet processing
1. Singering
2. Bleaching and mercerization
3. Dyeing
4. Printing and coating
5. Finishing

SINGERING

Table: 1. *Singering*

CHEMICAL TYPES	HAZARDS
Gas fumes Short fibres	Respiration

BLEACHING AND MERCERIZATION

Table: 2. *Bleaching and Mercerization*

CHEMICAL TYPES	HAZARDS
Hydrogen peroxide Hypochlorite Caustic soda ammonia acids solvents	Eye irritation Skinburns Respiratory problem Flammability

DYEING

Table: 3. *Dyeing*

CHEMICAL TYPES	HAZARDS
Dyes Acids &alkalis Hydro sulphite detergents	Dusting (causing asthma) Carcinogenic amines Allergenic dyes combustion Corrosion Endocrine disruption

PRINTING AND COATING

Table: 4. *Printing and Coating*

CHEMICALTYPES		HAZARDS
Pigments	Fixers	
Dyes Un reacted monomers Plasticize inks Thickeners	Epoxy adhesives Mineral turpentine oil Kerosene Solvents from screen	Flammability Carcinogenic amines VOC's biocides

FINISHING

Table: 5. *Finishing*

CHEMICALTYPES	HAZARDS
Resins Softeners Solvent Potassium permanganate	Respiratory problem Pulmonary edema Long term health problem

For chemical problem three terms is first

- Hazard
- Risk
- Exposure

Chemical hazards are four types:

- Physical hazard
- Occupational hazard
- Health hazard
- Environment hazard

Textile chemical with physical hazard

- Sodium hydroxide
- Kerosene
- Solvents
- Gas cylinders

Textile chemicals with occupational hazards

- Sulphuric acids
- Binders
- Formaldehyde-based resins

- Potassium permanganate sprays
- Ammonia
- Epoxy adhesives
- Mineral turpentine oil
- Varnishes

Textile chemicals with health hazards

- Carcinogenic (can cause cancer)
- Dyes that release carcinogenic amines
- Allergenic dispersion dyes
- Carcinogenic dyes and pigments
- Colorants that contains dioxide
- Carbon black pigments

GHS-globally harmonized system used for classification, labeling, packaging of chemicals

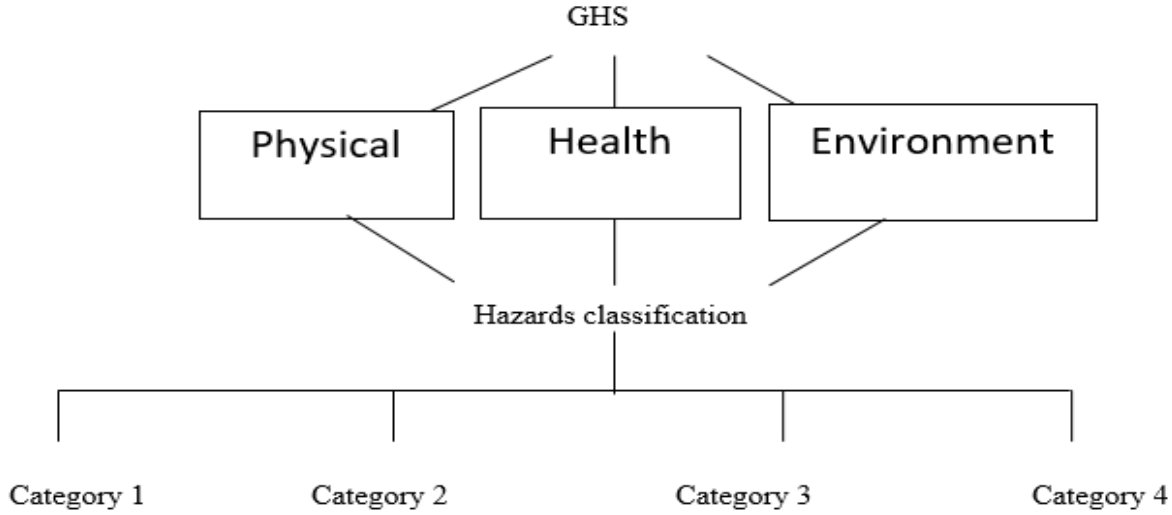

Fig: 1. *GHS Classification*

DIFFERENT ROUTES OF EXPOSURE TO CHEMICAL AT THE WORK

Table: 6. *Different Routes of Exposure to Chemical at the Work*

Sl.no	PPE	Exposure
1.	Eye protection	Eye injury from splashing of liquid chemicals such as solvents ,adhesives
2.	Impression gloves	Skin exposure, concentrate acids
3.	Face/nose masks	Air Bourne dust
4.	Liquid resistance foot wear	Liquid chemicals
5.	Body apron	Spillage of chemicals

Developing a chemical safety program

- Mapping of chemicals for hazards
- Planning action on hazards
- Communication of hazards(labeling, training, safety sign boards)
- Establishing standard operating procedure

Training

- Pre-purchasing requirements
- Laws on chemicals use ,storage and disposals
- Classification of chemical for hazards
- Chemical risk assessment
- Labeling of hazards
- Storage precaution
- Handling ,storage and disposal of hazardous chemical waste
- Use of personal protective equipment
- Emergency procedures

CONCLUSION

In this study, we segregated number of chemical types and exposure according to the nature of work related in the textile industry. To minimum the effect of these floating fibers or impurities, The humidified air which is circulated in the

spinning &weaving department is filtered so as to separate these floating impurities from the air, The workroom should not be more than 0.2mg/$m^3$and controlled by some specific test. The cotton dust should be dumped with proper care and avoid storing in open container. And avoid using the hazardous chemical without wearing personal protective equipment.

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