

Health Hazards of the Textile Finishing Industry

Ashokkumar TC¹, Dr Subrata Das²

¹PG Student (M.E. Industrial Safety Engineering), Dept. of Mechanical Engineering, Bannari Amman Institute of Technology, TamilNadu, India

²Professor, Dept. of Fashion Technology, Bannari Amman Institute of Technology, TamilNadu, India

Abstract- Textile processing devices includes the range of subunits engaged in exceptional procedures like pre-treatment dyeing, printing, finishing and number of other tactics which are required to convert grey material into finished material. Finishing refers back to the treatment of fabric substrates to impart applicable residences (apart from colouration), which include wash-and-wear end, anti-reduce finish, water-repelling end and flame retarding finish.

Index terms- Health hazard, chemical hazard, PPE, Ergonomically health hazard.

1. INTRODUCTION

Textile chemical processing is an important step in textile manufacturing. The uncoloured raw material contains a lot of impurities. The fundamental purpose of chemical processing is to remove the impurities and prepare the material for further processing. The colouration process impact colour by dyeing and printing operations. Here also, several chemicals are used in the finishing process, the finished good is improved by the chemical process so that they get the properties fulfill the end-user demands. typically, the-treatment the process starts from the grey testing process and moves through several intermediate methods. the final step is bleaching or optical whitening.

2. HEALTH HAZARDS

A chemical that's capable of inflicting associate degree acute reaction. A chronic result or each. Health hazards will have an effect on the entire body or a specific organ. Textile process units consist of a range of subunits engaged in numerous processes like pre-treatment colouring, printing, finishing and range of alternative processes that are needed to convert grey cloth into finished cloth. The staff within the

business faces numerous health hazards thanks to harmful chemicals and abysmal operating conditions. finishing refers to the remedy of textile substrates to impart fascinating properties (aside from colouration), like wash-and put on give up, anti-shrink quit, water-repelling cease and flame retarding

3. CHEMICAL HEALTH HAZARDS

The finishing process main hazard is constituted due to moist processing and this chemical process varies very based stop product. The most commonly used oxidizing agent in finishing process are bleaching agents such as H₂O₂, NaClO and sodium dichlorocyanurate.

The decomposition of hydrogen peroxide must be controlled manner.violent reaction occur when the decomposition is of uncontrolled condition.this leads to fast evolution oxygen.the volume of oxygen when its exceed than that of the relief device can withhold causing the vessel to fail

Blending oxidizing retailers with incompatible substances including reducing retailers will generate quite a few heat and poisonous gases, or result in explosion. Sodium hydrosulphite are utilized in reducing bleach bathtub, in stripping and in making use of vat dyes. different lowering retailers are thiourea dioxide, sodium formaldehyde sulphonylate, sodium bisulphite and sodium metabisulphite.Sodium bisulphite when infected with acid, gives upward push to unsafe fumes of sulphur dioxide.

Sodium hydrosulphite, while contaminated with water, generates a huge quantity of heat and might even ignite spontaneously.

The usage of pressure tool for excessive temperature operation may be positioned in

(a) Scalding is one of the hazard associated with the vat dyes .This occurs due to the unwanted flow hot liquid through kier from one inlet to undesired outlet where the person is expected to be working.Scalding is nothing but severe burn injuries.

(b) health risk from flammable dealers: fireplace and explosion hazards may stand up from using flammable materials, or oxidizing agents that can intensify a hearth thru offering more oxygen. Flammable substances (e.g. petroleum spirit) are frequently used for training of emulsion thickening in pigment printing.

This incurs considerable fireplace risks to the workplace, specifically whilst the posted articles are in the long run baked at immoderate temperature. a few aqueous natural acids, inclusive of acetic acid, are flammable at excessive concentrations.

The solvent base of resin coatings or adhesives, that is supposed to be results easily vaporized at a few level within the drying way, is usually flammable, e.g. white spirit.

(c) extraordinary dust: high-quality dirt or free fibres are generated due to the flocking process which allows the small fibers to accumulate the surrounding and affecting the machineries leading to severe problems. they may be without problems ignited by means of electrical ignition sources inclusive of overloaded circuit, broken insulation and static discharge of electrical system. nice dusts constituted of processed and dealt with nylon fibres can also end up explosive.

In fabric completing process alkalis and acid such as caustic soda and sulphuric acid are used .They are very much concentrated thus leading to severe burns and react dangerously with other flammable chemicals.

The dyeing and finishing process involves certain chemicals such as reactive dyes which causes respiratory sensitization and skin sensitization.

These embrace formaldehyde-based amber, watery acetic acid, liquid ammonia, aqueous ammonia, some shrink-resist chemicals and optical whiteners, soda ash, a variety of bleaches and acrylate (for preparation of screens).

Health Hazards Associated With Chemicals Used In Textile Industries

Process	Chemicals used	Health hazards
Singeing	Small amounts of exhaust gases, negligible impact	
Desizing	- Enzymes or H2SO4 for starch, detergents and alkali for PVA and CMC	Bloating and Diarrhoea. Irritant to eyes and skin
Scouring	NaOH,Na2CO3, surfactants, chlorinated solvents	Non-ionic detergents may cause bloating and Diarrhoea, Irritant to eyes and skin.
Bleaching	- Hypochlorite - Hydrogen peroxide - Acetic acid	- Chlorine gas released, causing severe irritation of respiratory tract and eyes tract and eyes - Toxic gases
Mercerization	NaOH, surfactants, acid, liquid ammonium	

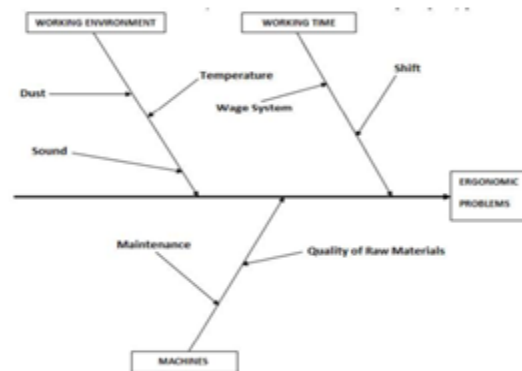
Process	Chemicals used	Health hazards
Chemical finishing:	- CH2O - Phosphorus	Intense irritation of eyes and nose and headaches.
- Anti-crease	- Softeners - Fluorinated chemicals	Causing vomiting, and coughing.
- Flame proofing	- Catalyst - Formaldehyde	High concentration can cause respiratory arrest.
- Softening	- Ammonia	
Water-proofing	- Paraffin - Aluminum salts - Zircon salts - Silicone - fluorocarbon resins	- Toluene may be used in solvent coating operations can cause, headaches, confusion weakness, and memory loss, and affects function of kidney and liver , formation of ozone which causes asthma

4 ERGONOMICALLY HEALTH HAZARDS

Temperature: temperature should controlled and maintain. if unable to controlled its affect of worker

Shift: If the facilities aren't given correctly and the running time is simply too long mental pressure could be extra for the worker and this adversely affect the paintings and this result in negative satisfactory merchandise.

The layout of the work stations have to be well deliberate. among the muscular-skeletal issues confronted by way of those employees are because of uncomfortable posture and work preparations. The paintings stations must healthy the workers and make the activity comfortable.



Remedial Measure

Contrary materials like soda ash and acetic acid should not be stored close to each other. Chemicals were mixed and poured in one area. Most of the chemicals were used in plastic buckets. It was very difficult to identify the contents of the buckets. In order to stay away from risks to workers all the containers whether small or large should be labeled preferably in hindi or english with risk signs and urgent situation actions prominently displayed. Protective notices in simple words on the health hazards drawn in in a variety of operations should be displayed in the workplaces.

Wheeled trolleys be supposed to be used for carry and large dye drums must be mounted on rollers. In storing chemicals, meticulous care should be taken to avoid misunderstanding where chemical names look very much alike, for example NaClO₃ and NaClO₂. Containers must be handled in proper conditions in order to prevent cross contamination of incompatible chemicals. Safeguard hails should be provided in spots where there is a risk of substantial contact with corrosives.

CONCLUSION

Safety and health hazards take part in an main role in any industry. It is necessary that the workers be aware of the various occupational hazards in the industry. Nevertheless, it is required that the organization should take necessary steps to save from harm their worker from implicit hazardous situations.

REFERENCES

- [1] Le Marechal, Alenka Majcen, Boštjan Križanec, Simona Vajnhandl, and Julija Volmajer Valh. "Textile finishing industry as an important source of organic pollutants." In Organic pollutants ten years after the Stockholm convention-environmental and analytical update. InTech, 2012.
- [2] Chavan, R. B. "Indian textile industry-environmental issues." (2001).
- [3] Wernli, Karen J., George Astrakianakis, Janice E. Camp, Roberta M. Ray, Chin-Kuo Chang, Gao Dao Li, David B. Thomas, Harvey Checkoway, and Noah S. Seixas. "Development of a job exposure matrix (JEM) for the textile industry in Shanghai

- [4] China." Journal of occupational and environmental hygiene 3, no. 10 (2006): 521-529.
- [5] Schrank, S.G., dos Santos, J.N.R., Souza, D.S. and Souza, E.E.S., 2007. Decolourisation effects of Vat Green 01 textile dye and textile wastewater using H₂O₂/UV process. Journal of Photochemistry and Photobiology A: Chemistry, 186(2-3), pp.125-129.
- [6] Kant, Rita. "Textile dyeing industry an environmental hazard." (2011).
- [7] Rajkumar, D., and Jong Guk Kim. "Oxidation of various reactive dyes with in situ electro-generated active chlorine for textile dyeing industry wastewater treatment." Journal of hazardous materials 136, no. 2 (2006): 203-212.