1.3.2 Mechanical hazards :

- Material handling: - Many accidents occur causing injuries to devices such as fork, cranes etc. Most of accidents occur due to the lifting materials wrongly.
- Machines :- Not Providing adequate safety guards and protecting shields on pulley gears, belts, motor, shafts couplings and chains in textile machines is potential hazard. which can be prevented by applying following regulations :
  - Powered mechanical equipments must be guarded.
  - Stopping and starting devices and other safety devices must be properly maintained.
  - Stopping and starting handles on machines must be designed in such a way that no risk of electricity and other damage takes place.

1.3.3 Chemicals hazards :

Fumes of various chemicals used in the bleaching, dyeing, printing and finishing. Processes may enter the human systems through respiratory Process and cause ill effects. Local effects of some chemicals on the skin and mucous membrane causes contact dermatitis, oil dermatitis etc. chemicals like cresols and cresolic acid also damage liver and kidney

Prevention:

- Effective ventilation system
- Substitution of hazardous substance
- Liquid dyes instead of powders
- Use of closeable containers for storage of acids and caustics
- Use of protective equipments like masks, gloves, goggles, etc.

1.3.4 Dust hazards :

Dust of Vegetable animal and mineral origin are very toxic or even carcinogenic. (Veg.-cotton fiber dust, Animal woolen dust, Min.-Asbestos).

In a textile industry, areas like mixing shed blow room, Carding, combing shed are full of dust, dirt, dry leaves particles etc. in the working environment. The cotton dust in there environments vary between 40-50 mg/m^3 of air. Workers exposed to this environment often get various respiratory aliments. They are mill fever,

Weather cough by assinosis etc.

Prevention

- Enclosing the machinery, installation of local exhaust
- Oiling of cotton
- Use of personal protective equipments
- Adopting work Practices Program

1.3.5 Occupational hazards :

The mechanization of the textile industry led to an increase in noise level within the working environment to levels those results in permanent hearing impairment among exposed workers.

Prevention :

- Machine modification

- Machine enclosure
- Proper Maintenance and lubrication
- Room acoustics
- Use of sound absorber Material at machine function
- Use of Hearing Protection equipments

1.3.6 Thermal & Environment

Humid and hot condition prevails in almost all the departments of the textile mill. In department like spinning, sizing a weaving the conditions is worse. This leads to excessive perspiration and loss of body fluid, there causing dehydration if adequate fluid intake is not ensure. Heat leads to psychological stress.

Prevention:

- Use local ventilation systems
- Use exhaust fan &
- Use the fine spray of water

1.3.7 Engineering hazards:

The textile machinery used in most of the Spinning mills is very old and in many mills they are driven by belts through line shafts located close to the roof. This type of power transmission exposes the workers to many potential hazards due to contact with moving belts, pulleys, shafts breakages of belts and other hazards. Since the workers are exposed to the machines of very old models on which the guards are not adequately provided.

Quite often, ignoring the necessary requirements of provision of space between the machines and the passages for the movements of the man and material has seen. The other factors like housekeeping and illumination also are often neglected thus resulting in many accidents.

1.4 Toxicity of dyes & finishing chemicals

1.4.1 Toxicity:

Toxicity is defined as the ability of a chemical to produce injury once it reaches a susceptible site in or on the body.

Textile industry uses a large amount of different chemicals, so the evaluation of the toxicity of these chemicals is very important art to protect the health of the workers.

Terms:

Certain terms used in the evaluation of toxicity are defined below:

Threshold limit value (TLV):

The TLV is the level of atmospheric concentration of potentially hazardous gases, vapors and dusts to which workers may be exposed during working hours throughout the year, without adverse effect on their health or efficiency. TLV is expressed in PPM or mg/m^3 (In case of gases)

LD test or dose level test:

It is the dose level that kills 50% of the experimental animals thus treated. It expressed in terms of weight of chemicals compound per unit weight of the total effluent produces by an industry in one year and expressed in mg/kg.

1.4.2 Toxicity of pretreatment chemicals:

Enzymatic desizing: - No health hazards have ever been reputed from the use of enzymatic desizing agents.

Singeing: During the singing of fabrics, dust and fly are produced that can cause some irritation. However by arranging a proper exhaust system, this hazard can be almost completely eliminated.

> **Scouring:** Sodium hydroxide used in Scouring and mercerisation is poisonous when ingested on breathed as fumes or dust. It is corrosive and causes burns. Ammonia is also corrosive and caused burns to eyes and skin. It's TLV Is 50 PPM and 35 mg. /M3. Anhydrous ammonia constitutes a fiber hazard and is explosive.

> **Bleaching Agents:** All the bleaching agents, namely H_2O_2, sodium hypo chloride and sodium chlorite are corrosive. H_2O_2 (35% w/w) causes blistering of the skin and irritation to the mucous membrane. It also constitutes a fire and explosion, hazard. Sodium chlorite solutions are corrosive and chlorine dioxide evolved during its decomposition which is a highly toxic gas. By comparison sodium hypochlorite solutions are less toxic. A sodium hypochlorite solution is often used by dye house workers for cleaning their hands. This can damage the skin .It is essential, to use sodium hypochlorite for removing dye from hands, it is advisable to use only dilute solutions and the treatment time has to be very short say 15-20 seconds. The hands must be immediately rinsed with plenty of cold water followed by a dilute solution of sodium bisulphite, and finally a soap solution and cold water. Organic solvents like trichloro ethylene and perchloroethylene act as an anesthetic and if breathed in high concentrations can cause death. The TLV of perchloroethylene and trichloroethylene are 100 ppm, 41 ml/100m³, and 100 ppm, 37 ml/100m³ respectively.

1.4.3 Toxicity of dyes:

The problem of toxicity of dyes attracted considerable attention offer the discovery of the carcinogenicity of naphthylamine and benzidine which were used as intermediates in the manufacture of dyes. The use of these chemicals is now banned in most countries. As for as dyes are concerned the toxicity hazards are negligible since the carcinogens are destroyed in the manufacture of final dye or pigment and the finished compound used in dyeing and printing are inactive. The majority of dyes on the market have been tested for toxicity to fish and have been found to be only slightly poisonous, the LC (48 h trout) is mostly above 100 ppm, and in some cases, even above 1000 ppm. Values below 1ppm are very rare. Little and lamb (scientists) have observed that only two dyes viz. methyl violet and malachite green have LC values of 0.05 PPM and 0.12 PPM respectively. There two basic dyes constitute the bulk of dyes toxic to fish.

1.4 Toxicity of finishing chemicals

Solutions and vapors of formaldehyde represent both an acute and a chronic irritant. Frequent or prolonged exposure can cause hypersensitivity. It, Swallowed, It causes violent vomiting and diarrhea and can lead to collapse. Formaldehyde produces a chronic inflammatory reaction to the respiratory treat. It causes a hardening or tannin effect on skin. If formaldehyde vapors are inhaled for a long time they cause bronchitis or bronchial pneumonia. Studies on inhalation of formaldehyde by animals have produced evidence of lung cancer.

Exposure to formaldehyde is suspected to be responsible for a number of abortions during the early stages of pregnancy. Free formaldehyde is always present in small quantities in the commercial urea formaldehyde resins. Free formaldehyde also evolves during the finishing process. Dimethylol dihydroxy ethylene urea (DMDHEU) gives the lowest level of free formaldehyde during finishing. While urea formaldehyde, melamine-formaldehyde and carbamate gives highest levels of evolved formaldehyde . The TLV limit for formaldehyde is 2PPM and is likely to be lowered to 1 ppm.

The resin finishing of textiles using magnesium chloride (as a catalyst) was considered to be a safe process. However, the reaction of Hydrochloric acid and formaldehyde in air produces bis-chloromethyl ether (BCME) at a very rapid rate. At room temp and 40% relative humidity, equilibrium is reached in less than a minute to yield parts per billion (IPPb) of BCME from ppm of reactants. BCME is known to be a highly totent inducer of tumors in the respiratory tract in mice and rats. BCME has been assigned TLV of 0.001 PPM LIPPb1. There is a controversy regarding the formation of BCME is not formed during resin-finishing. It has also observed that in the presence of cellulose substrate BCME is not formed. It is also advises caution in certain cross linking systems where in the presence of hydrogen chloride, acetic acid and or dioxane a measurable amount of BCME is formed. However, carried out experiments in the absence of cellulose substrate. Thus, no definite conclusion has yet been drawn regarding the formation of BCME, during the resin finishing of textiles using magnesium chloride as a catalyst. Tris (2, 3 dibromopropyl) phosphate (tries) was extensively used as a flame retardant, for PET, cellulose acetate and triacetate fibres. Initially, tris was shown to be a non hazardous chemical. However, tris was found to produces cancer in laboratory animals and it is probably.
Carcinogenic to human beings. There is no evidence; however, from any source to establish that tris has in fact, caused cancer in human beings.

1.5 Carcinogen

Any substance that produces cancerous growth in living tissues. Asbestos particles Nickel carbonyl, trichloroethylene, Benzedrine, vinyl chloride monomer, benzopyrene aflatoxin etc. are known to induce cancer in man or animals either by operational exposure in the industry or by injection in feedstuffs.