

Occupational Health Hazards and Hygiene in Pulp and Paper Industries

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The Pulp and Paper industries in India are mainly based on the raw-materials like Bamboo, Reeds, Wood, Bagasse, Paddy Straw and waste paper cuttings.

In the process, they are using chemicals like chlorine, Sodium hydroxide, calcium oxide, coal, hydrochloric acid etc.

The pulp and paper industry is posing health hazards mainly in handling with chlorine, bagasse and to a lesser extent in mechanical injuries due to handling of coal. Noise pollution is another menace to a lesser extent in several sections in the mill.

Proper health care and preventive measures can safeguard the health of workers effectively and completely.

PHEUMOCONIOSIS

Pneumoconiosis is an occupational lung disease. It is due to deposition of organic and inorganic dust and also diffuse inflammatory process involving the gas exchanging tissue of the lung with cellular thickening of the alveolar walls with tendency of fibrosis in the lung.

COAL DUST

It produces the pneumoconiosis due to inhalation of fine coal dust. The lung tissue gets irritation and produces bronchitis and fibrosis. This stage is predisposing factor for tuberculosis as the defensive mechanism is reduced in the lungs.

Intrinsic alveolar irritation leads to allergic reactions and Asthama like symptoms and bronchitis and bronchiectasis which leads to serious lung tissue damage and emphysema.

It is preventable by using dust mask and allergic reactions and bronchitis are treatable. Periodical medical examination is very important.

Coal dust inhalation is more in coal mine. It is negligible in pulp and paper industries.

BAGASSOSIS

It is a problem to the upper and lower respiratory system. Inhalation of fine dust of bagasse which is organic matter causes bagassosis.

It is like a farmer's lung which is very common to the farmers due to inhalation of agricultural dust during harvest season. Bagassosis is inhalation of fine bagasse dust into the lungs. It produces 2 problems.

- (a) Allergic reaction to the respiratory tract.
- (b) Inflammatory reaction to the respiratory tract.

The allergic reactions are similar to the asthma. It produces irritation of nasal cavity, throat and sneezing and cough which will be dry and sometimes fever may come. It persists for some days and further inhalation leads to inflammation and bronchitis and also leads to Bronchiectasis and ultimately leads to fibrosis of lungs and emphysema, the patient develops breathlessness and cough with sputum and fever. It is treatable disease with proper antibiotic, antiallergic and cough mixtures. Patient will come to normal within a week.

Preventive measure:- The prevention of inhalation dust is important. It can be done by using dust mask in the bagasse yard by the workers.

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Medical care:- Periodical medical examination and proper treatment of allergic portion may prevent Bronchitis and other complications.

Effective remedial measure:- It has been proposed in India like Cuba and Canada using of bagasse in wet operation is essential in preventing the bagassosis. Continuous water can be sprayed over the bagasse yard/ stock. So that the bagasse cannot be allowed to dry. The bagasse will be handled in wet portion by continuous water spray. It will prevent the fire hazard to bagasse yard too. The pith which is a waste in pulp and paper industry is posing a health problem as it produces the bagassosis and also asthma like allergic reactions and also it produces fungal skin diseases. The fungus which grows over bagasse and pith can be controlled by spraying 2% propionic acid to destroy the fungus which will not alter the fiber portion of the bagasse. The pith can be used for fire bricklets for boiler/or it can also be used in melanine industry for making cup and plates.

NOISE

The problem of noise is a health hazard particularly in boiler and paper machine. The excessive noise will produce more than its permissible limit will produce high blood pressure and partial and permanent deafness.

Preventive measures:- In such cases they may be provided ear muffs and the deafness may be prevented by regular audiometric examination should be done to those employees. There will be occupational hearing loss or deafness if exposed noise more than 160 db continuously without earmuffs.

Protection of exposed persons:- Hearing protection is recommended for all workers who are continuously exposed to noise louder than 85 decible in the frequency bands above 150 cyde per second workers are required to wear ear muffs, ear plugs or both. Regular audiometry should be done for workers working in Boilers, paper machine and bamboo chipper and other areas where noise is more.

Pre-employment audiometry is the must to asses the deafness due to other diseases in workers.

Alkalies:- For all the alkalies like sodium hydroxide/ pottassium hydroxide, the corrosive burn over skin can be treated with Ammonium chloride lime wash with Ammonium tartarrate 1% solution and also with proper antibiotic and skin ointment accordingly

Acids:- For all inorganic acid burn is washed with water and with sodium bicarbonate (except eyes) and wound can be treated with antibiotic and dressings.

CHLORINE

The inhalation of the chlorine gas produce more health hazards. It is not only dangerous to the lungs but also to the skin which burns with contact of chlorine, It is better to know fully well about the effect of chlorine on mankind which is extensively used in industry as a bleaching agent.

Chemical Name	- Chlorine (Cl ₂)
Physical state	- Gas or liquid under pressure
Colour	- Greenish yellow-gas clearamber-liquid
Odour	- Pungent suffocating
Corrosivity	- Corrostone
Boiling point	- Minus 34 degree centigrade
Melting point	- Minus 101°C

OTHER CHARACTERS

Chlorine is very toxic gas highly oxidising agent reacts voilently with water and iron which increase temperature. It is extremely irritant to the mucous memberance of the eyes and respiratory tract, skin and is very toxic. Concentration of 50 ppm is dangerous even for a short period 1000 ppm is fatal.

Hazards:-1) Fire: It is moderate with reducing agent. It can give violent reactions.
2) Explosion: Reacts with reducing agent.

PRECAUTIONS: KEEP COOL DURING FIRE-AVOID REACTION WITH REDUCING AGENT.

3) Extinguishing: Shut all the supply and keep the surrounding cool by water spray. Keep the chlorine container cool.

Effects of Chlorine:

- (a) SKIN - Skin will get irritation and burn if more in contact.
- (b) EYES - Irritation, burning, redness, watering and it damages cornea and even loss of vision sometimes exposed to chlorine fumes for even brief period.
- (c) INHALATION - It produces choking of the throat, leads to difficulty for respiration and produces violent cough and vomiting as phytia and death.
- (d) SWALLOWING - It is dangerous if a person swallows. It produces complete burn of the mouth, tongue, throat and cesophages and stomach. It produce profuse vomiting blood and death.
- (e) PRECAUTION - One must wear PVC gloves, gum boots and wear head mask and handle the cylinder and persons exposed by chlorine and self contained breathing apparatus.

FIRST AID (DURING Cl_2 LEAKAGE FROM CYLINDER)

1. The effected person should be removed to an area free from chlorine to an open space where fresh air is available.
2. The person should be made to sit in reclining position like on easy chair.
3. The cloths contaminated should be immediately removed otherwise skin burn will continue.
4. Keep the body warm by blanket or hot water bottle/bag.
5. Persons should be advised to breath shortly with small break to avoid imitation of throat and vomiting.
6. He should be given some cough mixture to avoid cough.
7. Artificial respiration may be given if respiration is stopping and oxygen inhalation should be arranged.
8. Eye should be cleaned with water for 15

minutes using sufficient water. Eye drops may be put and persons should be referred to ophtholmologist (Eye specialist). If burning of eye ball, eye lids and skin ointment should be applied.

ADDITIONAL INFORMATION ABOUT CHLORINE

1. In case of lage gas escape the presence the presence of cloud can be marked with ammonia (NH_3) with which it forms a mist.
2. Avoid liquid chlorine from leaking and body contact.
3. Turn away from gas clouds in a direction perpendicular to the wind direction.
4. Persons with pulmonary diseases should not be allowed to work in the chlorine plant such as Asthama, Bronchitis, Tuberculosis cases.
5. Always keep one oxygen breathing apparatus near chlorine plant with mask and gum boots.
6. Leaking of chlorine should be checked for valve and fusible plugs of cylinder.
7. Take the laking container in an open spare in isolated area and cylinder should be placed in such a manner leaking point should be on the top in such case only gas and not liquid Cl_2 escape.
8. In no circumstances water should be directed towards leaking container. Water makes the lack worst due to the corrossive effect and water will provide heat. Thus increasing the pressure in the container and forcing Cl_2 to escape faster. But water may be used in the cylinder that is not leaking to keep it cool.
9. Any leakage of cylinder must be attended immediately
 - i. Inform the emergency squad or manufacturers.
 - ii. Inform fire fighting station.
 - iii. All the persons should be evacuated and neighbouring people should be warned.
 - iv. Approach from the wind ward side so that escape gas is carried down wind to a lower level.

- v. No water should be poured over leaking cylinders.
- vi. Leaking valve, hole point should be closed using with breating apparatus.

The hazards of sodium hydrochloric acid and calcium oxide are minimum and it will produce only skin burn on contact. That can be treated without problem.

BLOW HEAT RECOVERY SYSTEM

TAILORMADE UNITS TO SUIT

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|------------------------------|--------------------------|
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-: For on the spot study, write to:-

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