ABSTRACT

Cotton dust in the workplace is major problem in cotton textile industries. These problem is more severe in spinning section. Dust consist of small and microscopic particles of various substances which are present as suspended particle in air. These particles harmful to human health. Because of this various diseases occurred like shortness of breath, cough and lungs cancer. Various aspects of health hazard in textile industries have been discovered and measure hazards in lungs cancer to reduce this health hazards in lungs cancer out dust collector is helpful.

The major health problems associated with cotton dust are health of worker in textile industry. The aims of the works are remove of dust particles occupational health hazards among the workers in Assiut spinning factory and to assess the different protective measures used during working day to prevent the different hazards.

Textiles dust enters the body by inhalation, and fine dust containing fibers may be deposited in the alveoli. The fibers are insoluble. The deposited in the lungs causes fibrosis, pleural plaques, and bronchitis and lung cancer. Textile dust results in impaired lung function after long period of exposure. The symptoms shortness of breath , chest pain, and later bronchitis with increased sputum. There is a need for textile mills to reduce the dust levels in the scouring, spinning and weaving sections.

Hence the dust cleaner equipment helps to reduce the dust to enter through breathing in lungs and create healthy environment.

INTRODUCTION

Cotton textile production normally takes place in several steps, beginning with ginning and ending with finishing. Each step has health and safety risks which are distinct and unique to that step. Depending by an industry, the Govt. of India has classified the industries into three categories, viz. red orange and green industries under red category are identified as the most heavily polluting followed by those in orange category and green category respectively. According to this classification, cotton spinning and weaving industries fall in the orange category which means these industries are prone to produce environmental pollution at an alarming level.

Although textile industry is an old and traditional one, not much attention was paid to the environmental hazards produced by this industry. However, with the increasing awareness towards environmental issues and labor welfare, and attention is being paid to this issue by employers. Machinery manufactures and technologist. Legal and statutory measures have also been enforced to control the hazards. As far as spinning mill is concerned, the hazards are confined mainly at the work place, i.e. inside the mill and not much outdoor pollution is generated by the spinning. The environmental and health hazards at the work place in a spinning mill can be classified in two main categories, namely environmental hazards and physical hazards.

Cotton dust and noise are the two main environmental hazards which cause health risk in a spinning mail. Out of these two, the cotton dust and fly, released in the spinning room environment, contribute maximum to the health hazards of the workers. The physical hazards are mainly the chances of accidents, involving physical damage to the workers, and process hazards such as fire. With proper precaution, process design training of labors and safety gadgets, the physical hazards can be minimized or almost elimininated however, the cotton dust is a continual and persistent problem.

Literature Review

**[1] Mahesh R Jadhav [ISSN 2278 – 0149 (**[**www.ijmerr.com**](http://www.ijmerr.com)**) Vol. 3, No. 4, October, 2014]:-** Cyclone is most commonly used device to separate dust particles from gas and dust flow. The project presents design development of cyclone based on CFD along with experimental trials .The present work is based on the performance of flour mill cyclone for different flow rates. In the present investigation the characteristics of flour mill cyclone are studied for various flow rates(inlet velocities) and its effect on performance parameters like pressure drop and efficiency are studied. Cyclone is designed with two symmetrical tangential inlets and a single tangential outlet at the barrel top area where impeller is mounted. The study was performed for gas-solid flow, based on an experimental study available in the literature, where a conventional cyclone model was used. Simulation of flow will be done with the help of CFD software and verification will be done with the help of experimental work. Results showed that these new designs can improve the cyclone performance parameters significantly and very interesting details werefound on cyclone fluid dynamics properties.

**[2] Qizhen Liu, Yanjing Sun, Lei Jia, Yihua Zhang, and Zhigang Shen [Journal of Clean Energy Technologies, Vol. 3, No. 2, March 2015]:-** Power plant A and Power plant B launched the rebuilt pilot project of bag house and power source of electrostatic precipitator in order to further increase the dust removal efficiency in coal-fired power plants and then improve air quality in Shanghai. Results showed that dust reduction rate rose to 69.5% and the concentration of particulate matter dropped to 9.2 mg/m3 after the rebuilt of bag house. On the other hand, dust reduction rate was 48.8% and the concentration of particulate matter was 17.9 mg/m3 after the rebuilt of electrostatic precipitator.

Problem Statement

Safety and health of workers is important for smooth and effective functioning of any organization .There are numerous risk factors at workplace that can affect workers health. comfort and performance in one or more ways .typical health effects of working environment are headache, fatigue, impaired vision, hearing loss, musculoskeletal problems are reduced work performance. in the textile industry, where the workers/operator performs task in a sitting/standing position, static and awkward postures, duration of work, furniture design and adequate rest pause are most often associated with the occurrence of serious MSDs. health effects may show up years after exposure or after repeated or long exposure.Due to increasing complexity of occupational health and safety problems, there is a need to musculoskeletal problems and occupational health hazards.

Form this projects we have observed that ,the workers are exceeding the working limit (8hr to 11hr) and though the working hour is more than the limit for each worker, the value of the pollutant is not accurately exceeding the permissible exposure limit but almost closer whose effects, in case of a continuous exposure might lead to severe negative impacts.

Objective and Scope

**The main scope of this project are as follows:-**

1. This project is helpful for textile industries to fulfill today’s strict govt. norms.
2. It is quite useful to reduce the health problems associated with breathing among workers.
3. Also ensure the healthy work environment.

**Objective of this project for following**:-

1. Cost reduction.
2. High efficiency of removing dust.
3. To have reasonable initial as well as low operating and maintenance cost.
4. Allow least possible dust to escape.

Methodology

**Following are list of the various components used in system:-**

1. Cyclone
2. Filter
3. Collecting drum
4. Air blower
5. Stand
6. ON/OFF switch
7. Collecting bag

**Function of these components:-**

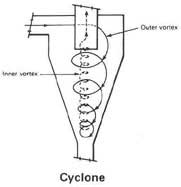
1. Cyclone:- Cyclone produces the separation of the powders due to inertial forces effect, moreover, it forces the airflow to de-dust at an helical motion, on itself, inside of a room in development tapered downward. The air moved by a fan enters down from above where it is forced to a circular motion between two concentric walls. It therefore creates into the cyclone a swirling air motion. The solid particles of dust are pushed by centrifugal action against the inner walls of the cylinder body. Gradually, and with continuity, they descend down with spiral motion to the neck of the cyclone to fall within the bin or are discharged through a rotary valve.

Fig 1.1 shows cyclone

1. Filter: - These filters offer very fine filtering ability using only the best non-woven polyester material available. They are certified to trap 99.9% of particles from 0.2 to 2.0 microns.

1. Collection drum:- The drum is nothing but the plastic bucket which has dimensions of 12 inch in diameter and 14 inch height.
2. Exhaust fan:- The exhaust fan is employed in this of 2350 rpm of 9’ of blade diameter and 7.75’ of its length .
3. ON/OFF switch:-To ON and OFF the our dust collector as per our requirement we need switch.
4. Stand :- The is employed to provide the stability to our dust collecting equipment.
5. Fan Casing:- The cylindrical casing is used in which the exhaust fan is situated to provide protection as well as guide the air to flow in particular direction.
6. PVC pipes:- The PVC pipes of the 4 inch as well as 4.5 inch are used for guiding the flow of the dirt air to cyclone body.

**Working of the cyclone dust collector:-**

The switch is on and the fan starts rotating at 2350 rpm which cause in the casing the suction pressure which tend to allow the dirt particle to enter in the casing and flow through pipe & enter into the cyclone body. 

Cyclone separators provide a method of removing particulate matter from air with dust particles through the fan . In general, a cyclone consists of an upper cylindrical part referred to as the barrel and a lower conical part referred to as cone .The air stream enters tangentially at the top of the barrel and travels downward into the cone forming an outer vortex. The increasing air velocity in the outer vortex results in a centrifugal force on the particles separating them from the air stream. When the air reaches the bottom of the cone, an inner vortex is created reversing direction and exiting out the top as clean air while the particulates fall into the dust collection chamber attached to the bottom of the cyclone.

The cleaned air is then eliminated through the outlet tube which also has filter attached to it.

Conclusion

By using the cyclone dust collector we can minimize the emission of dust fabric particles in textile industry which could cause breathing problem to the worker of the textile industry hence by collecting in dust drum as well as fresh air is passed though air filter. And also the market price of the cyclone dust collector is between 60,000 to 80,000 rupees so the our dust collector can manufactured under 10,000 to 12,000 rupees.

References

1. Hazard analysis by simple dust collecting system by osha.
2. Mahesh R Jadhav [ISSN 2278 – 0149 ([www.ijmerr.com](http://www.ijmerr.com)) Vol. 3, No. 4, October, 2014**]**.
3. Qizhen Liu, Yanjing Sun, Lei Jia, Yihua Zhang, and Zhigang Shen [Journal of Clean Energy Technologies, Vol. 3, No. 2, March 2015].