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AN REVIEW ON VENTING SYSTEM IN VARIOUS LUNG DISEASE CAUSING INDUSTRIES.

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Abstract:

The term 'occupational disease' covers any disease contracted as a result of an exposure to risk factors arising from work activity". These occupational diseases are exposed through inhalation, ingestion, injection through different parts of the body. The occupational diseases caused by inhalation of air in the working area is considered to be an major factor to cause occupational illness towards the workers. Approximately 12,000 people die each year due to occupational respiratory disease and about two-thirds of these due to asbestos-related diseases .The air in many workplaces contains hazardous substances in the form of dusts, fumes, mists, gases and vapours. These substances can be chemical or biological agents hazardous agents move through the lungs to other parts of the body, harming other organs .Many people have a genetic tendency towards allergic disease. After they have been exposed to chemical or biological agents, they're more likely to develop conditions such as rhinitis and asthma. The presence of these hazardous agents in the various working area can be reduced or eliminated by providing proper venting system. This paper provides an review about what type of venting system and technology can be used in different work place like textile industry, cement industry, paintshop and welding shop.

I.INTRODUCTION

The safety of workplace is an essential component of efficiency and productivity. In a working environment, one must be able to ensure that the worker have been provided with required safety equipment. Most often, the labor in developing countries faces the brunt of the safety problems. At times their safety is ignored and even when safety tools are given, they can often be obsolete. Amongst other fields, the industrial sector is often the one that requires the most attention in this area.

Hence these occupational diseases can be consider to be an major cause to make an major impact on the health of the worker. The worker in the working premises can be exposed to occupational disease through:

1.Inhalation
2,Ingestion
3.Absorption

From an journal published by KebedeSiyoumetc, all reported that came to know that there were 36 million person have been died due to non communicable diseases in 2010, among these 4.3 million of people were died due to respiratory diseases , mesothelioma including asthma and chronic obstructive pulmonary diseases. Those occupational respiratory diseases accounts upto 30% of all registered work related diseases with up to 50% prevalence among workers in high risk sectors. These can't be easily identified in blind eye. It also doesn't provide immediate symptom's for diseases. The dust available in the air is allowed inside the lungs , thus the deposition of these particles in the airways and lungs induce them to caused chronic lungs disorders.

These lung related diseases are occurred in occupational area majorly due to presence of tiny dust particles ,fumes and smoke produced at the time of processing in the working area.these

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particles not only cause diseases but also causes irritation in the air way, chest tightening and shortening of breathing.

Lung diseases are the pinnacle of occupational diseases. [2]Chronic exposure to irritants at work site can lead to pulmonary disease that may persist for prolonged period, even after the exposure ceases

. Occupational lung diseases are a broad group of pulmonary diseases developing either from repeated or persistent inhalation of particulate matters, which causes morbidity and even mortality of the workers. They also major health issue in the workers exposed to hazardous substances (chemical, physical, biological agents) in their workplaces; which lead to progressive deterioration of lung function causing severe respiratory problems such as asthma, chronic obstructive pulmonary disease.

[2]Types of occupational lung diseases:

- Respiratory cancer
- Chronic Obstructive Pulmonary Disease (COPD)
- Occupational asthma
- Pneumoconiosis.

II .LUNG DISEASES CAUSING INDUSTRIES

Lung diseases are most specifically affect the workers working in the industries where too much of dust particles ,smoke and fumes are allowed inside the working area. [3]Some of the industries that are considered to produce high respiratory diseases are:

I. Cement industry
II. Textile industry
III. Paint shop
IV. Asbestos industry

Author have done an extensive review about lung diseases prone industries and had give an suggestion to prevent the employee from the diseases

II. A)CEMENT INDUSTRY

[3]Cement is produced typically through a series of processes that includes quarrying, crushing, raw milling, blending, kiln burning to form clinker and homogenous blend of limestone and clay. Dust with aero diameter of less 100µm is inhalable. In cement factories, dust is produced during crushing and grinding of raw materials, blending and kiln burning to form clinker, cement milling and packaging [4]The main route of entry of cement dust particles in the body is the respiratory tract. Cement dust contains limestone, clay, calcium, silica- quartz, aluminium and iron. The silica produced from the quartz is considered to be highly toxic , when completely dependent on its penetration to the alveolar portion of the lungs that reach alveoli. The respirable silica dust enters the lungs and causes the formation of scar tissue, thus reducing the lungs' ability to take in oxygen. The occupational lung diseases in cement industry can be identified by different symptoms like Chest Tightness, Cough, Sputum, Wheezing ,Dyspnea and even mild cold , the disease caused by inhalation of silica as been termed an silicosis.

II.B)TEXTILE INDUSTRY

The textile industry is also considered to be an one of the top contributor of occupational lung diseases among workers. [5]The textile industry over the years has gone through many modifications in its operation .cotton dust are produced at the time handling or processing of cotton. It contains a mixture of many substances including ground-up plant matter, fibre, bacteria, fungi, soil, pesticides, non-cotton matter, and other contaminants the presence of these particle textile industry act as an agent to cause byssonosis respiratory symptoms prevalent among textile workers include; cough, phlegm, wheezing, shortness of breath, chest tightness and chronic bronchitis

II.C)PAINT SHOP

The painting area is considered to be an highly hazardous are where several volatile and solvents are present in the working area. the employee worker in this area is considered to get maximum chance of occupational respiratory diseases . Mostly the paint used in the automobile industries have isocynate (low weight molecular compound) which is considered to be an major agent for occupational asthma . [6]These spray paint creates

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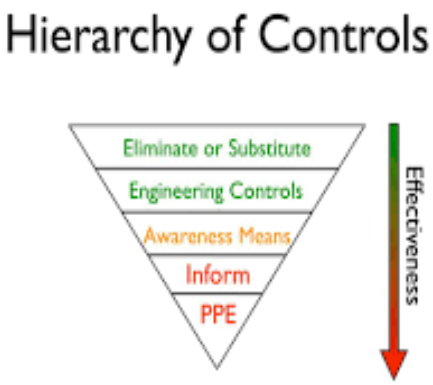
fine mists or droplets of paint that may stay suspended in the air for a short period of time there by increasing the risk of inhalation and eye, skin exposure. Some examples for diisocyanates are TDI (toluene diisocyanate), MDI (methylene diphenyldiisocyanate), HDI (hexamethylenediisocyanate).Also these paints have major constituents of pigment, resins ,additives and solvents. The resins are not toxic but the exposition towards it may cause tightness of chest, flu, fever and even act as the asthma agents .the pigments consists of lead ,chromium and zinc which are toxic when reacted towards the human organs. hence the paint shop workers are highly exposed to occupational respiratory diseases.

II.D) ASBESTOS INDUSTRY

The asbestos industry is considered to an volatile working area where the asbestosis sheet are produced. These sheets are made up of thin and threaded fibres. When the sheet broken down, these tiny fibrous particles break down to produce silica and fibre dust particle in the atmosphere.[4]When such fibres reach the alveoli (air sacs) in the lung, where oxygen is transferred into the blood, the foreign bodies (asbestos fibres) cause the activation of the lungs' local immune system and provoke an inflammatory reaction dominated by lung macrophages that respond to chemotactic factors activated by the fibers. The result is fibrosis in the ilung , thus asbestosis. This fibrotic scarring causes alveolar walls to thicken, which reduces elasticity and gas diffusion, reducing oxygen transfer to the blood as well as the removal of carbon dioxide. This can result in shortness of breath, a common symptom exhibited by individuals with asbestosis.

III.CONTROL MEASUJRES

the various control measure that can be taken to avoid the exposition of workers towards the occupational diseases in the following industry can be based on hierarchy of controls



Based on these hierarchy of control we mostly use engineering control to reduce the exposure towards the hazards the venting system ,automation ,process design layout can be used as engineering control measures.

VENTING SYTEM USED IN INDUSTRIES

Ventilation is an example of an engineering control method in which workplace hazard can be eliminated or reduced to acceptable levels. [8]The use of personal protective equipment should not be the primary means to control exposure to paint and other material, unless substitution, engineering or administrative controls are not feasible. These ventilation is done to maintain indoor air quality in the work place. The ventilation can be done by either exhausting or supplying the air. The ventilation system are of two types as: general ventilation (dilution) and local exhaust ventilation. general ventilation systems are the use of natural drafts through open windows and doors, roof ventilators, or mechanical fans or blowers mounted in roofs, walls or windows.

• When small quantities of air contaminants are being released into the work environment at fairly uniformrates. .
•When there is sufficient distance between worker and the contaminant source to allow sufficient air movement to dilute the contaminant to safe levels;
• When only contaminants of low toxicity are being used.
•When there is no need to collect or filter the

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contaminants before the exhaust air is discharged to outsidearea. .

• When there is no possibility of corrosion or other damage to equipment from the diluted contaminants in the work environment air.

One disadvantage of general ventilation is that it is very difficult to provide sufficient dilution where the worker is performing the work.

The term local exhaust ventilation refers to a ventilation method that contains or "captures" contaminants at their source of generation before they escape into the work environment and to the worker. ǀThe local exhaust ventilation consists of hood ,ducts ,air cleaner and fan .the local exhaust ventilation has to be designed in an effective way by placing it an closed exposure and allowing uniform air rate .

RESULT AND DISCUSSION

The safety of workplace is an essential component of efficiency and productivity. Healthy workers are major investment In a working environment, one must be able to ensure that the worker have been provided with required safety equipment based on the Factories Act 1948. Most of the industries are built with high roof buildings, which provides enough aeration inside the shed but no one ensures that floor level workers are getting enough Air Change per Hour (ACP). This paper has given an clear indication that lung diseases prone industries are not design with provision of providing enough oxygen rich air to worker. Here venting system is preferable .The venting system has to be selected based on the working area .thus by placing the venting system we can able to eliminate or reduce the respiratory diseases causing agents, Authors of this paper suggest that each industry can provide one clean room at accessible distance ,where workers have to be exposed periodically, based on their health report. It may give positive solution to protect the worker form lung reacted respiratory diseases

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