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Dry Fog Dust Suppression System in coal Handling Plant

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ABSTRACT: Numerous thermal energy stations use coal as their fuel. To deal with the coal, each power station is furnished with a coal taking care of plant. The coal must be measured, handled, and dealt with which ought to be done successfully and proficiently. While working in the coal taking care of plant the main consideration which diminishes staff proficiency is the work space for example a dusty climate. Loads of care is constantly taken to diminish dust emanation. To take care of the issue of serious residue and challenging to control in coal transport line without tissue in a nuclear energy station, this paper presents the standard of dry mist dust concealment innovation, device parts, benefits and burdens and the application in a nuclear energy station. Assurance of residue focus when the dry haze dust concealment work or doesn't work. Information show that the pace of dry haze dust concealment is by and large more noteworthy than 80%, the residue fixation is under 10 mg/m³, particularly the concealment impact on little particles of under 10 µm dust is self-evident. Practice shows that residue has been really smothered and it has a decent application prospect, when this innovation and gadget are applied.

I. INTRODUCTION

Coal is a prime source of strength for India and it'll preserve to maintain its lead for the foreseeable future. Dust is a common reality for almost each operation in coal mining. Many approaches can be pinpointed as contributions to dirt era like drilling, blasting, haul roads, coal cutting by way of non-stop miner, conveyor belts and crusher houses. With an expanded level of mechanisation and the pressing demand to enhance manufacturing for minimising the supply gap, generation of air borne respirable dust is growing necessitating extra powerful dirt manipulate practices. Being a labour extensive industry, coal mining warrants greater efforts to mitigate dirt pollution.

Prolonged publicity of coal mine dirt is known to purpose diverse breathing diseases like pneumoconiosis, silicosis, bronchitis, bronchial asthma, fibrosis of lungs and tuberculosis (TB), relying upon the nature of the dust. Free silica/quartz gift inside the dirt of mine air has been diagnosed as a first-rate purpose of those fitness dangers to miners. Indian coals are taken into consideration to be of 'go with the flow' starting place and therefore include excessive mineral remember intermixed with coal count number. Quartz is one of the fundamental minerals found in coal and therefore miners are uncovered to fitness dangers arising from inhalation of quartz laden coal dirt generated inside the coal mines (Nair and Sinha, 1988). Dust with quartz content material of up to fourteen.Forty nine% has additionally been said in coal mines of Bhart Coking Coal Limited, Dhanbad (Pandey, et al., 2008). The health risk to the miners varies depending upon the nature of coal and its mineral content material, situation of the mines, nature of job handled through the miner and sooner or later the exceptional and the efficacy of the protection measures followed with the aid of management.

Air-borne dust from mining activities spreads over nearby populated regions and vegetation causing harmful outcomes in many methods to the human beings, plants, forests, animals and water sources. The corrosive impact of the dust shortens the existence of lubricants of Heavy Earth Moving Machinery (HEMM), increases upkeep costs and decreases its operating efficiency. The dirt impedes visibility thereby lowering manufacturing potential. It is likewise a capability safety danger.

II. LITERATURE REVIEWS

Dust control practices in the Indian mining industry, Jai Krishna Pandey 20 February 2012 says Dust manage includes either dirt consolidation or dust capture. Dust consolidation is typically practiced for settled dust which turns into



airborne in beneficial circumstance e.G. Haul roads of open forged mines. Dust collection or seize is resorted to whilst it's miles airborne. In those instances dust is amassed near its supply of technology for powerful result and therefore the method is beneficial for controlling dust generated in localised spaces or point sources like drilling, blasting, crusher residence and conveyor switch points with the assist of unique varieties of dust seize association. Dilution of dirt is limited to small awareness of dust most effective. The Central Institute of Mining and Fuel Research (CIMFR) has made a large contribution in this place and has verified a few very powerful but simple techniques for providing dirt control in diverse conditions which might be defined in the following sections. Few face operations inclusive of blasting do no longer permit green and cost effective dirt control. Preventive steps like sample of holes, quantity and electricity of explosive and water stemming facilitate decrease dust generation and are in all likelihood the higher tools to conquer the problem

Dust Suppression System Raw Material Handling Plant (Bhavesh Solanki) says Raw material is basic need of any industry and its improper management and handling can lead to serious production losses and delay in the delivery of output products. Keeping this in mind and to avoid any type of production losses and downtime every plant has a separate department that looks after the management of raw material and its handling. Functions of plant are Feeding of row material at Boiler and Kiln, Maintain Proper size and Quality, Unloading of Raw material, Maintain Stock of different raw materials.

Inhalable dirt: which enters the frame, but is trapped inside the nostril, throat, and higher respiration tract. The aerodynamic diameter of this dust is set one hundred μm . Respirable dirt: are small enough to penetrate the nostril and top respiration system and deep into the lungs in which gasoline exchange take region. Particle sizes of respirable dust are up to 10 microns Dust control systems are an important factor in meet in environmental and health and safety requirements, while also helping and protecting employees and reducing site emissions. Prevention of dust in the bulk material handling operation is an impossible task. Properly design ed bulk material handling component scan play an important role in reducing dust generation, emission ,and dispersion. After all prevention the dust still remaining in the work place can be controlled by one or more of the following techniques. 1. Dust Suppression System 2. Dust Collection System

III. METHODOLOGY

As its call implies, 'Dry Fog' technology is a humidification system which makes use of water droplets so pleasant that the instantaneous environment stays dry, even when ranges are extended to over 90 percent. Wet spots are avoided from forming because of the minute size of individual water droplets produced via those machines. Minimizing droplet length reduces adhesion, so that character droplets aren't drawn to each other to shape large ones. The avoidance of wet spots is vital in lots of touchy commercial programs.

PRINCIPLE OF OPERATION

It agglomerates the airborne dust particle to water droplets in order that the particle turn out to be heavy enough to return to the product movement by using pressure of gravity.

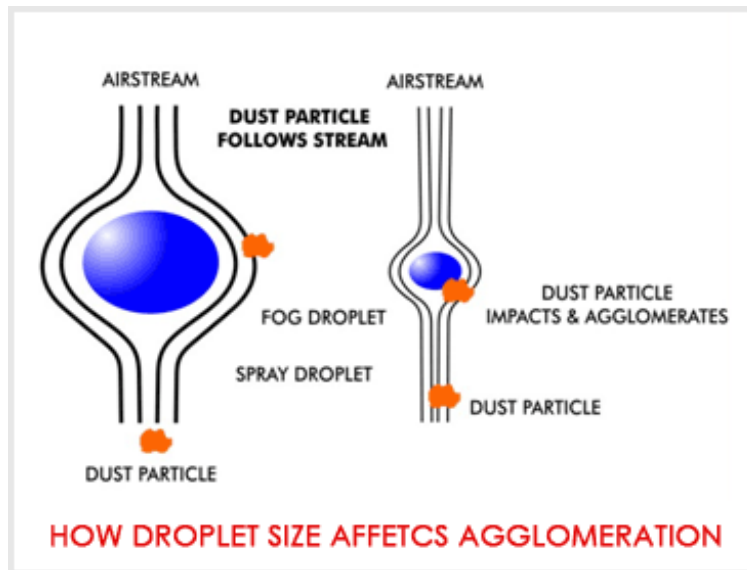


Fig. 1: moist fog and dry fog

AGGLOMERATION

1. Enough water droplets of the equal length because the dirt particles should be generated at the same rate because the dirt debris.
2. Both dust debris and water droplets must be contained in the equal location in order that agglomeration can occur.

Utility requirement for Optimum Fog:

The Air and water requirement for the nozzles required in your project are as follows :

FP Nozzle Models	Air Consumption		Water consumption	
	CFM	Kg / cm2	LPM	Kg / cm2
FP-1	1.5	5	0.15	0.3
FP-10	5	3.5	0.315	0.3

IV. CONCLUSION

In this project we've brought approximately the coal managing plant of a thermal strength plant and the hazard concerned at some point of transportation of coal from unloading / transfer points . How the coal dust is formed and how it reasons results to surroundings , machines and human being .We have discussed about one-of-a-kind strategies of controlling coal dirt used in thermal electricity plant life what are their benefits. Risk of coal dust is categorized on basis of danger rating and effects.Different kinds of coal dust controlling strategies are discussed, existing dust suppression gadget became explained and concept of dry fog dirt suppression device changed into done and format turned into shown .

The control strategies of coal dirt will have obvious blessings concerning the manage of respirable dirt.

Some of those advantages are that, there will be

- A reduction in health dangers
- A lower in atmospheric pollution



- An improvement in working conditions of the people
- Efficient operation of the equipment with minimum use of water so as to now not saturate the product or plant and equipment

Advantages of the synthetic fogging nozzle:

- It is extraordinarily reliable from a protection standpoint.
- Since the synthetic fogging nozzle does now not rely on high strain of the water to obtain maximum atomization, wear troubles are really removed, as there may be no want for high-pressure water pumps.
- The synthetic fogging nozzle cleans itself while working with excessive frequency sound waves.
- The nozzle has no transferring elements and is built of 100 % chrome steel.
- This gets rid of wear and corrosion and guarantees years of maintenance loose provider even with poor water pleasant.

Dust Suppression Efficiency	99% (Droplet sizes ranging from 1-10um clearing all PM2.5 and PM10 dust particles)	90-99% (depends on the design and type of collector)
Cost	Medium (requires air compressor)	High
Installation Cost	Low	High
Maintenance Cost	Very Low (Rs400 a month water filter)	High (Changing of filters and repairs on the motors)

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