



Magna Engineers

**Crusher Plants of M Sand Iron Ore / Slag
Coal Handling Plants Reclaimer Excavator**

Humidification





An Introduction - Dust Suppression Systems

At Crusher Plants of Iron Ore / Slag, Blue Metal and M Sand

The Dust Suppression system is very much required to control dust in large-entry stone mines, including silica dust, Iron Ore and Blue metal. Most stone mines are limestone mines, but substantial minorities are marble, sandstone, granite mines and Blue metal. While working in the crusher Plant, handling is the major factor which reduces staff efficiency in the working environment i.e. a dusty atmosphere. Lots of care is always taken to reduce dust emission. Generally all systems used in crusher plants are wet dust suppression systems. Here, we present the reasons for success of this type of dust suppression system. The spray discharge should be proportional with dust emission. The solenoid or needle valve should be open with proportion with quantity of dust generation.

At Coal Handling Plants of Thermal Power Stations

Many thermal power plants use coal as their fuel. To handle the coal, each power station is equipped with a coal handling plant. The coal has to be sized, processed, and handled which should be done effectively and efficiently. While working in the coal handling plant the major factor which reduces staff efficiency is the working environment i.e. a dusty atmosphere. Lots of care is always taken to reduce dust emission. Generally all systems used in power station coal handling plants are wet dust suppression systems. Here, we present the reasons for success of this type of dust suppression system. The existing system can be easily modified by using Hydromist system. The spray discharge should be proportional with dust emission. The solenoid or needle valve should be open with proportion with quantity of dust generation.

The Dust Suppression System is meant to suppress the dust generated during transfer of Iron ore at feed, discharge points and various conveyor transfer Points. There are several existing methods of controlling dust but many are ineffective, costly and have detrimental effects on plant and machinery. An effective system for the control of fugitive dust in industry should meet the following objectives.

Cement Industry Dust Suppression

Processes involving cement production handling for “Dust suppression” application at various stages:

- Crushers,
- Bins & Silo Venting,
- Milling,
- Packing,
- Conveyors,
- Rail, Road, & Ship Loading & Unloading
- Elevators,
- Classifiers,

The cement production diagram below identifies where dust control may often be required.

1. Must be efficient to meet Health & Safety requirements.
2. be practical, user friendly and simple in operation.
3. Have reasonable cost.
4. Have low operating costs.
5. No adverse effects on product quality or plant and machinery.

This system consists of five main parts.

1. High Pressure Pumping system.
2. High Pressure Hoses
3. Dust Suppression Atomizing Nozzles
4. Control units with Electrical systems.
5. Fittings, Adaptors, Valves and other accessories

HIGH PRESSURE PUMPING SYSTEM includes Booster Pump, H.P Valves, Spray Nozzles and H.P Pipe lines are required to supply & pressurize water through H.P Pipe lines fitted in a series with Atomizing Nozzles. The required quantities of nozzles are fitted at appropriate points to suppress the dust effectively.

Electrical Control Panel: consists of sensing units, control panels. Iron Ore flow is sensed by sensor. The control panels are consisting of various relays and transformer.

Operating Principles of Existing System: Auto control or manual control governs the system. It has to be insured that main tank is filled with water. The water is pumped by feed water pump from main tank to feed water tank and at the same time High Pressure pump intakes the required quantity of water from the booster Pump, wherever the flow rate of the H.P Pump is higher. The feed water pump operation is controlled by float switch automatically. The pump picks up at low level and stopped at high level. The interlock with low level of main tank will not allow picking up the feed water pump.

After insuring proper water level the Booster pumps will start. If the pressure increases the pressure relief valve keeps the system in recalculation. The sensing system for controlling spray at various headers insures spraying solution if conveyor is running with Iron Ore and at the same time it will not allow spraying solution if conveyors are running empty. The solenoid valve headers are energized if conveyor is running with Iron Ore. If all or some of the solenoid valves are not energized the system will realize pressure through pressure relief valve, which protects the system. A solenoid valve is provided with bypass line, which operates when none of the spray header solenoid valves are operative.

Advantages: of Hydro Atomizing Systems for dust suppression is as follows:

- Reduced Health Hazards.
- Decrease in Atmospheric Pollution.
- Improved Working Conditions
- Efficient Operation with Minimum use of Water.

This system is effective on respirable dust. Typical water droplet sizes are 50-100 microns, which are almost equal to respirable dust. And it does not operate on the emission quantity. The spray of the system should be operated on emission quantity. Thus, water sprays can be improved by increasing pressure or by designing nozzles which produce smaller droplets. We have developed the control system which can increase and decrease the spray pattern. Most of the improvements in this direction have been already made. The problem with this approach, and one, which prevents much additional improvement, is that introduction of very small water droplets into an atmosphere.

We have explored in greater detail its inherent design features and also made it extremely reliable from a maintenance standpoint As the fogging system rely on high pressure water to achieve maximum atomization, wear & tear problems are virtually eliminated, Hence, we require High pressure Industrial waterjet pumps. The nozzle has no moving parts and is constructed of 100% stainless steel as compared to some competitors who use brass parts. This eliminates wear, tear and corrosion, insures years of maintenance and long service even with normal fresh water, this dust suppression Nozzles can be operated without clogging intermittently on regular basis.

Efficiency of Hydromist Dust Suppression Systems:

This system uses water at High pressure to produce micron sized droplets that are able to suppress respirable dust without adding any detectable moisture to the processed raw material.

Over the years, “Hydromist” has established the following facts:

1. For a given spray nozzle, the collection efficiency for small dust particles increases as the pressure increases in uniformity in Hydro Atomization.
2. At a given pressure, the efficiency increases as the nozzle design is changed so as to produce smaller droplets without clogging.

The conclusion is clear; the smaller droplets are more effective in knocking small dust particles out of the air. The reason for this is not hard to see. Consider a water droplet about to impinge on a dust particle, or what is aerodynamically equivalent, a dust particle about to impinge on a water droplet, if the droplet diameter is much greater than the dust particle, the dust particle simply follows the airstrip lines around the droplet, and little or no contact occurs. If, the water droplet is of a size that is comparable to that of the dust particle, contact occurs as the dust particle tries to follow the streamlines. Thus the probability of impact increases as the size of the water spray droplets decreases.

Efficiency of water-droplet formation:

Factors affecting the efficiency of water-droplet formation are Particle size, Particle solubility, Particle (Hydrophobic or hydrophilic), Presence of hygroscopic salts, Charge, temperature, Relative humidity, Pressure, Electric Fields, Moisture retention. The efficiency of "Hydromist" spray dust capture will increase by increasing the probability of water droplet and respirable dust particle contact.



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