Good dust control is good process control.

Enclose conveyor transfer and screen discharge points.

Choke feed crushers to reduce dust and also produce the best gradations.

Reduce speeds on paved and unpaved roads.
Dust Control Best Practices

Dust control touches every part of an aggregate operation, from productivity, efficiency, and product quality to compliance, safety, and good neighbor relations. According to Mark Kestner, Ph.D., president and CEO of National Environmental Service Co. (NESSC), “My philosophy has always been that good dust control is good process control. If your stone isn’t spilling on the ground or going up in the air, it’s going across a snare and into a truck, railcar, or barge to make money.”

Dust in aggregate operations comes from three major source categories: roads, stockpiles, and processing operations. The most significant causes of dust from an operations standpoint include mobile equipment on unpaved roads, conveyor discharge, says Clif Morris, general manager of aggregates for Tilcon New York.

Engineered controls that are employed to contain dust and spillage should be an integral part of plant design. Kestner says, “Any owner/operator of a new mine is required by federal and state laws to obtain permits to construct, install, and operate the facility. As part of the permitting process, the mine must specify the dust controls it will use and must demonstrate that it is able to comply with NSPS [New Source Performance Standards].”

As part of the design, transfer points should be enclosed on three sides, covered, fitted with a dust curtain, and properly skirted. Load points should have sufficient idler support to prevent sagging between idlers that leads to visible dust and spillage. “I see more and more plants using impact beds to maintain uniform seals at load points and dual skirting at impact crusher discharge,” Kestner notes.

Kestner and Morris agree that the following steps are required when developing a dust control plan:

1. Conduct a site survey to identify all sources of dust on the property.
2. Estimate “uncontrolled” dust emissions from these sources using EPA AP-42 emission factors; this provides a baseline to evaluate the performance of controls.
3. Specify Reasonably Available Control Measures (RACMs) for each dust source.
4. Estimate “controlled” emissions using control efficiency ratings established by federal or state EPAs.
5. Establish a budget to purchase and install dust controls.
6. Implement the control plan.

The first step in taking control of dust is to conduct a site survey to identify all sources of dust on the property. Plant operations produce dust from three major sources: roads, stockpiles, and processing operations. After identifying sources of dust emissions, producers should specify Reasonably Available Control Measures (RACMs) for each source and implement a control plan.

While water works well in a variety of ways to control dust in operations, producers also should address other sources of dust. While water works well in a variety of ways to control dust in operations, producers also should address other sources of dust. While water works well in a variety of ways to control...
Voices of Experience

Mark Kestner

Thirty years ago, when I got into this business, a lot of producers thought that dust, dirt, and spillage was just something you had to live with. I even had one old-timer tell me that dust was good for you — actually helped to scour your lungs out! It was impossible to convince them that dust control measures, like avoiding interruptions in process flow and choke-feeding crushers, were not only good for dust control but also good for production," says Mark Kestner, Ph.D., president and CEO of National Environmental Service Co. (NESCO).

In the intervening years, the industry has found that dust control and productivity aren’t mutually exclusive. Today, producers see that environmental compliance is the key to a sustainable and profitable aggregate industry.

For a new or expanding mine looking to get new permits, dust control measures must be part of the mine plan. But what should an existing mine do to add or upgrade dust control systems?

Kestner says that in today’s tough economy, a mine should begin by implementing the least expensive control measures first. "These include training operators in best practices. For instance, speed control is a good example of an operating practice that can go a long way to reducing dust from paved and unpaved roads — as well as reducing the costs of more expensive controls like watering or chemical suppressants."

Using in-house labor and material to improve the enclosure of dust sources is another, comparably inexpensive, way to control dust. Kestner explains that dust enclosures can be fabricated and installed by plant personnel from scrap steel and used conveyor belting.

Once a producer has done what it can do with good operating and engineering practices to control dust, the next step would be to look at wet suppression systems. Water spray systems are the workhorse of dust control in the vast majority of aggregate plants. They are relatively low cost, and a properly designed spray system can be easy to operate and maintain.

And maintenance should not be ignored. Proper preventive maintenance plays a large part in controlling dust. "Because I believe preventive maintenance is the key to compliance, dust control equipment deserves the same level of preventive maintenance as production equipment," Kestner says. "Most of the fines and citations I see are not because plants don’t have dust controls, it’s because they are inoperable due to lack of maintenance."

"When you look at dust control as a process control problem rather than a compliance problem, you are much more likely to come up with an effective and affordable solution," Kestner adds. "If you wait until you get fined or cited, you’re going to wind up spending a lot more money on dust controls."

Clif Morris

According to Clif Morris, general manager of aggregates for Tilcon New York, dust control measures should be designed into both the pit/plant layout and also into the actual processing plant. For instance, dust control through a mine layout could include the placement of processing equipment and situation of stockpiles at lower elevations; stockpiles should also be positioned in areas that reduce the effects of the predominant wind, with care taken to minimize their height.

"Additional design considerations for the pit would include paving the most common travel ways and leaving adequate distance from the scale to the exit to minimize dust and silt that could make it onto public roadways," Morris says. "And if you’re using water for dust suppression, it needs to be fed from a very clean source to prevent clogged filters and nozzles."

From a processing standpoint, considerations for dust control should include covers on conveyors, at transfer points, and at the screen discharge, as well as hooded and sealed areas at crusher discharge points to allow spraying of water, making sure to maintain the skirt with tight seals. "Make sure you have an adequately high-pressure wet suppression system, and use automated controls to keep the proper amount of water in the plant," he notes. "Nozzles should be placed in areas that allow easy inspection and service. And drain valves should be installed at low points, which helps to prevent the effects of freezing during cold weather."

Indeed, water is a producer’s best friend for dust control. Morris believes a water truck should always be part of an operation’s production fleet. "An overlooked, but effective, method is utilizing the water truck to soak down the shots in the pit. Wet or moist feed to the plant can go a long way to cut down dust," he says. "Keeping stockpiles sprayed down also helps."

Mobile equipment on unpaved roads and surfaces can account for more than 30 percent of total dust emissions, according to Morris. "The top thing operators can do to control dust from mobile equipment is to control the speed of the vehicles onsite," he says. "Additionally, producers should shorten haul roads, if possible, and grade roads with clean aggregate wherever possible to keep silt off of the haulway. A water truck also can come in handy to wet down roadways.

From a maintenance standpoint, two key items in a wet suppression system that require regular care are nozzles and filters. "The nozzles need to be checked daily, and the filters need to be checked and cleaned monthly," Morris says. "Solenoid valves are another component that must be checked and cleaned regularly, in order to operate properly."