

Dust to Dust

A close look at the many products and methods that minimize fugitive dust emissions and erosion

By Carol Wasson

There's both rhyme and reason in saying that controlling dust is a must. Its particulates pollute the environment, aggravate respiratory illnesses, clog equipment components, coat vegetation, and scatter in the wind to wreak further havoc down the road. With drought situations at an all-time high across much of the nation, it's a good time to take a closer look at the myriad of dust-control products and methods. So plentiful are the options, it's impossible to cover them all.

Water has long been the dust suppressant of preference; arguably, however, it's not the best choice. Dust-control experts agree that any money thought to be saved by the simple use of water is absorbed by higher labor costs. Additionally, water evaporates in minutes, requires frequent applications, causes unwanted runoff and erosion, and allows vehicles to track mud elsewhere, creating more dust. Then there is the issue of water shortage—indeed it's a most precious resource.

"Using hundreds of millions of gallons of water for dust control on construction sites in drought-ridden regions particularly will have an impact on water reserves," says Marty Koether, managing partner of Tucson, AZ-based EarthCare Consultants, which provides consulting and turnkey services for soil stabilization and dust control. Koether is known in the Arizona region as the "Dust Doctor." He points to the fact that Colorado River users will remain vulnerable to water shortages under a number of federal government drought plans now under review. "Shortages are possible as early as 2010, and by 2026, the probability that the river won't meet demands increases to 35%," says Koether, adding that Arizona will be hit hardest by a shortage under rules that govern the river.

Each year Koether's company provides dust-control applications for the Maricopa County Department of Transportation on over 40 miles of road shoulders and maintains over 30 miles of unpaved roads and alleys for the city of Scottsdale, AZ. Also, EarthCare Consultants was awarded the contract at the Phoenix Sky Harbor International Airport, one of the high-profile "at risk" entities for violations of the EPA Federal Implementation Plan (FIP) for reducing particulate matter (PM-10). In less than 60 days, EarthCare completed over 1.7 million square yards of dust-control applications. This successful project established environmental and performance standards for the area's future soil stabilization and dust-control projects.

To contractors, Koether emphasizes that dust control will save money on projects, first and foremost, by eliminating dust violations and fines. He points to the fact that two Phoenix companies recently settled with the EPA for nearly \$250,000 over violations on construction sites. "Surfactants and chemical dust suppressants can also save money by reducing the amount of water used on a project and the labor and equipment to apply it. Haul roads into job sites are areas where stabilization with the proper chemical dust suppressant can reduce or even eliminate the maintenance of the road—and the need to water it continually," he says.

Koether explains that chemical road treatments or palliatives work effectively to keep dust under control. He lists generic examples of these palliatives as anionic asphalt emulsions, polymer emulsions, resin-water emulsions, and calcium chlorides. "When considering chemical palliatives, the contractor should ascertain whether the chemical is biodegradable or water-soluble—and what effect its application could have on the surrounding environment, including water bodies and wildlife. Some suppressants may affect vegetation or may not be suitable to an arid climate. Other products may emit strong odors and be dark brown or almost black on the soil. Some will leach out during heavy rains and leave a trail where residue has traveled. Some products may last weeks; others may last for years," he says.

Above all, Koether stresses that contractors should be very careful about their selection of palliatives to ensure they are not using a product they may be liable for in the future. He recommends that contractors check with local government agencies where projects are located to verify current products and vendors used.

With that said, let's take a look at a variety of dust-control palliatives and their manufacturers.



Tackification

Dust-control palliatives are also generally known as chemical or organic tackifiers, compounds that hold soil in place. Some tackifiers were developed and refined for use by American forces in Iraq and Afghanistan to eliminate accidents caused by blinding dust clouds. Tackifier types may include chloride salts, resins, polyvinyl acrylic polymers (PVAs), dust-control foams, and such environmentally friendly products as bonded fiber matrices or products derived from soybeans and lignin. Because of such factors as soil type, climatic conditions, slope, water-quality impact, environmental sensitivity, product drying time, and cost, every site requires a different treatment plan. For example, chloride salts are best used in moist climates, while resins are best in dry regions and away from any bodies of water.

Envirotac II is an acrylic copolymer commonly used on construction sites to stabilize the pad and eliminate dust caused by revegetation. Its manufacturer, Environmental Products and Applications Inc., says that an application of Envirotac II lasts 12 months or longer, eliminating the need for long-term water-truck maintenance. Sold in concentrated form and mixed with water before application, Envirotac II soaks into the ground up to three-quarters of an inch, binding the soil particles.

Photo: Environmental Products and Applications Inc. It takes more than water to contain a helicopter's whirlwind.

As featured in the May/June 2006 issue of *Erosion Control*, Envirotac II has been affectionately dubbed "Rhino Snot" by the military forces at Camp Rhino in Afghanistan, where the product is used to control dust at landing sites. More information on Envirotac II can be found at www.envirotac.com.

Made by Soilworks LLC (www.soiltac.com), Soiltac is a polymer-based emulsion that also works its way down into the soil to maximize the penetration depth. Once cured, the company says, Soiltac becomes completely transparent, leaving the natural landscape to appear untouched. Its ultimate results are based on the application rates. Modest applications can create a light, temporary surface crust that is permeable by water and is useful for dust-control needs, while heavy applications can generate results similar to the qualities of cement.

Midwest Industrial Supply Inc. offers a complete line of products and services, including what the company describes as a new category of soil stabilization and dust control patented as "synthetic organic dust control." In that category is EnviroKleen, a product that does not require dilution with water. The company says it's nonhazardous, colorless, and odorless; it will not create an oil sheen and is clear to slightly tinted upon application, usually making the soil appear darker. Another Midwest product, EK35, is also in the synthetic organic dust-control category but is modified with naturally occurring resins that work to agglomerate fine silt or clay particles, making them larger so they cannot become airborne. EK35 is well suited for applications with heavy equipment or where there is carry-over and spillage. The natural penetration and action of traffic works the EK35 into the surface, says the company.

Located online at www.midwestind.com, Midwest Industrial Supply also offers programs providing either turnkey control of fugitive dust or a guaranteed program of monitoring and maintaining the prescribed level of dust control.

Another organic dust-control solution is Reclafil, manufactured by Biological Targets Inc. (www.biologicaltargets.com). Suited for erosion and dust control as well as organic agricultural applications, its engineers say that the product provides a "biologically sustainable environment" in the soil while improving soil stability and enhancing soil moisture retention. It adheres to soil particles, fills the pore spaces, and binds more water molecules, thereby increasing the soil's capacity to retain water.

Dust-control foams are another option. The properties of foam bubbles mean that less foam will treat a larger surface area than that of water alone. Zircon Industries Inc. offers its Airborne Dust Control Foam, a concentrated foaming agent designed to saturate dust-control particles to the point at which they no longer remain suspended in the air.

The company's product line also includes a treatment called Zircon's Dust Free Road Stabilizer, which is ideal for controlling road dust and maintaining road base. It is both hygroscopic (draws moisture from the air) and deliquescent (resists evaporation), says the company. More information on Zircon products can be found at www.liquidheat.com.



Photo: Environmental Products and Applications Inc. With drought conditions increasing, dust control is more important than ever.

DirtGlue Enterprises, found at www.dirtglue.com, offers two brands of DirtGlue Polymer Emulsions, for either light surface applications or heavier industrial applications such as the stabilization of light- and heavy-duty driving surfaces. The emulsions bond the individual soil particles together, forming a flexible crust that strengthens the surface of the soil. The company says the product is even suitable in such

environmentally sensitive areas as wetland buffer zones.

Similar to a “bonded fiber matrix” product, which combines fibers and bonding materials to form a protective crust, DirtGlue can be combined with any fiber type (straw, wood fiber, paper fiber, and gypsum) to “glue” mulch materials to steep embankments.

DirtGlue is promoted as a proactive approach to environmental issues on a construction site. Excavation contractors know that a disturbed site will produce sediment and siltation, so they use silt fences and hay bales to catch the fines moving with the runoff (a reactive approach). DirtGlue prevents the fines from moving in the first place, creating a proactive approach.

An interesting note is that DirtGlue has been used in flood-prone areas to make temporary berms to block impending floodwaters.

Terra Novo Inc. of Bakersfield, CA, has created a fiber matrix option called EarthGuard (www.earthguard.com), which controls fugitive dust and soil erosion without a hardening process. Stormwater can then easily penetrate the soil and ease plant growth. On grading jobs, the product can be used for day-to-day dust control by adding 2 quarts of EarthGuard to each 1,000 gallons of water used in the water truck. This is said to allow the reduction of water-truck passes by up to 75%.

When contractors are ready to leave a site, extended dust control of up to three months can be achieved by using 8–10 gallons of EarthGuard mixed with water. Consult with Terra Novo Inc. for specific application specifications.

The Industrial Products Division of the United States Gypsum Co.

(www.gypsumsolutions.com) has introduced a new erosion defense system called Enviro-Shield Bonded Fiber Matrix, designed to prevent both water and wind erosion while also promoting plant growth. It's the only product of its type that incorporates gypsum plaster as part of the mix. Gypsum supplies calcium and sulfur as nutrients to the soil, enhances the structure of heavy clay and sand soils, and buffers soil pH. The new bonded fiber matrix is ideal for steep slopes and inaccessible or rough terrain where installation of blankets is difficult. It also offers an excellent solution in areas where public safety may be a concern, such as around schools, golf courses, housing developments, retail areas, roads, and airports, says the company.

Another new approach is Dust Stop, a proprietary formulation of completely biodegradable natural starches produced by the Canadian firm Cypher International (www.cypherltd.com). It's billed to be healthier and more effective than traditional suppressants. The product has been designed for high, moderate, and even low temperatures, and is available in a citronella scent, which the company claims repels rodents, small animals, and insects.

Lastly, Borregaard LignoTech (www.lignotech.com) is the producer of the lignin-based Dustex, a polymer product derived from trees. Essentially, the palliative binds dust particles together to anchor them to the ground. Popular internationally in dry climates like that of Dubai, Dustex produces a firm road surface that can last for several years. The advantage of the product is that it breaks down once the road is taken out of use. It is highly effective for haul roads in mining or quarry sites.

Operator Training

“The key to proper, cost-effective, and environmentally sound dust-control product application is operator training and experience,” says Koether, who explains that while the use of surfactants added to a water truck require little experience, chemical dust suppressants are best applied by manufacturer-trained personnel.

“All of these products have application requirements and parameters that must be followed to ensure safe, effective application,” he says. “We don't feel that simply shipping a product to a job site with written instructions is prudent. That eliminates the vendor's accountability for the successful application of the product.”

Koether goes on to explain that water-truck drivers might have class-A commercial driver's licenses with tanker endorsements and still be lacking the necessary training to handle chemicals. “Contractors may save by buying bulk products, but we believe that those savings are lost in improper handling and misapplications by unskilled operators. To ensure desired results, our company provides all of our products as ‘delivered and applied.’ We use metered distributor trucks and tankers for most of our applications. Our operators must have both tanker and hazardous-material endorsements. Many of our contracts require precise applications of our products, and the computerized distributor trucks



Photos: Environmental Products and Applications
Polymers such as Envirotac II are used for long-term coverage or for large areas.

ensure our applications meet specifications," he says.

To learn more about EarthCare Consultants LLC, visit www.dustdr.com.

Dust-Control Tips

While there is much to be learned about palliatives and application methods, there are general practices that can mitigate fugitive dust emissions without the use of chemical applications. Experts will tell you that dust levels can be reduced with a little preplanning. Instead of grading all at once, for example, try to time each grading phase to coincide with the construction phase. Schedule work during hours when wind is less likely. Provide windbreaks, such as trees or shrubs left in place during construction or maintenance, or construct barriers, such as wind fences. Throw a tarp over unused soil areas. Limit driving speeds on the site and lay a few inches of gravel at the site exit to knock off debris from tires before vehicles enter city streets.

Finally, some contractors will put sprinklers out before grading to get moisture into the soil. Premoistening soil before it's disturbed is more effective than trying to excavate dry soil. Instead of using additives in water used to premoisten, spray the site with a soil stabilizer after it is to grade.

Above all, have standard dust-control procedures already in place and require that all managers comply. Everyone should be a member of the dust-control team.

Topics: [Environment](#), [Air Quality](#)
