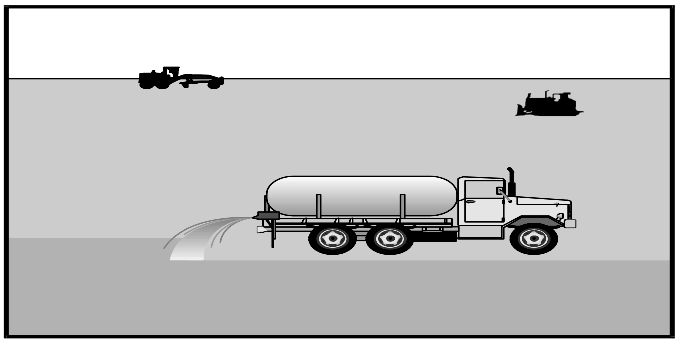
**ACTIVITY:** Dust Control

# AM – 11



CITY OF KNOXVILLE

| Targeted Constituents | | | | |
|---|---|---|---|---|
| ● Significant Benefit | | ◗ Partial Benefit | | ○ Low or Unknown Benefit |
| ● Sediment | ○ Heavy Metals | ○ Floatable Materials | ○ Oxygen Demanding Substances | |
| ○ Nutrients | ◗ Toxic Materials | ◗ Oil & Grease | ○ Bacteria & Viruses | ○ Construction Wastes |

**Description**

Dust control measures are necessary to stabilize soil from wind erosion and to reduce dust generated by construction activities. Dust is a nuisance and pollution source by itself, or may pollute stormwater runoff. Dust control is considered primarily as a temporary measure after disturbance in construction and prior to surface stabilization such as paving or vegetation. This management practice is likely to create a significant reduction in sediment as well as partial reductions in toxic materials and oil and grease.

**Suitable Applications**

The following construction activities will generally require some type of dust control measures:

- Clearing and grading activities
- Construction vehicle traffic on temporary roads
- Drilling and blasting activities
- Sediment tracking onto paved roads
- Soil and debris storage piles
- Batch drop from front-end loaders and other construction equipment
- Areas with unstabilized soil

- Final grading and site stabilization usually is sufficient to control post-construction dust sources.
- Dust control is particularly important in windy or wind-prone areas, such as the top of hills or near public roads.

**Approach**

- Schedule construction activities to minimize exposed area by clearing only areas where phased construction is to take place. Identify and stabilize key access points prior to commencement of construction. Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Quickly stabilize exposed soils using vegetation, mulching, spray-on adhesives, calcium chloride, water sprinkling, or gravel. Consult Table AM-11-1 for types of BMPs that can help to stabilize different types of ground conditions.
- Minimize the impact of dust by anticipating the direction of prevailing winds. Maintain existing vegetation as windbreaks whenever possible. Use temporary

stabilization methods or place undisturbed vegetative buffers between areas being graded and adjacent properties.

- Direct most construction traffic to stabilized roadways within the project site. Limit vehicle traffic to low speeds (typically 15 miles per hour) and control the number and activity of vehicles on a site at any given time. Plan ahead so that vehicles can be used efficiently.
- Wet suppression (or watering), chemical dust suppression, gravel or asphalt surfacing, temporary gravel construction entrances, equipment washdown areas and haul truck covers can be employed as dust control applications for heavily traveled areas. Temporary or permanent vegetation, mulching and sand fences can be employed for areas of occasional or no construction traffic. If the wet suppression method is chosen, be sure the runoff is routed to a sediment control device, such as a sediment pond, check dam, etc.
- Provide covers for haul trucks transporting materials, which may contribute to dust.
- Provide for rapid cleanup of sediments deposited on paved roads. Furnish stabilized construction road entrances and vehicle washdown areas. Consult BMP fact sheets for ES-01 (stabilized construction entrance), ES-02 (tire washrack), and ES-03 (construction road stabilization).
- Implement dust control measures for material stockpiles.
- Prevent drainage of sediment-laden stormwater onto paved surfaces.
- Stabilize abandoned construction sites using vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for stabilizing gravel roadways and stockpiles. The types of chemicals available and recommendations for their use are listed in Table AM-11-2, Commonly Used Chemicals for Dust Control.

***Selection of Dust Control Agents***

Selection of dust control agents should be based primarily on cost-effectiveness and environmental hazards. Choose appropriate dust control agents near environmentally sensitive areas, such as wetlands or natural streams.

Chemical methods contain dust-suppressant or dust-binding agents applied to the soil surface to bind finer particles together. Chemical dust control agents must be environmentally benign, easily applied, easily maintained and economical.

Most chemical dust control agents are inorganic compounds that are compatible with soil and biota. After application, the compounds dampen and penetrate into the soil (with a hygroscopic reaction pulling additional moisture from the atmosphere). This allows the chemicals to adhere fines to the aggregate surface particles. Some compounds may not penetrate soil surfaces made of silt or clay, so soil tests may be required to determine suitability.

Key factors in determining the method include the following:

- Soil types and surface materials - both fines and moisture content are key properties of surface materials.
- Properties of the chemical agent - the five most important properties are penetration, evaporation, resistance to leaching, abrasion, and aging.

- Traffic volumes – the effectiveness and life span of dust control agents decreases as traffic increases. For high traffic areas, agents need to have strong penetrating and stabilizing capabilities.
- Climate - some hygroscopic agents lose their moisture-absorbing abilities with lower relative humidity, and some may lose resilience. Under rainy conditions, some agents may become slippery or even leach out of the soil.
- Environmental requirements - the primary environmental concern is the presence and concentration of heavy metals in the agent that may leach into the immediate ecosystem, depending on the soil properties.
- Frequencies of application - rates and frequencies of application are based on the type of agent selected, the degree of dust control required, subgrade conditions, surface type, traffic volumes, types of vehicles and their speeds, climate, and maintenance schedule.

***General Application Guidelines***

For dust control agents, the untreated soil surface must first contain sufficient moisture to assist the agent in achieving uniform distribution (except when using a highly resinous adhesive agent). Consult detailed manufacturer's instructions for dust control agents prior to use. The following guidelines should be considered:

- Ideally, application should begin in the spring, prior to the summer heat so that the subgrade and surface materials will not have dried. If the surface has minimal natural moisture, the area to be protected must be pre-wetted so that the chemicals can uniformly penetrate the surface.
- In general, cooler temperatures or higher humidity will cause decreased evaporation, increased surface moisture, and thus significant increase in control efficiency. However, chemical and organic agents should not be applied under frozen conditions, rainy conditions, or when the temperature is below 40° F. Tar and bitumen agents should not be applied in fog or rainy conditions, or when the temperature is below 55° F.
- More than one treatment with salts or organic compounds per year may be necessary if the construction schedule requires heavy truck and equipment traffic for extended time periods. Generally the second treatment should be significantly diluted.

**Maintenance**

- Most dust control measures require frequent attention and should be monitored throughout the day. If dust control problems are noted, stop work and immediately concentrate on using additional dust control measures.
- The primary maintenance requirement is the reapplication of the selected dust control agent at intervals appropriate to the agent type. High traffic areas shall be inspected on a daily basis, and lower traffic areas shall be inspected on a weekly basis.

**Limitations**

- Watering prevents dust only for a short period and should be applied daily (or more often) to be effective.
- Overwatering may cause erosion. This potential can be limited through use of buffer/filter strips, silt fences, straw bales, vegetation, etc.
- Oil must not be used for dust control. Oil will cause immediate stormwater pollution and may contaminate groundwater. The use of oil for dust control will be considered as an intentional spill of hazardous material.

- Chemically-treated subgrades may make the soil water repellant, interfering with long-term infiltration and growing vegetation on the site. Some chemical dust suppressants are subject to freezing and may contain solvents that must be handled carefully.
- Asphalt, commonly used as a mulch tack or as a component of hydroseeding, requires a 24-hour curing time to avoid adherence to equipment, worker shoes, etc. Application should be limited because asphalt surfacing may eventually migrate into the drainage system.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.

**Additional Information**

State and local agencies require dust control in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act.

**References**

**13, 14, 24, 30, 31, 33, 34, 35, 43** (see BMP Manual Chapter 10 for list)