



Methods for Dust Control



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Table of Contents

Why is Dust a Problem?	2
Controlling Dust Emissions.....	3
Chemical Dust Suppression.....	5
Prepare a Dust Control Plan.....	7
Cost of Dust Suppression Projects.....	7
Dust Program Savings and Benefits.....	8
Washington Regulations Related to Dust Control	8
Information and Resources	11

Why is Dust a Problem?

Dust can contain soil, ash, soot, salts, pollen and spores, and a host of other materials depending on the location and activity causing the dust. For example, dust from construction sites, industrial areas, agricultural operations, or roadways might contain pesticides, heavy metals, asbestos, bacteria, fungi, and a variety of other contaminants. Dust particles are very small and easily inhaled. Even short-term exposure to dust can cause respiratory problems and allergic reactions.

Dust emissions also contribute to air pollution significantly. Outdoor dust occurs throughout Washington, especially in dry areas like Eastern Washington. At various times of the year, dry weather conditions and wind can cause big dust storms, but there are many other common sources of dust emissions as well.

Sources of dust emissions include:

- Agricultural field operations
- Parking lots or feed lots
- Rural areas
- Waste cleanup sites
- Industrial facilities
- Land clearing
- Construction activities
- Demolition activities
- Storage piles
- Masonry
- Landscaping
- Paved and unpaved roads
- Transportation and track out
- Activities on vacant land
- Equipment yards

Dust contributes to:

- Health and respiratory problems
- Vehicle accidents from low visibility
- Impacts to fish and other aquatic life
- Impacts to soil and vegetation
- Impacts to water quality
- Vehicle and equipment erosion
- Lowered property values
- Lowered quality of life
- Complaints from the public

Controlling Dust Emissions

Dust emissions can be prevented or reduced in four basic ways:

1. Limit the creation or presence of dust-sized particles.
2. Reduce wind speed at ground level.
3. Bind dust particles together.
4. Capture and remove dust from its sources.

Some dust control techniques work with many sources of dust:

- Plant or mulch areas that won't received vehicle traffic.
- Apply gravel or landscaping rock to areas where planting, mulching, or paving is impractical.
- Construct natural or artificial wind breaks or wind screens. Consider restricting landclearing or earthmoving activities during periods of high winds.
- Apply water to reduce emissions from temporary sources.
- Clear vegetation only from areas you will work right away.
- Surface-apply chemical suppressants to non-trafficked areas to form a less erodible soil surface.

Other techniques are more specific:

Unpaved, Trafficked Areas

Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots. Lowering the speed of a vehicle from 45 miles per hour(mph) to 35 mph can reduce dust emissions by up to 22 percent.



Restrict the number or type of vehicles that can access the road, if possible. Restricting use by tracked vehicles and heavy trucks also helps prevent damage to road surface and base.

Paved, Trafficked Areas

- Improve paved material conditions by reducing the use of skid control sand or salt. Use coarse material that isn't easily crushed into powder during snow and ice season.
- Vacuum or wet sweep fine dirt and skid control materials from paved roads soon after winter weather ends and at other times as needed.
- Reduce vehicle track out: fill muddy areas with gravel or other surface material, install grizzlies, or build vehicle tire/underbody wash stations near unpaved road junctions.
- Pave or stabilize shoulders of paved roads with gravel and vegetation.
- Provide for stormwater drainage and construct curbing to prevent water erosion onto paved roads.

Upgrade the Road

- Increase surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (smaller than .075 mm) to 10-20 percent.
- Improve drainage and crown, the normal slope toward the outer edge of a road surface.
- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Use alternate, paved routes, if available. Paved surfaces produce up to 90 percent less dust than unpaved surfaces.
- Apply chemical dust suppressants by blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments. Chemical treatment can reduce emissions by 30 to 80 percent.
- Pave or treat permanent haul roads, construction sites, and parking or staging areas at commercial, municipal, or industrial facilities.



Other Specific Sources

- Apply load control measures like load covering, freeboard, bed-liners, and watering. Require prompt clean-up of spills.
- Cover piles with wind-impervious fabric.
- Limit use of off-road recreational vehicles on open land. Confine operations to specific areas, require permits, or prohibit use.
- *For agricultural fields:* use strip cropping, increase soil surface roughness, plant wind breaks, rotate crops, reduce tillage, plant cover crops, limit burning, and apply mulch.
- *For feed lots:* use sprinkler systems, surface amendments, manure harvesting, and vegetative barriers to control dust and odor.

Chemical Dust Suppression

Chemical dust suppressants are commercially available for use on many types of emission sources. The performance of a product depends on many factors:

- Application method and rate.
- Surface moisture content during application.
- Hydrological conditions, like site precipitation and drainage.
- Mechanical stability of the surface aggregate.
- Percent of fines in the aggregate mix.
- Structure of the base and subgrade.

Don't expect a chemical suppressant to compensate for deficiencies in surface characteristics, material composition, local site, or climate factors.

Keep in mind that most of the products designed for trafficked areas are primarily intended for medium-traffic, low cost roads, that are typically surfaced with gravel. Dust suppression and periodic unpaved road maintenance are normally combined. For unpaved road applications, products *applied and mixed into the road surface* usually work better than if simply applied to the surface.

Evaluate available products against your own specific emission source, site, performance, and cost criteria. Review the manufacturer's product literature, safety data sheet (SDS), and instructions before purchase and prior to use. Consider the risk to human health or the environment from hazardous characteristics of product ingredients, application practices, and the environmental characteristics of the site.

Be aware that during preparation or application, chemical dust suppressants may exhibit hazardous characteristics such as corrosivity or ignitability. Some products may produce excessive heat when mixed with water. Others may contain toxic or carcinogenic ingredients or contaminants. Observe all safety precautions and follow the manufacturer's directions when handling, mixing, and applying chemical suppressants.

Any suppressant product or its ingredients may migrate from a treated site due to carelessness in application, runoff, leaching, volatility, dusting, or adhesion to vehicles. In areas where surface water or groundwater is nearby and where stream flow rates are low, adverse environmental impacts are possible.

The burden of proof for product safety lies with the chemical manufacturers, distributors and users. Ask the vendor whether their product has characteristics or meets criteria that would cause it to designate as a Washington State dangerous waste as it is applied to the ground, after drying or curing, or as a result of biochemical decay.

Washington's Globally Harmonized System for Hazard Communication (Chapter 296-901, WAC) requires chemical manufacturers to obtain or develop an SDS for each hazardous chemical they produce. All employers must have an SDS at the workplace for each hazardous chemical they use.

The Department of Ecology does not approve, recommend, or endorse specific products or service providers. However, we can help you in evaluating the environmental safety of specific products. Contact your regional office of Ecology's Hazardous Waste and Toxics Reduction Program for assistance and ask about safer alternatives.

Do not use undocumented material for dust control. All legitimate products have manufacturer product literature and an SDS that describe the product's ingredients, characteristics, recommended use, safety practices, and limitations of use. If Ecological information (SDS Section 12) is not provided on the SDS, obtain and review this information from the manufacturer before making a purchasing decision.

Prepare a Dust Control Plan

A good dust control plan can help reduce negative effects from dust. At a minimum a dust control plan should include:

- Identification of all fugitive dust sources.
- A description of the dust control method(s) to be used for each source.
- A schedule, rate of application, calculation or some other means of identifying how often, how much or when the control method is to be used.
- Provisions for monitoring and recordkeeping.
- A backup plan in case the first control plan does not work or is insufficient.
- The name and phone number of the person responsible for making sure the plan is implemented and who can be contacted in the event of a dust complaint.

Be sure to consult with your local Air Pollution Control agency.

Cost of Dust Suppression Projects

Developing an effective and cost-efficient dust control program means accurately identifying and accounting for the true costs and savings of any new alternative, compared to your current practices. Using unpaved roads as an example, the costs can be grouped into the categories listed below:

Road Improvement Costs

Drainage improvements, geometric improvements, repairing of failed areas, excavation and removal of substandard material, and addition of surface material. (Note: These costs are not part of dust suppression program costs if they would be required anyway, without dust suppression.)

Surface Preparation Costs

Addition of select material (fines or coarse material), breaking up and loosening the road surface, watering, shaping, and compacting.

Product Supply and Application Costs

Material cost, transportation cost, application cost, and contract supervisor cost (if a project supervisor is provided by the contractor).

Miscellaneous Costs

Traffic control, detour, inspection, crew supervision, material storage (if inventory is maintained) and liability costs.

Dust Program Savings and Benefits

Road Maintenance and Repair Savings

Less frequent regrading and less frequent need to add supplementary road materials accrue savings due to reduced loss of gravel and fines and greater durability of the road surface.

Savings from Non-road and Off-site Benefits

Savings accrued from dust control program benefits not specifically related to the road itself, such as human health, vehicles and equipment, and the environment.

Washington Regulations Related to Dust Control

The following laws apply in Washington:

[Chapter 70.94 RCW](#)¹ Washington Clean Air Act and [Chapter 173-400 WAC](#)² General Regulations for Air Pollution Sources

These statutes require owners and operators of fugitive dust sources to prevent fugitive dust from becoming airborne and to maintain and operate sources to minimize emissions.

¹ Revised Code of Washington

² Washington Administrative Code

Chapter 70.95I RCW Used Oil Recycling

Prohibits the use of used oil as a dust suppressant. In fact, federal regulation 40 CFR Part 279, Standards for the Management of Used Oil (Subpart I) prohibits the use of used oil as a dust suppressant in all 50 states unless a state petitions EPA. If you plan to use a chemical suppressant, verify that it does not contain any used oil. Used oil is defined as: “(a) lubricating fluids that have been removed from an engine crankcase, transmission, gearbox, hydraulic device, or differential of an automobile, bus, truck, vessel, plane, heavy equipment, or machinery powered by an internal combustion engine; (b) any oil that has been refined from crude oil, used, and as a result of use, has been contaminated with physical or chemical impurities; and (c) any oil that has been refined from crude oil and, as a consequence of extended storage, spillage, or contamination, is no longer useful to the original purchaser” (RCW 70.95I.010).

Chapter 90.48 RCW, Water Pollution Control

Section .080 prohibits the discharge of any material into surface or groundwater that could cause pollution as defined in WAC 173-200-020(22). If your site is near surface or groundwater, use dust control measures that will not have any aquatic impact. If you decide to use a chemical dust suppressant, select a product with no or low aquatic toxicity.

Ecology’s [Sand and Gravel General Permit](#) for sand and gravel operations has specific requirements for use of chemical treatment products including a prohibition of the use of ligninsulfonate for dust suppression in excavated areas, including areas where topsoil has been removed.

Chapter 70.105 RCW, Hazardous Waste Management

Prohibits disposal to the ground of any dangerous (hazardous) waste. If you are planning to use a chemical dust suppressant, make sure it does not contain any dangerous waste ingredients.

Chapter 70.105D RCW Hazardous Waste Cleanup - Model Toxics Control Act

This law requires the identification and cleanup of hazardous sites. Ecology can investigate reports of releases or the presence of hazardous substances. If a hazardous product is used as a dust suppressant and Ecology later receives a complaint of contamination, a site assessment may be conducted.

A cleanup may be required if a potential threat to human health or the environment is determined. The determination depends on the hazardous substance(s) present, the concentration(s), the environmental characteristics of the site including proximity to surface and groundwater, as well as the current or proposed future use of the property.

Anyone considering the use of products that contain hazardous substances should carefully weigh the risk of possible future cleanup costs or loss in property value, especially if land use is likely to change toward more unrestricted uses such as residential housing.

[Chapter 90.03 RCW Water Code](#) and [Chapter 90.44 RCW Regulation of Public Groundwaters](#)

These laws require a water right permit for all surface water withdrawal and for any water from a well that will exceed 5,000 gallons per day (RCW 90.44.050). If you plan to use water for dust suppression at your site, be sure that you have a legal right to that water. If in doubt, check with Ecology's [Water Resources Program](#). Temporary permits are usually obtainable in a short time period. In some instances, water may need to be obtained from a different area and hauled in, or from an existing water right holder.

Information and Resources

[Washington Clean Air Agencies](#)

[Benton Clean Air Agency](#) – Benton County

[Ecology Central Regional Office](#) – Chelan, Douglas, Kittitas, Klickitat, Okanogan counties

[Ecology Eastern Regional Office](#) – Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman counties

[Ecology Northwest Regional Office](#) – San Juan County

[EPA Region 10](#) – Tribal lands

[Northwest Clean Air Agency](#) – Island, Skagit, Whatcom counties

[Olympic Region Clean Air Agency](#) – Clallam, Grays Harbor, Jefferson, Mason, Pacific, Thurston counties

[Puget Sound Clean Air Agency](#) – King, Kitsap, Pierce, Snohomish counties

[Southwest Clean Air Agency](#) – Clark, Cowlitz, Lewis, Skamania, Wahkiakum counties

[Spokane Regional Clean Air Agency](#) – Spokane County

[Yakima Regional Clean Air Agency](#) – Yakima County

Dust Palliative Selection and Application Guide:

<http://www.fs.fed.us/eng/pubs/html/99771207/99771207.html>

Aggregate Roads Dust Control - A Brief Synthesis of Current Practices

<http://www.lrrb.org/media/reports/2013RIC67.pdf>

University of New Hampshire – Technology Transfer Center: Unpaved Roads:

<http://www.t2.unh.edu/unpaved-roads>

EPA's Safer Choice Standard: <http://www2.epa.gov/saferchoice/safer-choice-standard>

Search Safer Choice Products: <http://www2.epa.gov/saferchoice/products>

