

Guide to Handling Fugitive Dust from Construction Projects



AGC of Washington Education Foundation



and the
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Introduction

Fugitive Dust is particulate matter that is suspended in the air by wind or human activities and does not come out of a stack.

Air quality regulations require the use of control techniques to minimize Fugitive Dust emissions. The goal is to eliminate visible airborne Fugitive Dust. Therefore, state and local regulatory agencies expect that as many of these control techniques be employed as necessary to achieve this goal.

Reasons for Fugitive Dust Control

Fugitive Dust from construction projects is regulated by the Washington State air quality laws for several reasons:

1. Fugitive Dust can become a nuisance to neighbors by depositing on their property;
2. Inhaling Fugitive Dust particles can cause respiratory diseases;
3. Fugitive Dust can be a direct safety hazard.

Purpose of Brochure

This brochure is designed as a guide to provide practical examples of suggested best management practices necessary to comply with air quality regulations involved in the construction process.

While Fugitive Dust can be created from a variety of activities, such as agricultural activities, this brochure will focus on Fugitive Dust that is created by construction activities. Air pollution from debris burning, plant operations, rock crushing and abrasive blasting, sometimes associated with construction activities, and are dealt with in other regulations and publications. For additional information on the subject, the web sites of local air quality agencies are listed in the back of this brochure.

Why Fugitive Dust is a Problem

Nuisance

It is unlawful in the state of Washington to cause or allow air contaminant emissions in sufficient quantities and of such characteristics and duration that it unreasonably interferes with enjoyment of life and property.

Safety

Fugitive Dust from construction can reduce visibility on roadways and highways, resulting in traffic accidents.

Health

Fugitive Dust can also have significant health effects if it is inhaled in large amounts, or if dust contains crystalline silica, asbestos fibers, heavy metals or disease spores. Very small particles can be inhaled deep into lungs and are a particular health threat for the young, the old, and those with chronic respiratory problems.

Construction

Fugitive Dust can be created directly from the activities involved in construction, such as moving soils or demolishing structures. Fugitive Dust can also be generated by disturbing residual soils or materials that have been left behind by construction activities. For example, vehicles can generate Fugitive Dust from dirt on roadways that was tracked out as mud from construction sites.



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Pre-Construction Planning

Fugitive Dust control planning is a partnership between the owner, general contractor, subcontractors and any other party whose activities during the project may lead to the generation of Fugitive Dust. This partnership extends to legal responsibilities as well in that all parties can be held liable for non-compliance and subsequent regulatory actions, including monetary penalties.

Incorporating Fugitive Dust control measures in the plans and specifications of the project can help ensure that the participants in the construction partnership avoid violations of Fugitive Dust regulations. Early planning can also help owners and project designers to “level the playing field” in the competitive bid process and avoid change orders.

Fugitive Dust Control Plan

A Fugitive Dust control plan might include:

1. Identification of all Fugitive Dust Sources.
2. A description of the Fugitive Dust control method(s) to be used for each source.
3. A schedule, rate of application, calculations or some other means of identifying how often, how much and when the control method is to be used.
4. Provisions for monitoring and recordkeeping.
5. A backup plan in case the first control plan does not work or is inadequate.
6. 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 Fugitive Dust complaint.
7. Back-up or company phone number.
8. Map or drawing of the site.
9. Source and availability of materials such as water.

Weather, equipment and site conditions will require that field personnel make on the spot, common sense changes in order to address the intent of the regulations.

Inspection Checklist

Incorporating a simple inspection checklist during the daily report process helps make the tasks of Fugitive Dust control more routine. A checklist system reduces paperwork, acts as a job reminder, and serves as a record of efforts to minimize Fugitive Dust problems. Categories that might be included in the checklist are:

1. Date
2. Time
3. Preventative measures
4. Frequency of control measures application
5. Weather conditions
6. Comments

Remember:

Fugitive Dust controls are only effective when they are monitored and managed through frequent inspections and maintenance of control measures.

Site Specific Design Considerations

The specifics and level of complexity of each Fugitive Dust control plan will depend on a number of factors that are specific to each project. Consider the following:

Cost of Alternatives

Several factors must be taken into consideration when weighing various alternatives. Cost considerations include:

1. Unit cost,

2. Total project cost,
3. Acquisition cost,
4. Maintenance cost,
5. Cost of non-compliance,
6. Capital cost, and the
7. Cost of time waiting for product or application.

While one method may not be cost effective for large projects because the unit cost is high, it may be cost effective for small projects because the acquisition cost is low.

Environmental Constraints

Water application is one of the best short-term methods for controlling Fugitive Dust. However, water runoff containing mud and silt can cause damage to streams and other resources. A Fugitive Dust plan should be considered in conjunction with the overall Temporary Erosion and Sediment Control (TESC) plan. The Department of Ecology can be contacted for even more specific information.

Location

The proximity of the project to populated areas may dictate more controls, due to anticipated impacts, than a project in a remote location. Wildlife habitats and wetlands may also be affected by Fugitive Dust.

Project Size and Duration

The marketplace will not practically allow for the same rigors of control to be applied on all projects. For example, a land clearing project involving several acres or a major excavation project may call for truck wheel washing facilities, while this may not be practical for clearing a residential lot. A project lasting several months may call for more durable measures where one lasting several days may rely solely on water.

Public Relations

Adopting a “good neighbor policy” by including a large sign with the company or job site phone number may help to make sure that local complaints are phoned directly to the site, rather than to the regulators. Controversial projects, or projects that do not have a high level of community support, are oftentimes under more scrutiny. Care should be given to choosing not only the technically correct, but aesthetically correct solutions.

Risks to Others (Sensitive Populations)

Fugitive Dust can have particularly adverse health impacts on young children, the elderly, and persons with respiratory problems. Thus, additional control Measures would be expected for a project near a hospital, nursing home, day care facility, school, etc.

Site Conditions

Topography and soil type can make a difference in the control of Fugitive Dust. Rocks and sand may be less dusty than hardpan, silts and clays. Hills, trees and shrubbery can serve as natural windbreaks; however, these are not control measures and do not meet the requirements of air pollution regulations. Soils that are disturbed on tops of hills or on wide open flat surfaces are more affected by wind.

Weather

Moisture, in the form of rain and humidity, are natural dust suppressants. However, extremely rainy conditions can carry soil, in the form of mud, to other areas where it can dry and become a Fugitive Dust hazard. Wind can intensify Fugitive Dust problems.

Common Fugitive Dust Management Practices

The following is a list of commonly employed Fugitive Dust management practices for various dust sources. The best management practices for a particular project should be selected based upon site-specific considerations.

Graders and Scrapers

1. Use water truck or sprinklers to moisten soils before grading.
2. Minimize areas of clearing and grubbing to a manageable size.
3. Minimize timeframes between Fugitive Dust-creating activities and final solutions (ex., roadway excavation and paving).
4. Avoid activity during high winds.



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Front-End Loaders and Backhoes

1. Use water truck to keep soils moist.
2. Use water sprays (e.g. garden hose) when dumping soils into haul trucks.
3. Minimize drop height.
4. Avoid activity during high winds.

Haul Trucks

1. Wet loads with garden hose.
2. Ensure adequate freeboard.
3. Cover loads.
4. Reduce speed on unpaved haul roads to less than 15 mph.
5. Surface haul roads with gravel.
6. Pave haul roads.
7. Pave exit aprons.
8. Surface exit aprons with quarry spalls (aka “rip rap”).
9. Brush off mud from wheels, wheel wells, running boards and tail gates.
10. Wash wheels and inner fender wells immediately prior to exiting (note: this control may require installation of a sedimentation basin).
11. Use street sweeper to remove trackout from paved roadways (note: sweepers should be periodically checked to ensure that the water storage tank is full and spray nozzles are in good working order).
12. Flush streets with water (note: this control may require the installation of a sedimentation basin).



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Demolitions

1. Use water sprays (e.g., fire hoses) before, during and after use of wrecking ball or bulldozer.
2. Avoid activity during high winds.

Renovations

1. Use chutes and covered dumpsters for lowering dusty materials (e.g.' sheetrock) from multi-story buildings.
2. Avoid activity during high winds.

Storage Piles

1. Use sprinklers to keep piles moist.
2. Use tarps to cover piles.
3. Use soil stabilizers.



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Descriptions of Best Management Practices

Fugitive Dust emissions can be prevented and reduced in four basic ways:

1. Limiting the creation or presence of dust-sized particles.
2. Reducing wind speed at ground level.
3. Binding dust particles together.
4. Capturing and removing Fugitive Dust from its sources.

These Fugitive Dust control measures are not mutually exclusive. Most situations require the use of two or more of these methods in combination for any particular situation, and several methods will be employed to handle the variety of situations that make up a particular job.

Storage Coverings- Fabric/Other for Erosion Control

Fabrics and plastics for covering piles of soils and debris can be an effective means to reduce Fugitive Dust. However, these materials can be costly and are subject to degradation from the sun, weather, and human contact. Straw and hay can also be used to cover exposed soil areas, although they can be disturbed by wind and track though.

Dust Suppressants-Chemical

There are many types and brands of Chemical Dust Suppressants which work by binding lighter particles. Chemical Suppressants may be applied as a surface treatment to “seal” the top of an area, or may be applied using an admix method that blends the project with the top few inches of the surface material.

Examples of these products include, but are not limited to:

1. Hydrolyzed starch derivatives,
2. Calcium chloride,
3. Magnesium chloride,
4. Lignin derivatives,
5. Tree resin emulsions, and
6. Synthetic polymer emulsions.

Other products, and properties of products, can be found in the Department of Ecology’s [“Methods for Dust Control”](#), as well as from many vendors.

Used Oil Caution:

It is important to note that used oil may **NOT** be used as a dust suppressant. [RCW 70.95-I](#) specifically prohibits the use of used oil as dust suppressant and is referenced in the “Applicable Washington Regulations” section of this brochure.

Erosion Controls

Plants, bushes, trees, earthen banks and rock walls provide natural, and more permanent, windbreaks. Other erosion control measures, such as wood or porous fences can be installed for temporary measures. Because enclosures and wind screens can be costly the feasibility of using this type of control must be determined on a case-by-case method.

Filter Fabric Around Catch Basin

Filter fabric around a catch basin is used to collect sediment from muddy water run-off. Sediment, when left to dry, can cause Fugitive Dust emissions. Sediment collected in filtering

systems must be dealt with on a regular basis. Treating mud with flocculants, or “mucking out” catch basins, are two methods to deal with the residual debris.

Flocculating Agent

This is a method using a chemical agent to bind soil particles suspended in water so that when the material dries it does not become airborne. This method might be used after a sediment catch basin is no longer needed, but before water-suspended soil can be dealt with in a more permanent way.

Minimizing Disrupted Surface Area

A conscious effort, especially during sitework and/or demolition, to disrupt only those areas that absolutely need to be cleared in order to accomplish a project can provide a variety of benefits. Vegetation left in place during sitework reduces the area subject to wind erosion. In addition, minimizing the disrupted surface area can also reduce the size of the project, potentially reducing the types and cost of Fugitive Dust control. Disturbing natural soils crusts in some geographical areas, such as Central and Eastern Washington, may unnecessarily create Fugitive Dust situations. Limiting vehicle access points to and routes within a project help to reduce these disruptions.

Paving

This is a more permanent solution to Fugitive Dust control, suitable for longer duration projects or situations. High cost is the major drawback to paving. Paving may be an appropriate solution for access roads to large development projects, where the road can eventually be incorporated in the overall plan for the area. Another appropriate use of paving might be “maintenance” projects such as parking lots and staging areas, where gravel cover is not adequate for Fugitive Dust control or erosion.



David S. Jenkins -Port of Seattle

Stabilized Construction Entrance (Quarry Spalls)

These are buffer areas that minimize the amount of material tracked on to a trafficked road surface, sometimes called “rock entrances”. These buffer areas consist of very large aggregate, usually 4” to 8” crushed quarry rock, which jars particles free from wheels and undercarriage, as vehicles travel over the quarry spalls. This aggregate is sometimes laid over a fabric road carpet to increase effectiveness.

Scheduled Work

Rescheduling work around especially windy days can potentially be one of the least expensive and easiest Fugitive Dust control measures. This can also be a totally impractical option if work crews are idle and/or this is a project with significant time constraints. It is also unreasonable to expect to discontinue work in geographical areas that are prone to high and continuous winds. However, limited use of rescheduling in extreme weather conditions might be appropriate. The high-profile aspects of certain projects and population exposed should be taken into consideration when scheduling especially Fugitive Dust producing work. Evenings and weekends are possible alternatives for scheduling work in business and school locations; while mid-day may be more appropriate for residential areas because people are more likely to be away from home.

Speed Reduction

High vehicle speeds increase the amount of Fugitive Dust created from unpaved roads and lots. Reducing the speed of a vehicle from 45 to 35 miles per hour can reduce emissions by up to 22 percent according to a Washington State Department of Ecology study (Ref. 2, page 24). However, no more than 5 to 15 miles per hour is recommended for most conditions. Speed bumps are a commonly used method to ensure speed reduction. In cases where speed reduction cannot effectively reduce Fugitive Dust, it may be necessary to divert traffic.

Street Sweepers

Street sweepers are often used in conjunction with water. Some sweepers have a spray as well as brushes. However, sweepers can spread mud when there is a lot of wetness. Some sweepers, for parking lots and smaller jobs, actually have vacuum systems to trap Fugitive Dust. Dry sweeping is discouraged, especially in very dry climate conditions, because it causes dust particles to become airborne.



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Vehicle Spillage

Covers for haul trucks help to prevent soils and other materials from being dropped on roads. However, covering loads is not required by state law if six inches of freeboard is maintained within the bed of the truck. Vehicles driving over dirt and other debris tracked onto roads can cause significant Fugitive Dust emissions. Reducing the drop height for loading equipment, wet suppression, and wind guards are effective ways of minimizing the Fugitive Dust created during loading operations.

Water Spray

Water spray, whether it is through a simple hose for small projects, or a water truck for large projects, is an effective way to keep Fugitive Dust under control. Misting systems and sprinklers are mechanisms that can be employed to deliver continuous wetness. However, there are several constraints in using water. Water can be very costly for larger projects in comparison to other methods. Heavy watering can also create mud, run-off, and environmental problems.



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Wheel Wash

A wheel wash is a method to remove mud and dirt from wheels by driving through a shallow trench filled with water or onto an area where the wheel wells and undercarriage can be hosed down. Care should be taken to keep the trench deep enough so that it is effective, but not so deep that it interferes with the mechanical operations of the vehicles. The trench may be lined with asphalt to ease maintenance in removing collected silt. A wheel wash can be used in conjunction with brooms or hoses to remove dirt from other areas of vehicles. Wheel washes must have a containment area to take care of the run-off.



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Vehicle Scrape

This is an alternative to a wheel wash when water disposal, or other environmental constraints, are present. Establishing a specific area where compact dirt or mud is removed from ledges of dump trucks, wheel wells, hitches, tires, and other confined areas, will reduce track out.

Applicable Washington Regulations

It is important to make sure that your Fugitive Dust control practices comply with federal, state and local laws. The following is a list of some of the regulations that apply; however, contact your local Air Pollution Control Agency, County Health Department and/or Public Works Department to find out the specific requirements for the area in which your project is located.

Local Air Pollution Control Agency Regulations

Contact your local air pollution control agency for the specific regulations appropriate to the location of your project. These agencies and their web sites are listed on the last page of this brochure.

Chapter 70.94 RCW – Washington Clean Air Act and Chapter 173-400 WAC

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.

Chapter 70.95-I RCW – Used Oil Recycling:

This law prohibits the use of used oil as a dust suppressant. Used oil includes any oil that has been refined from crude oil, used, and as a result of such use, is contaminated by physical or chemical impurities. If you plan to use a chemical suppressant, verify that it does not contain any used oil as an ingredient. Also, be certain that if the product contains fuel oil ingredients that the fuel oil does not contain used oil.

Chapter 46.61.655 RCW – Dropping Load, Other Materials – Covering:

This regulation prohibits the discharge of debris from vehicles and prescribes minimum loading standards in lieu of covering truck beds.

Chapter 90.48 RCW – Water Pollution Control:

Section .080 prohibits the discharge of any material into surface or ground waters that could cause pollution as defined in WAC 173-200-020(22). If your site is near surface or ground water, use dust control measures that have zero or minimal aquatic impact. If you decide to use a chemical dust suppressant, select a product with no aquatic toxicity.

Chapter 70.105 RCW – Hazardous Waste Management:

This statute prohibits the 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 (MTCA):

This law requires the identification and cleanup of hazardous sites. The Department of 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.

[Chapter 90.03 RCW](#) – Surface Water Code and [Chapter 90.44 RCW](#)

Regulations of Public Ground Water (wells):

This regulation requires a water right permit for all surface water withdrawal and for any water from a well that will exceed 5,000 gallons per day. If you plan to use water, and have questions about, call the Department of Ecology’s Water Resources Program.

Local Air Pollution Control Authorities

[Department of Ecology](#) – East Region_Counties: Ferry, Stevens, Pend Oreille, Lincoln, Grant, Adams, Whitman, Franklin, Walla Walla, Columbia, Garfield, Asotin

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

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

[Northwest Clean Air Agency](#) Counties: Island, Whatcom, Skagit

[Puget Sound Clean Air Agency](#) Counties: Snohomish, King, Pierce, Kitsap

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

[Southwest Clean Air Agency](#) Counties: Lewis, Cowlitz, Clark, Skamania, Wahkiakum

[Department of Ecology](#) – Northwest Region

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

[Department of Ecology](#) – Central Region: Okanogan, Chelan, Douglas, Kittitas, Klickitat

Participating Associations

Asphalt Paving Association of Washington, Inc.

Associated Builder & Contractors of Western Washington

[Associated Builder & Contractors Inland Pacific Chapter](#)

[Associated General Contractors Inland Northwest Chapter](#)

[Associated General Contractors of Washington](#)

[Building Industry Association of Washington](#)

[Building Industry Association of Whatcom County](#)

[Central Washington Home Builders Association](#)

[Master Builders Assoc. of King and Snohomish Counties](#)

[Tri-City Construction Council](#)

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