



## Dust Suppressants For Temporary Helicopter Landing Areas

Alan Yamada, P.E., Civil Engineer, Project Leader

The purpose of this publication is to identify dust abatement products presently being used by the Forest Service for helicopter landing areas and to uncover other roadway dust control products which may be useful. Additionally, techniques for applying the products are suggested, but the most feasible application method will depend on the accessibility of the site and available equipment.

### DUST CONTROL

The turbulent air currents created by the helicopter rotor wash drives loose soil particles into the air. See figure 1. The airborne dust particles negatively impact humans and wildlife, including aquatic life and vegetation. The dust also increases vehicle, helicopter, and equipment wear and damage due to mechanical abrasion.



Figure 1.—Helicopter landing on an untreated landing area.

There are many methods of controlling dust at permanent helicopter landing sites such as constructing a concrete pad, applying asphalt pavement, or growing a vegetative cover such as sod.

However, more often temporary landing sites are required for firefighting operations.

An important criteria in selecting a suitable temporary helipad site is to locate a landing area that will minimize airborne dust, for example, a grassy field. If the dust problem cannot be avoided at the selected helicopter landing site, then applying a dust suppressant may be a worthy option.

Utilizing dust suppressants on helipads are not limited to firefighting operations. Repeated entry to a particular location over a long time period to ferry research specialists or other personnel may warrant a dust abatement application. In these situations, a dust suppressant could be applied to a small area suitable for landing one helicopter.

### DUST ABATEMENT PRODUCTS PRESENTLY USED

On most firefighting operations, water is applied to the landing area to suppress airborne dust. Chemical dust abatement operations are administered if the landing site will be used for a prolonged period.

#### Water

Water is the most common dust suppressant used on temporary landing areas. As a suppressant, water has many advantages. It is usually free and readily available during firefighting operations.

Water is also considered very environmentally friendly, unless excessive application causes erosion and sediment runoff. The disadvantage of using water is the limited duration of the effectiveness as a dust suppressant. Water works well until it evaporates.



Evaporation may take place very quickly on hot, dry, windy days. Frequent light applications may be necessary to keep the dust under control.

Repeated applications of water over an extended period could be very labor intensive, thus, an application of a dust suppressant may be a feasible alternative to water.

### **Polybinder**

A survey of helicopter operation specialists found that Polybinder is the dust abatement product being used by the Forest Service for helicopter landing areas. See figure 2. Polybinder is an ammonium lignin sulfonate product that binds soil particles and creates a hard, crusty surface when cured.



*Figure 2.—Landing area treated with Polybinder.*

Lignin sulfonate is a by-product of the paper manufacturing process. This product is water-soluble and may leach during heavy rains. Being water-soluble, the product can be rejuvenated with additional sprinkling of water.

Some helicopter operation specialists also mentioned their reluctance to use Polybinder or any dust abatement other than water for various reasons. Reasons given included costs, difficulty in applying products while landing area is being utilized, availability of products, and others. Another reason is the landing area soil material would be tacky before it has time to cure. Field units would step in this tacky material and track it into helicopters. According to the supplier, Polybinder's tackiness has been greatly reduced when they changed to the ammonium lignin sulfonate. The curing time of the dust abatement product depends on the type of soil material, moisture content of the soil material, ambient temperature, humidity, dilution ratio of the dust abatement product, and the application rate. The important variables that

can be controlled are the application rate and how the dust abatement product is applied.

### **APPLICATION METHODS**

If a chemical dust suppressant product is used, frequently they require some dilution prior to application. The product can be mixed in a water tank truck, commonly used for roads, with a distributor spray bar attached to the back. The dust abatement concentrate can be mixed with water in a dip tank or a collapsible tank and sprayed on the needed area with a Mark III pump or dispersed with a bucket suspended from a helicopter. Eductors on the discharge side of the pump from a fire engine or a Mark III pump are also used. The eductor siphons the concentrated dust abatement liquid from a 5-gallon can while the landing is being sprayed. For smaller remote areas, a 2-gallon garden watering can with a spout can be used to spread the liquid mixture.



*Figure 3.—Truck applying dust abatement product to landing site.*

The preferred application method uses a water tank truck with a spray bar as shown in figure 3. This method provides the best control for the amount of dust control liquid being applied to the soil surface. The curing time is minimized because only the required amount of dust abatement product is applied uniformly to the landing area. Dropping dust abatement products from a helicopter bucket produces drop patterns with various application concentrations. Some areas will have more solution than required and will take longer to cure. An eductor with a fire engine or a Mark III pump has been used but the dilution ratio and the application rate are not uniform.

Sometimes prewetting the ground with water is done to increase the penetration depth of the dust abatement solution on soils with very low moisture content.

Two light applications of the dust abatement product may be more effective than one heavy application. Consult the product supplier for proper application rates and application methods.

## **DUST ABATEMENT PRODUCTS USED ON ROADWAYS**

The following products are used on aggregate surfaced or native soil roadways to control dust. The intent of this section is to provide brief descriptions of the products used to control dust other than Polybinder. This publication is not promoting or endorsing the use of any of these products. Some of the suppliers of these products are listed at the end of this Tech Tip. The suppliers should be contacted for additional information, product costs, dilution requirements and application procedures.

The road managers and geotechnical engineers on the Forest or in Regional Offices are excellent sources of information. They are familiar with the soil types in the local area and could suggest successful dust abatement products that have been used. The road managers are also familiar with dust abatement suppliers, local contractors capable of applying the products, and availability of equipment.

### **Other Lignin Sulfonates**

Lignin sulfonates used in dust control applications are usually calcium, sodium, or ammonium lignin sulfonates. Dustac is an ammonium lignin sulfonate and Road Binder is a calcium lignin sulfonate.

### **Magnesium Chloride, Calcium Chloride**

Magnesium chloride and calcium chloride are commonly used to control dust on roadways, but they contain salt and can be corrosive. Some manufacturers provide these dust abatement products with anti-corrosive agents. These products are deliquescent and hygroscopic, meaning they retain moisture and reduce evaporation rates. Calcium chloride is available in flakes or pellets, which are easier to transport than liquid. Magnesium chloride is marketed as DustGuard, and Dust Off.

### **Tree Resin Emulsions**

These emulsions are produced from pine tree resins. They are applied as a liquid after dilution and cure to a hardened surface. These products act as an adhesive, binding soil particles together. These products are low in solubility, therefore additional water will not rejuvenate the product after it is cured. These products include Road Oyl, Enduraseal200, Dustbinder, DustControlE, and Dustrol EX.

### **Synthetic Polymer Emulsions**

Synthetic polymer emulsion formulations are composed of polyvinyl acetates, vinyl acrylic copolymers, copolymer methacrylates, and polybutadiene. These synthetic products have been referred to as "Elmer's Glue" and have been used on landing areas in the past but are not used today.

The products act as adhesives, binding the soil particles and hardening when cured. Products include Soil Sement, Soil Seal, Top Seal, ECO-CF, Soil Master WR-RSB, Aerospray 70A, and Marloc.

### **Vegetable Based**

Dust suppressants manufactured from vegetable by-products are available and the suppliers claim these products to be biodegradable and non-toxic to humans and the environment. These products include Dustkill, a soybean by-product; Greenplus Dust Control Agent, a by-product from processing canola oil; and Dust Down, a product from the desugarization of sugar beet molasses.

### **Synthetic Organic**

A product introduced in 1998 is a synthetic organic dust control product that the manufacturer claims to be extraordinarily safe and friendly to the environment and humans. This product called EnviroKleen is clear, odorless, and oil-sheen free.

## **SUMMARY**

Water is the most common and widely used product for controlling dust on helicopter landing areas. Only on sustained operations are dust abatement products other than water considered. Based on the people surveyed, Polybinder is the product most applied as a dust suppressant on helicopter landing areas.

The dust abatement product should be applied in a controlled manner to limit the amount of the product being consumed, minimize the impact to the environment, increase the effectiveness of the product, and minimize the curing time. A dust abatement product should also be non-toxic to plants and animals, allow the landing area to revegetate, and be fairly easy to clean off of the equipment.

Excellent sources of dust control information on a Forest would be the road manager and the geotechnical engineer. They are familiar with the soil types in the area, successful products, local suppliers, and contractors that have the proper equipment to apply the products.

## PRODUCT SUPPLIERS

### LIGNIN SULFONATE

#### **Polybinder**

Jim Good Marketing  
Shafter, CA  
(805) 746-3783

#### **Dustac**

Eterna-Line Dust Abatement, Inc.  
Boise, ID  
(208) 322-7000

Georgia-Pacific Corp.  
Bellingham, WA  
(360) 733-4410

Western Feed Supplements  
Yakima, WA  
(509) 248-8961

#### **Road Binder**

Georgia-Pacific Corp.  
Bellingham, WA  
(360) 733-4410

### MAGNESIUM CHLORIDE

#### **DustGard**

Great Salt Lake Minerals Corp.  
Ogden, UT  
(800) 453-4516  
(801) 731-3100

Pelletrox  
Portland, OR  
(800) 452-0736  
(503) 285-2626

Dust Chem  
Ogden, UT  
(800) 869-6406

#### **Dust Off**

Cargil Inc. – Solarchem Resources  
Newark, CA  
(800) 544-2498

South Western Sealcoating, Inc.  
Murrieta, CA  
(909) 677-6228

Pelletrox  
Portland, OR  
(800) 452-0736  
(503) 285-2626

### CALCIUM CHLORIDE

Great Western Chemical Co.  
Seattle, WA  
(206) 763-2350

Hills Brothers Chemical Co.  
Portland, OR  
(800) 257-1920

Oxford Inc.  
Moyie Springs, ID  
(208) 267-2297

### TREE RESIN EMULSION

#### **Road Oyl**

Soil Stabilization Products, Inc.  
Merced, CA  
(800) 523-9992

#### **Enduraseal200**

Pelletrox  
Portland, OR  
(800) 452-0736  
(503) 285-2626

#### **Dustrol EX**

Lyman Dust Control  
Courer D'Alene, ID  
(604) 828-0218

#### **Dust Control E**

Lyman Dust Control  
Courer D'Alene, ID  
(604) 828-0218

### POLYMER EMULSION

#### **Top-Seal**

Base Marketing International  
Kileen, TX  
(817) 526-5550

#### **Soil Seal**

Soil Stabilization Products, Inc.  
Merced, CA  
(800) 523-9992

#### **Soil Sement**

Midwest Industrial Supply, Inc.  
Canton, OH  
(800) 321-0699

#### **Aerospray 70A**

Cytec Industries  
Bountiful, UT  
(800) 835-9844

#### **Marloc**

Reclamare Company  
Seattle, WA  
(206) 824-2385

#### **ECO-CF Soil Binder**

ECO Polymers  
Los Angeles, CA  
(213) 954-2240

#### **Soil Master WR-RSB**

Environmental Soil Systems, Inc.  
Granada Hills, CA  
(800) 368-4115

### VEGETABLE BASED

#### **Dustkill**

Dustkill  
Columbus, IN  
(812) 376-7288

#### **Greenplus Dust Control Agent**

Greenland Corp.  
Ennis, MT  
(406) 682-5237

#### **Dust Down**

Albina Asphalt Co.  
Portland, OR  
(800) 888-5048

### SYNTHETIC ORGANIC

#### **EnviroKleen**

Jim Good Marketing  
Shafter, CA  
(805) 746-3783

Photos courtesy of Jim Good Marketing.



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