

Roads Tech Tips

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A DEMONSTRATION OF A DUST PALLIATIVE

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Background

Asphotac is a proprietary asphalt emulsion that is distributed by Actin, Inc., East Chicago, Indiana. The product has been used to control dust problems at various industrial steel production companies in northwest Indiana. Asphotac was demonstrated on Road 2901, Fremont National Forest, Silver Lake District, Oregon. The road was 10.7 miles long and 16 feet wide with turnouts approximately every 500

feet. Its elevation varied from 4800 to 6800 feet with an average grade of 6 percent. A third of the road was flat and maximum grade was 12 percent. Prior to the Asphotac application the road had 4 inches of 1/2-inch minus crushed aggregate base course. The rock had been compacted until visual displacement ceased, and the road had a smooth running, out-slope surface.

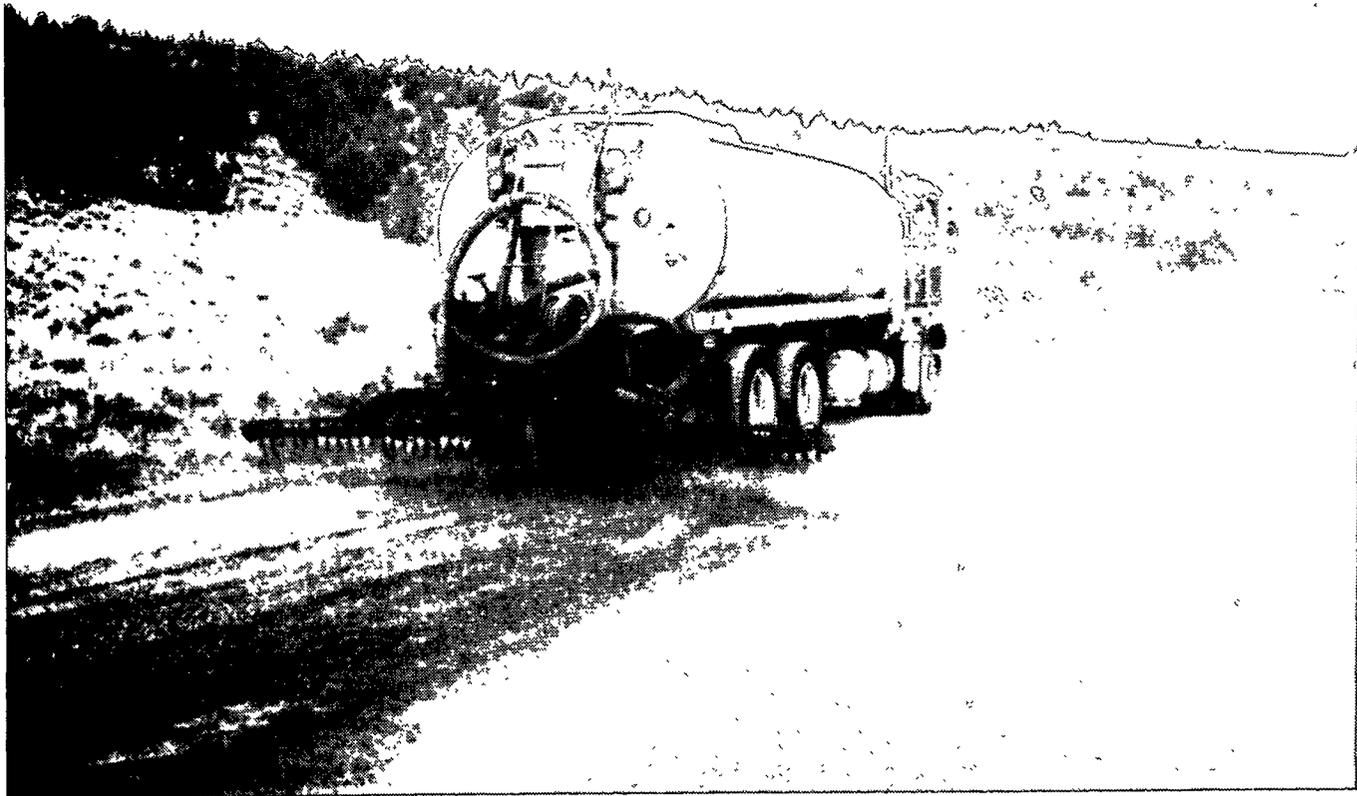


Photo 1. Asphotac Application



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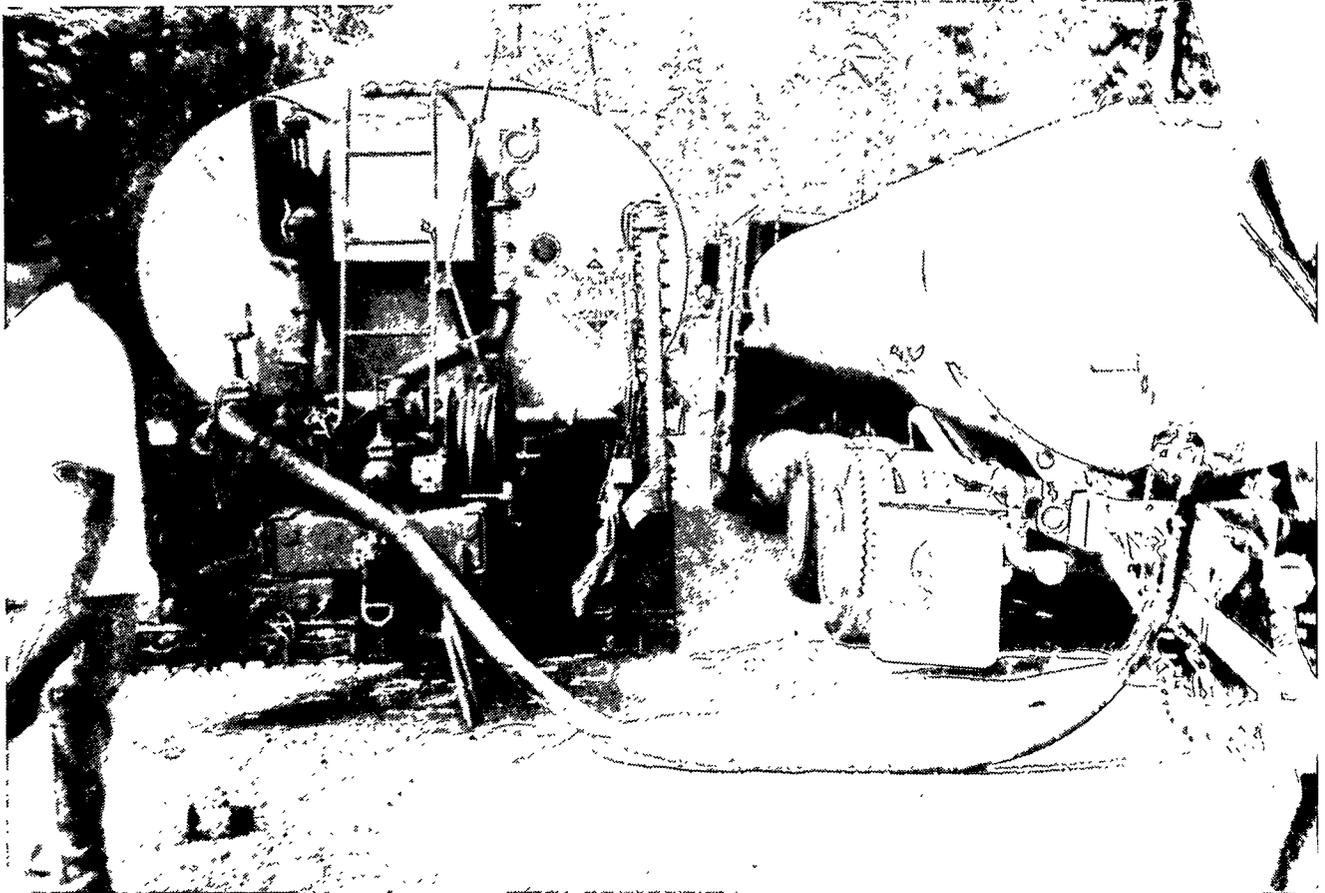


Photo 2. Mixing Asphotac Concentrate and Water on Job Site

Water was supposed to have been the original dust abatement material, but water is not an abundant resource because the Fremont NF is on the dry side (eastside) of the Cascades. The Forest had been investigating different methods of dust abatement other than using water. This product would satisfy that requirement and would better protect the Forest resources and road investment as well as maintaining traffic safety better than water.

Asphotac Application

Asphotac arrived at the job site in a concentrate and was mixed on the job site. For this project, the concentrate was diluted one part concentrate to five parts water (photo 2). Almost any water source may be used to mix with the concentrate. The Forest's water sources were a spring-fed pond at the end of the project and the District Compound. Since the road had been shaped, no other preparation was

necessary. A total of 0.60 gal per sq yd of mixture was applied (or 0.10 gal of concentrate) in three applications. First application was 0.30 gal per sq yd, second and third were both 0.15 gal per sq yd. The road's moisture content needs to be less than optimal before application. Lower moisture will allow Asphotac to penetrate quickly and deeply, due to the mixture's high water content.

After the first application, bubbles formed on the road surface indicating that the voids in the road were being filled (photo 3). Penetration was 1 to 1-1/2 inches after the first application. The other two applications did not penetrate as much, but developed a thin surface crust. Traffic, because of Asphotac's fast penetration and curing time, can resume almost immediately after application without harm to vehicle or road.



Photo 3. Bubbles Forming on Road Surface During First Application

Test Results

The timber volume was 2 million board feet, and it took about 2-1/2 months to haul the volume. Important properties of successful dust palliation, according to "An Evaluation of Dust Abatement Material Used in Region 6" by Brian Langdon, are as follows:

1. The product should penetrate.
 2. The product should leave a useful residue.
 3. The useful residue should resist leaching.
 4. The useful residue should impart cohesion to dust particles.
 5. The useful residue should resist aging.
- Rain occurred the day after the Asphotac application and no apparent leaching.
 - The dust that occurred on the Asphotac-treated portion seemed to settle quickly. Halfway through the haul, the observers noticed that the Asphotac had penetrated the first two inches of depth and lightly coated the aggregate and soil particles. This added weight of the coating shortened the airborne time of the particles.

- Traffic can start using the road soon after application; therefore, no road closure is necessary (see photo 4).
- The contractor's crew that applied Asphotac seemed pleased with the material because it did not plug their equipment and spreader bar.
- No water pre-treatment is necessary when using Asphotac.
- The only water used is in the mixture, thus the total amount of water needed is predetermined and not wasted.
- Washboarding started to occur on the grades and sharp curves in two weeks and it started on the flat portions after four weeks.
- Washboarding occurred on 80 to 90 percent of the road by the end of the haul.
- Road maintenance had to be accomplished because of excessive washboarding.

The Forest Service Force Account Crew noticed that the Asphotac treated roadway was easy to scarify and repair, making the crew's work faster to accomplish.

Project Cost

The equipment, with operators required for Asphotac to be applied, included a tanker truck for the Asphotac, a water truck to dilute it, and a spreader truck. The actual project cost for the 10.7 miles of the Asphotac application was:

Actual application rated gal/sq yd	0.1
Unit cost including transportation and application costs	\$2. per gal
Product Cost	\$23,000.
Water Cost	\$1,200.
Total Project Cost	\$24,200.



Photo 4. Traffic Can Start Using the Road Soon After Application

Conclusions

The observers concluded that Asphotac met the properties of a successful dust palliation. Asphotac demonstrated good resilience after the maintenance crew reworked the road. Asphotac was still controlling dust.

Asphotac for this project did not prevent washboarding or potholing, but prevention of washboarding or potholing are not requirements of dust palliation. Asphotac succeeded as a dust palliative throughout the haul (see photos 5 and 6).

Specifications Asphalt Emulsion SS-XTAL-100

Viscosity, Saybolt Fural at 77°F (seconds)	= 20 - 100
Storage stability test, 24 hours, percent	= less than 1
Demulsibility, 50 ml, 0.01 NCaCl ₂ , percent	= less than 30
Sieve test, percent	= less than 1
Residue from distillation, percent	= 48 to 52
Settlement 5 days, percent	= less than 3
Comforms to Requirements of OSHA Standard 1910.1200	

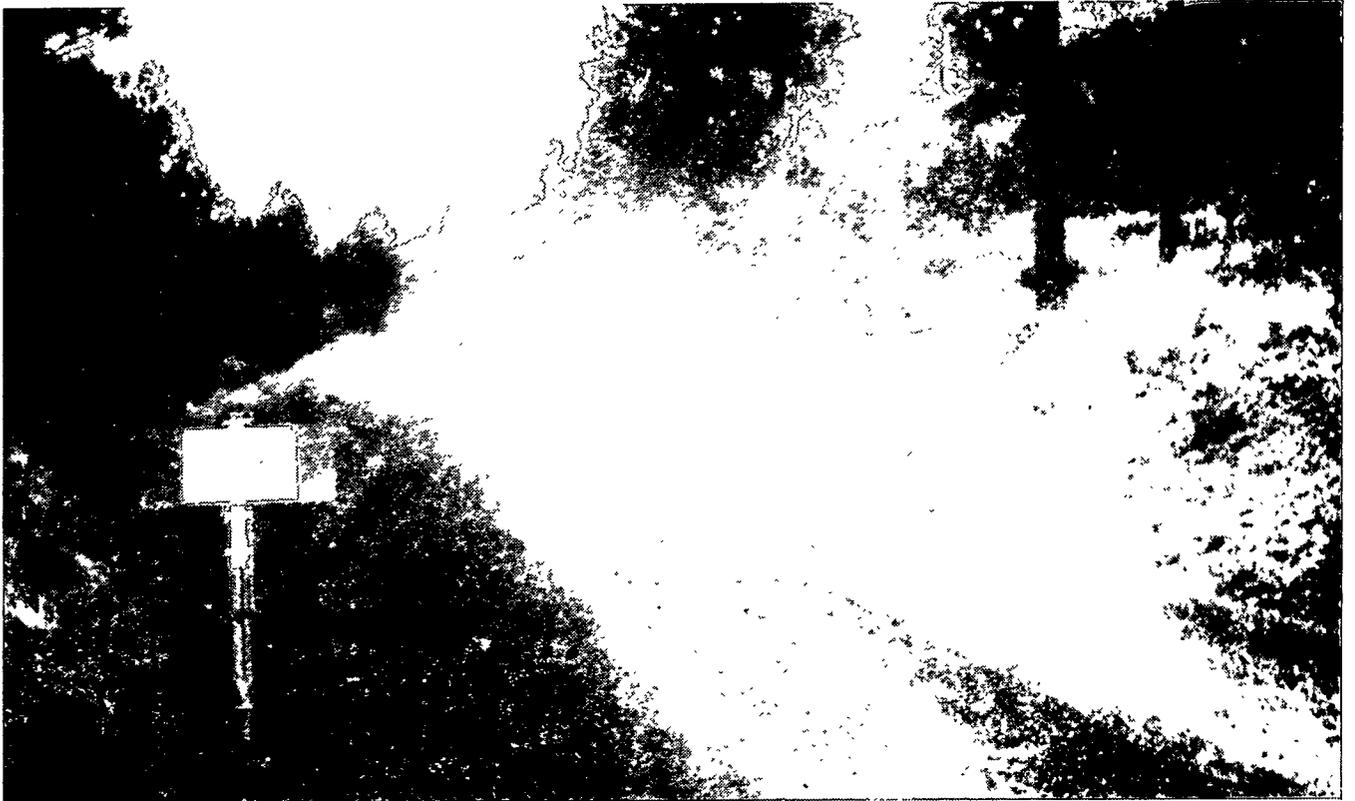


Photo 5. Traffic on Asphotac, Day 10.



Photo 6. Traffic on Asphotac, Day 40 (3/4 of Timber Haul).

Manufacturer's information on Asphotac can be obtained from:

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