



Spring Grading of Your Dirt and Gravel Roads

For road crews, the spring thaw signals the end of winter and the beginning of spring grading season. Nearly every municipality has dirt and gravel roads in need of repair. (Even the city of Philadelphia maintains more than six miles of dirt roads each year.) That means that sometime between March and June, depending on your location and elevation, you will need to get out and begin work on your dirt and gravel roads.

Spring grading of these roads prepares the road surface for summer traffic by rebuilding a proper surface structure to shed road drainage and restructuring materials to reduce dust. To fully understand how important spring grading is, you must first understand winter's effects on the road and how spring brings ideal conditions for preparing the road for summer.



Ideal Wet Conditions

Over the winter months, excess water becomes trapped in the roadway. Because roadside plants and trees that normally would pull groundwater from the road area are dormant during winter, roadsides become saturated with excess water. The freeze-thaw cycle further saturates the road by drawing large amounts of water upward. Then, as the road thaws from the surface downward, water becomes trapped between the road surface and underlying frozen soil.

As melting snow and early rains add more water and soon mud to the roadway, spring is the toughest time of the year for any unpaved road. The good news for road maintenance crews is that during what quickly becomes "mud season," excessive spring moisture ironically becomes the key to repairing the road.

When the road thaws, it becomes uniformly wet, creating ideal grading conditions that cannot be duplicated during sustained rain events or summer downpours. Uniform moisture, from the road base to the road surface, is crucial to proper grading. This top-to-bottom moisture lubricates road particles and allows them to be moved more easily during grading operations. Proper moisture also prevents aggregate from segregating by size, as would happen during the grading of dryer material. Finally, adequate moisture levels throughout the entire road structure help to achieve proper compaction of the driving surface.

Proper Drainage

The initial spring grading is the best time for road maintenance crews to ensure that they have provided for proper drainage of the road. Road crews can salvage berm material that has been pushed to the side of the road by traffic and winter maintenance activities and

incorporate this valuable material back into the road surface. With the use of a grader or a road drag, road crews can cut into this berm material, move it onto the center of the road, and mix it with existing road surface material.

Springtime's high moisture levels create the ideal conditions to aid in this process of reincorporating berm material. Grading equipment can cut deeper into the existing wet road surface to loosen the fine material and reincorporate it with the larger berm material to get a quality road surface. By allowing material to ride up the grader blade and roll back onto its self, road crews can achieve an effective mix of the larger berm material with the loosened fine road material. Without uniform moisture to adequately lubricate all road materials and prevent segregation by particle size, this task would be both difficult and costly.

Dust Control

Spring grading also plays an important role in reducing road dust. By incorporating the proper techniques now, you will notice less dust and fewer complaints from drivers and adjacent landowners throughout the rest of the year.

Most dirt and gravel roads in Pennsylvania are made by placing purchased hard aggregate over a much softer native material. As long as the hard stone remains incorporated into the road surface, the road remains stable and solid. But traffic on the road often causes larger stones in the aggregate to become loose and to migrate toward the edge of the road, where the stones collect in windrows. Under the abrasive force of traffic, these harder stones grind against the road surface, creating loose, fine material that ends up as dust.

If you see significant windrows of loose stone along the edge and centerline of the road, you know the road needs to be graded. Road compaction is the key to avoiding road degradation and dust generation that occurs when loosened material travels back to the raveled windrow on the road edge.

Compaction is Critical

Road compaction is often the most overlooked component of sound road maintenance. Too many maintenance crews rely on traffic alone to compact a freshly graded road. But, since traffic tends to run the same path over and over, this practice actually speeds up the creation of unwanted and expensive-to-repair rutting.

Compaction in the driving lanes will destroy the road crown that spring grading operations just achieved. To prevent the loss of road crown and to lengthen maintenance cycles, road crews should ensure that the road is uniformly compacted after all grading operations.

A simple pull-behind static roller works wonders and is an affordable option for most municipalities. If compaction equipment is not available, graders and other equipment can be used instead. A few parallel passes over the recently graded road segment will help to compact the road material, set the crown, and reduce the need for future maintenance efforts.

THE IMPORTANCE OF SPRING MAINTENANCE in preparing dirt and gravel roads for year-round use cannot be overstated. "Mud season" will not last forever, so get out there and take advantage of those wet spring conditions before the warmer days of summer arrive.

Reference: Moving Forward, PennDot LTAP, Winter/Spring 2008