

Appendix 4: Geotextile Use for Forestry Roads*

Geotextile fabric keeps fine soil particles in the roadbed from getting mixed into the gravel or rock that is laid atop the road surface. Tests show that it takes only about 20% (by weight) of roadbed soil mixed into the surface gravel to reduce its load bearing capacity. This problem usually is due to the movement of large amounts of water. When heavy loads cross the surface of the roadway, they essentially “pump” water upwards and move soil particles, which increases the likelihood of road failure.

Selecting geotextile

Two important criteria for selecting a geotextile are permeability and strength:

1. **Geotextile material must be permeable**, and allow water to move through it while retaining the fine soil or sand particles. It should let water pass through it at the same rate or slightly faster than the adjacent soil. It must also retain the smallest soil particle size without clogging or plugging.
2. **Consider the material strength properties** when selecting a specific geotextile fabric. Be sure to take into account how its physical properties will survive the road construction process as well as how it will survive the pressures of traffic on the graveled surface and enhance the life of the road. These strength properties are described in manufacturers’ literature and design manuals in a variety of terms including burst or abrasion resistance, and puncture, grab, or tearing strength.

Tips for Selecting Geotextiles

- Select geotextile that will perform best for your given soil, moisture, equipment, traffic and expected amount of gravel surfacing. Find out from others who have used geotextiles what worked best for them
- You will need to know the soil characteristics and permeability of the roadbed, and match them to the permeability of the geotextile fabric.
- Select geotextile that can withstand installation and survive the construction period without puncturing, tearing, bursting, or fraying.
- Use the correct type of surfacing material. If gravel is to be used for the road and traffic will travel directly on the aggregate, then you must provide more fines (15% or more) or the aggregate will slip off the fabric.

Installing Geotextiles

1. Shape the roadway and establish the crown. Roll the fabric down the road. Standard roll widths usually make it necessary to use one roll per lane of road.
2. If there is much wind, you may need to weight the sides and end with shovels full of gravel, or use spikes to pin the fabric down.
3. Overlap the fabric at the centerline as recommended by the manufacturer’s instructions. The absolute minimum overlap recommended is 12”. Overlap the end of the preceding roll over the top of the next roll in the direction that the gravel will be spread to minimize wrinkles and shoving of the geotextile fabric during spreading and blading of gravel.
4. Dump and spread the gravel or base course material using normal methods. But make sure you do so in the direction of the laps. A minimum of one-foot (1’) of surfacing material is typically recommended.

5. In unusual conditions, particularly in extremely wet and soft areas, end dump trucks should back up while depositing gravel. This allows the truck to be driven on the gravel rather than on the fabric and will minimize rutting of the subgrade by the truck tires.
6. When two or more rolls are used side by side, always dump aggregate on the top layer and blade over the lap to the next layer. ***Always avoid driving onto the geotextile fabric with any equipment.***
7. If the geotextile is ripped or torn during gravel placement, place a piece of geotextile over the torn area to cover three feet (3') in all directions from the tear.
8. Once the surfacing material has been applied over the geotextile, begin blading. Be careful that the blade does not dig into the base course and displace or rupture the fabric.
9. If rutting of the subbase occurs after the geotextile has been placed, the ruts should be filled with new gravel. Do not attempt to regrade the existing surface without adding new gravel since you may tear the geotextile.

** Excerpted and adapted from: "Geotextiles in Road Construction, Maintenance and Erosion Control".
College of Engineering, University of Massachusetts at Amherst, undated.*



Photos of geotextile underlayment and stone aggregate applied atop a freshly-graded forest road on Rendezvous Mountain Educational State Forest in Wilkes County, NC. March 2008.