

## **What are “dirt” trails made of?**

Although not commonly understood, soft trail surfaces are usually *not* made out of dirt. Like dirt roads, they are usually composed of a highly engineered mixture of crushed rock. In New Hampshire, the rock used is the state’s famous granite.

### ***What is this soft trail surface called?***

One of the causes of confusion is the various names for the material. Common variants include:

- Stonedust
- Hardpack
- Knit pack
- Crushed gravel.

All refer to the material used for most “dirt” roads. However, the requirements for roads can differ from the requirements for trail surfaces.

### ***Northern Rail Trail background***

The Friends of the Northern Rail Trail in Merrimack County needed to create an excellent bicycling and walking surface for 34 miles, most of which had been improved by the Boston & Maine Railroad with ballast rock. Ballast is an excellent surface for railroad tracks, since it drains well and resists erosion. But when the ties and rails are removed, this rock is an extremely annoying surface for bike riding or walking.



*Ballast rock surface*



*Stonedust (Hardpack) surface*

When the Friends group started in 2005, we ordered material from a local supplier without being particular about the composition. This worked fine for the first two years. Then disaster struck. After going through considerable effort in the third year, we resurfaced the trail with a material that bicycle riders hated. It was too “stony.” We had to go back over the entire two miles with fine material. That corrected the problem, although the results were not as good as if a better mixture had been used in the first place. However, having to do the two-mile project twice caused great distress within the Friends group.

In the fourth year, Alex Bernhard did some research and found out how the National Park Service handles the excellent surface on the carriage roads at Acadia National Park. The trick is to have a mixture of fine, medium, and coarse crushed stone material. Too much of the fines, and the surface is like sand. Too much coarse material, and the results feel stony. The intermediate material helps make the whole mixture “knit” together into a fairly hard, flat surface.

This background caused the Friends of the Northern Rail Trail in Merrimack County to buy the material with a specification and then test samples against the specification before applying it. Chris Gamache of Trails Bureau initially objected to specification testing being part of Recreational Trails Program (RTP) projects. He asked if federal Transportation Enhancement (now Transportation Alternatives) projects require material specification and testing. We were able to show that they do, and Chris gracefully accepted the testing as a legitimate RTP project cost.

Using this process, we were able to complete our 34 miles of stonedust application without additional stonedust problems.

### ***Trail Building Process***

In our first few miles, we graded the ballast rock to the side of the trail before applying the stonedust. Then we realized that the railroad had a point. The ballast helps protect from erosion. We adjusted our approach to the following steps:

- Use a road grader to level the ballast rock.
- Employ a vibratory roller to compact the ballast into the soil. [Remark: At this point the trail was rideable with a mountain bike.]
- Apply 6 inches of stonedust.
- Compact the result using the vibratory roller.

Bruce Bohannon managed a Swanzey project to upgrade the Ashuelot Rail Trail south of Keene. He used a deluxe approach that resulted in a more uniform trail width. The main problem Swanzey has is holes created by chipmunks. We may have avoided chipmunks by using ballast rock under the stonedust. Or perhaps the Keene area is loaded with chipmunks.

### ***Hardpack specification***

Specification of the stonedust material relies on sieves of various sizes that test the percentages of the material that pass through. For example, the NH DOT specification for Stone Dust Wearing Surface for Trails (Item 304.7) says the following:

*3.1 Stone dust shall be a clean, granular, well-graded and free from clay, sand or organic material. It shall be crushed stone screenings made of hard, durable, sharp edged rock fragments, free from dirt or other deleterious matter.*

*3.2 Stone dust material shall conform to the gradation limits in Table 2. A sample shall be submitted to the Engineer for approval prior to use. The stone dust shall be from a single source for the entire project.*

**Table 2—Stonedust Materials—Required Gradation**

<b>Sieve Size</b>	<b>Percent Passing by Weight</b>
<i>9.51 mm (3/8 in.)</i>	<i>100</i>
<i>4.76 mm (#4)</i>	<i>75-90</i>
<i>2.00 mm (#10)</i>	<i>45-65</i>
<i>0.297 mm (#50)</i>	<i>15-25</i>
<i>0.149 mm (#100)</i>	<i>10-15</i>
<i>0.074 mm (#200)</i>	<i>6-12</i>

My memory is that we only had three size gradations for our RTP projects, but that may be wrong. We did find that the largest fragments should pass the 3/8 inch sieve. Such a mixture is often referred to as “3/8 minus.”