

Vegetated Riprap (Root-Rap, Compost Grouting)



This method is a bioengineering practice for establishment of plant material within the voids of typical riprap. The concept is to inject compost, or organic soils into the riprap voids, then seed the area. We expect to see this practice applied where vegetation is preferred for ecological or aesthetic seasons, yet traditional riprap is required for slope stability or scour prevention. This method has been considered a success along the rocky north shore TH61 roadsides, and is now being applied throughout the state. MnDOT Specification 2577 (Soil Bioengineering Systems) have two applicable specifications for placement of riprap, soil, and overseeding of the riprap voids (2577.3 H Root-Rap & 2577.4 D Granular Channel liner). Costs are similar to sod installation (though this does not include the riprap itself). Where there is suitable light and water, we surmise that this method is better at shoreline protection than either riprap or vegetation alone. The following photos are of this method being applied at the site of the TH23 DeSoto Bridge replacement in St. Cloud. Final grading and site restoration of the temporary access road called for riprap to the top of the bank. In order to vegetate the area, MnDOT worked with DNR and the City of St. Cloud to develop a solution to meet all parties interests. MnDOT desired riprap for protection of the slope adjacent to bridge abutments, while the DNR and city desired natural vegetation. The agreed to plan called on Composted Riprap as a solution. For more information on the development of this method see: http://www.glc.org/basin/pubs/projects/mn_AppNatRes_pub02.pdf

This method has proven successful on open slopes, though has only recently been applied adjacent to bridges or open water. Application should be limited to areas above the expected flow line of the river and more than 10 feet away from abutments or the 'drip line' of a bridge.

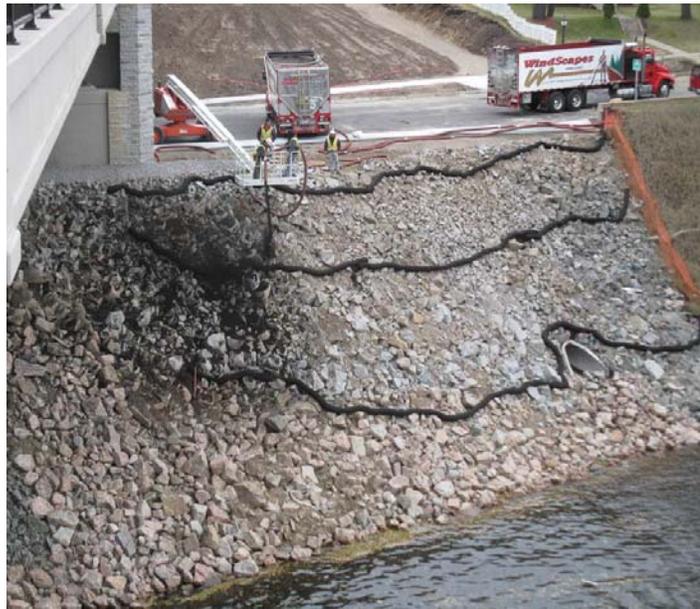
In the photos on the next page, a Grade 2 leaf and grass feedstock compost, at a rate of 270 cubic yards per acre was applied. This typically filled the riprap voids. Typically voids are filled approximately $\frac{3}{4}$ full. Compost is not always required, though soils suitable for plant growth is required. Downslope perimeter controls may also be required to limit movement of the compost or soil due to rain and wind events until plant establishment. Unless controlled, over time natural succession from grasses and forbs to shrubs and trees will occur due to seed dispersal from adjacent vegetation.



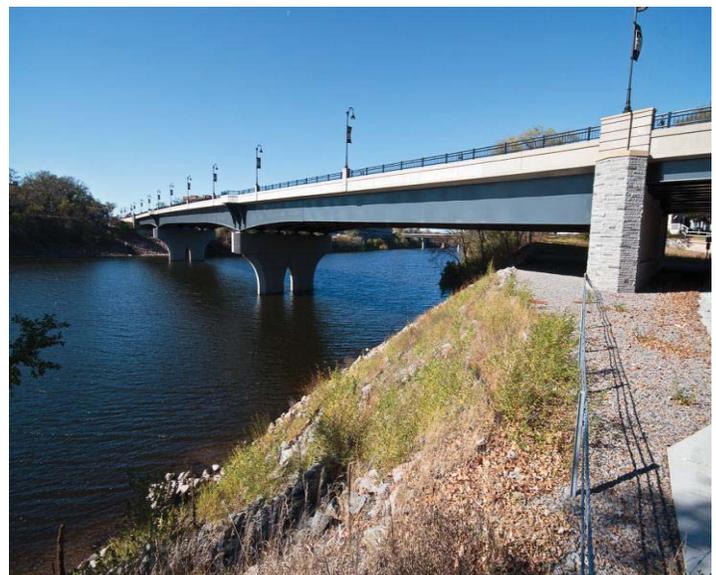
In this example sediment control logs were placed horizontally to break the slope for erosion control purposes. Also, the steep slope was not favorable for safely walking on, so a boom truck was called upon for broadcast application. Ideally the compost should be truly injected into the voids, though in this case was broadcast over the entire area with hopes of it settling into the voids prior to the winter setting in. Seeding followed compost placement. In this example project, applied seed did not germinate as expected. This was determined to be a combination of the south facing slope along and drought conditions. Subsequent years growth was noted to include species from natural dispersal of adjacent vegetation.



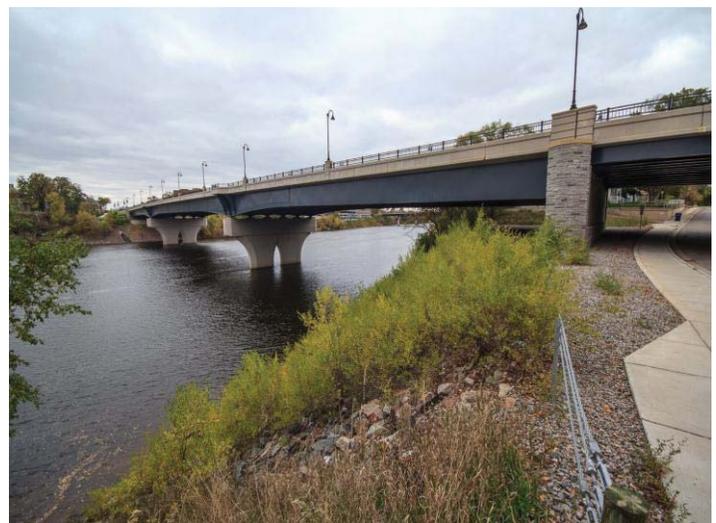
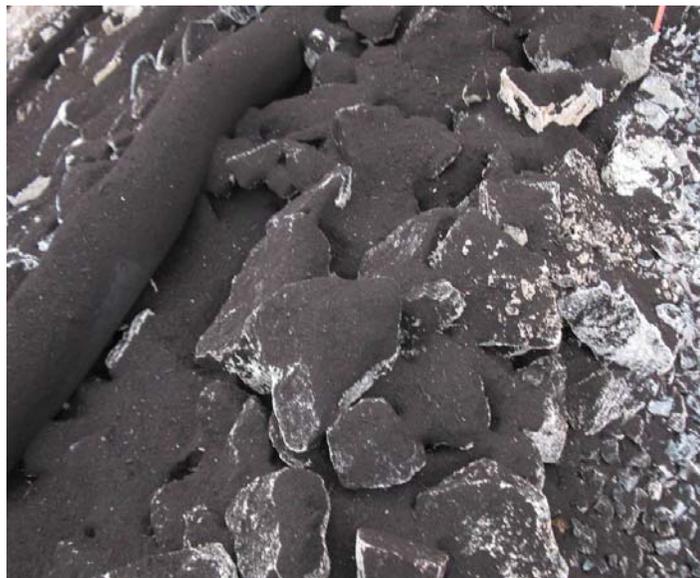
First spring (2010)



The TH 23 Mississippi River Crossing project was installed during in the fall of 2009.



One year later (2011)



Third year (2013)