

Remit To: P.O. Box 1289, Issaquah, WA 98027
425-392-1200 (office) 425-392-4335 (fax)
www.soildynamics.com



◆ 2001 AWARDS OF ENVIRONMENTAL EXCELLENCE



◆ 2001 AWARDS OF ENVIRONMENTAL EXCELLENCE

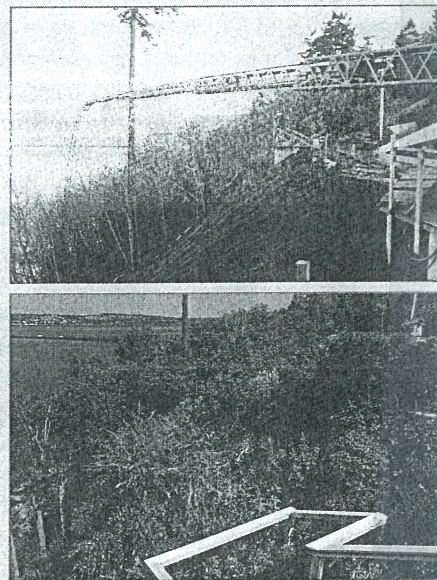
Using Soil to Save Soil

To the diverse and growing list of erosion control materials, add one more: living soil. But this isn't the run-of-the-mill dirt typically found at construction sites. It's EssentialSoil, a patent-pending mixture of mineral soil, compost tea (made by steeping compost in water), protozoa, bacteria, fungi and other aerobic microorganisms, worms, and oxygen developed by Hendrikus Schraven in Issaquah, Washington.

This product has earned IECA's 2001 Excellence in Technology Award. The annual award recognizes a new practice, design, or process that combines technological and environmental considerations to reduce erosion and sediment and improve water and air quality.

Custom-blended for specific site conditions, EssentialSoil can be applied on disturbed sites using a teleconveyor or a blower. A blower developed by Schraven can shoot the material through a 10-cm- (4-in.-) diameter hose as far as 152 m (500 ft.) or more at rates up to 31 m³ (40 yd.³) per hour, he reports. The 0.6-m- (2-ft.-) thick application of the material resists erosion on slopes greater than 70° without any netting to hold it in place, he adds.

Such sites include a landslide restoration project in Seattle, Washington. "The slope was hydroseeded late in the growing season and withstood several weeks of continuous wet weather, including downpours, before the seed even began to germinate," recalls Schraven, who



Installation of EssentialSoil and establishment of vegetation seven weeks after planting

All photos: Hendrikus Schraven Landscape Construction & Design



Before (left) and three months after installation (right) of EssentialSoil on an eroded slope

earned IECA's 1998 Contractor of the Year Award. "On other projects in the Pacific Northwest region of the United States over the past three years, we've used this material to produce 13- to 15-centimeter- (5- to 6-inch-) tall stands of native grasses in eight to 10 weeks on slopes without any erosion control blankets or mats to protect the sites."

Soil Dynamics, a division of Hendrikus Schraven Landscape Construction & Design Inc., markets EssentialSoil. Schraven developed the product to overcome the limitations of current slope construction and renovation practices. In some cases, he says, they actually encourage erosion. Usually these practices leave a surface layer of hardpan. These densely packed soil particles reduce water infiltration significantly, increasing runoff and the potential for erosion. In addition, plant roots can't penetrate the compacted soil pores. So erosion-controlling vegetation dies and, therefore, fails. That's not all: Lack of oxygen in the tight soils kills microbes, the key to maintaining a healthy soil structure and converting soil nutrients into a form that plants can use.

Schraven's product closely imitates the erosion-resisting and nutrient-recycling abilities of natural topsoils. "We can apply it in at least 0.3- and 0.6-meter- (1- and 2-foot-) thick layers so that in as little as one day we can accomplish what takes nature hundreds to thousands of years to establish," he points out. "We're using microbes to reestablish a natural, self-sustaining ecosystem on the hillside."

Schraven says natural topsoils, removed during slope construction, can be used to achieve similar results if done correctly. This requires that slopes be of minimum incline, the saved topsoil be of highest quality and not compacted when reapplied on the slope, and the subsoil be scarified.

"In many cases, however, soil removed prior to construction for saving gets stockpiled," he explains. "This disturbs the microbiology and natural balance of the soil, which was originally formed in microlayers deposited over hundreds to thousands of years. This disturbance immediately destroys the soil's percolability and ability to bond, and oxygen within the soil structure is lost,

making it susceptible to rain saturation and runoff or sliding.

"EssentialSoil has the ingredients to reproduce nature's 100% organic process from microbes to raw materials. When combined with the application process, it is effective on steep slopes and in other applications."

Schraven reports that in geotechnical lab tests conducted by Shannon & Wilson Inc. in Seattle, saturated EssentialSoil remained stable during tilt table trials where slopes exceeded 70° from horizontal. The product was also tested at San Diego State University's Soil Erosion Research Laboratory in California. A test bed, on a 2H:1V slope and covered with a 31-cm- (12-in.-) thick layer of the material, was subjected to the erosive forces of three successive simulated rain events within 24 hours, each equal to a standard 10-year storm event of the Los Angeles basin in California. The same application then underwent a simulated 50-year storm event, all within a 41-hour period.

In the first series of tests, the bare EssentialSoil treatment reduced soil losses 98% compared to the bare-soil control (clayey sand). The product also reduced runoff by 31%, compared to the control. In the 50-year storm trial, the EssentialSoil treatment reduced sedimentation by 100% and reduced runoff by 45%, compared to the control.

In addition to improving erosion control, Schraven notes, EssentialSoil offers other benefits:

- It allows construction of steeper slopes. This saves land and cuts equipment costs compared to more conventional construction practices. Also, he says, a 15° increase in the angle of repose over a 9.1-m (30-ft.) run could reduce the height of a 7.6-m- (25-ft.-) high retaining wall to less than 3.7 m (12 ft.).
- It reduces normal repair and upkeep costs by starting a natural, self-sustaining process.
- It reduces water contamination by binding heavy metals in subsurface or adjacent soils or water sources.
- It allows and accelerates reforestation on steeper soils. Deciduous or evergreen trees can be planted within one year of soil installation.
- It eliminates use of chemical fertilizers, herbicides, and pesticides.
- It allows installation of soil and native vegetation on slopes that are difficult to work on or otherwise inaccessible.
- It can reduce costs of engineered drainage systems by improving soil permeability. In some cases, cost factors might favor conventional erosion control practices, such as hydroseeding.

"But often this is a short-run approach due to unfavorable existing soil conditions and improper preparation," Schraven says. "If EssentialSoil allows you to stabilize a 60° slope instead of a 45° slope, you will realize immediate cost savings with this product. But the most important savings are in the form of long-term benefits: eliminating costly redos, reducing sedimentation and runoff, and rapidly establishing native vegetation and wildlife habitats, to name a few. If you add up all of them, there is no doubt about the cost savings and environmental effectiveness of this living soil method of controlling erosion on slopes."