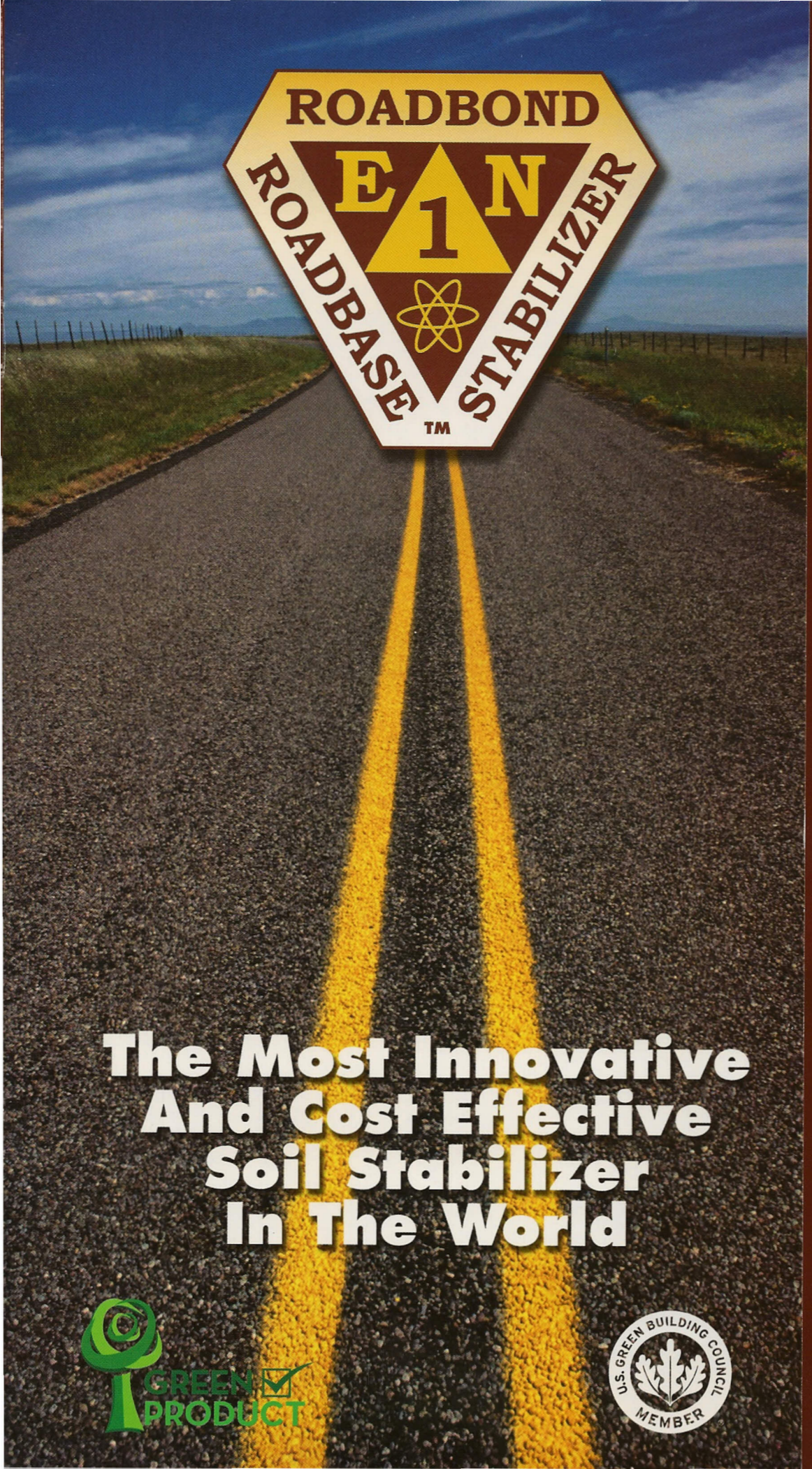


GREEN ADVANTAGE

REDUCE CONVENTIONAL STABILIZERS | REINFORCE ROADBASE

REPLACE LIME

WHAT IS ROADBOND EN 1™ ?

ROADBOND EN 1™ is a patented soil stabilizer developed by CSS Technology, Inc. It is easy to use, cost effective and environmentally harmless according to the US Forest Service.

Now more than ever, the transportation and construction industries are seeking innovative products that will reduce common reoccurring failures and promote a sustainable environment. ROADBOND EN 1 is a widely used soil stabilizer that saves time, money and natural resources.

ROADBOND EN 1 has three main uses:

- Replaces lime stabilization
- Reduces Portland cement and flyash
- Reinforces strength of base material and recycled in-place material

ROADBOND EN 1 contains strong oxidizers, powerful solvents and natural dispersants. The interaction of these compounds in the soil:

- Increases strength and strength improves over time
- Reduces permeability
- Controls shrink and swell
- Increases dry weight

Field trials, lab tests and years of general use in various climates, soil types, traffic loads and construction methods have led to the wide-spread acknowledgment of ROADBOND EN 1 as an effective soil stabilizer. Thousands of projects completed since 1986 on six continents offer conclusive evidence of its reliability.

ROADBOND EN 1™ Patented Soil Stabilizer

"Tested In The Lab...Proven In The Field"

Developed and Patented by:
CSS Technology, Inc. | Tolar, TX 76476
RoadbondSoil.com | sales@roadsysllc.com
844 762-3797

REPLACE LIME

ROADBOND EN 1 is used instead of lime to stabilize clay subgrade soils and saves over 60% in materials cost. It is also placed, mixed, compacted and finished in a single operation without the need to remix several days later. Many projects are stabilized and paved in less than 5 days!

Benefits:

- Provides a working table for construction in adverse weather
- Improves strength
- Reduces swell potential
- Reduces permeability and suction
- Increases dry weight

Advantages:

- Saves over 60% of the cost of lime
- Installs in one day ... no remix days later
- No adverse reaction to high sulfates
- Reduces water requirements

Save Time, Money and Natural Resources
Small Carbon Footprint And Less Impact On The Environment

GREEN ADVANTAGE

REDUCE CONVENTIONAL STABILIZERS | REINFORCE ROADBASE

REPLACE LIME

REDUCE CONVENTIONAL STABILIZERS

ROADBOND EN 1 is used to enhance the strength gain of conventional stabilizers such as Portland cement and flyash. This means the amount of conventional stabilizer can be reduced by 40% to 50% without a corresponding drop in strength.

Advantages

- Saves up to 40% of the cost of conventional stabilizers
- Reduces reflective block cracking
- Less maintenance in the years after construction
- Reduces the impact of material shortages
- No delay waiting for third party vendor
- Reduces water requirements

Many tests clearly indicate a major strength gain when ROADBOND EN 1 is used. The Texas DOT conducted several strength tests on limestone base and flyash, with and without ROADBOND EN 1. The result was a strength increase that ranged from 200% to 400%!

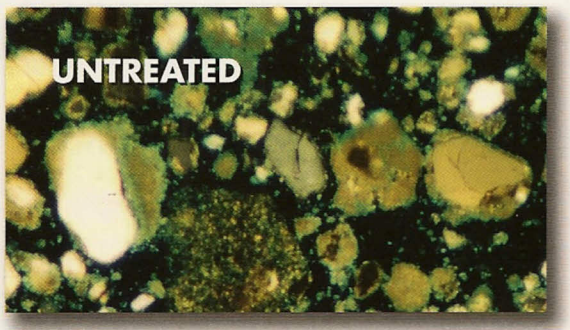
Save Time, Money and Natural Resources
Small Carbon Footprint And Less Impact On The Environment

REINFORCE ROADBASE

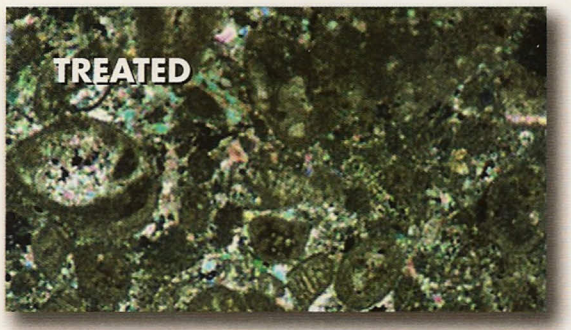
ROADBOND EN 1 is used to improve the strength of base material and recycled in-place material. Field trials and lab tests confirm that soil treated with ROADBOND EN 1 is much stronger than untreated material and that the strength improves over time.

This allows reclaimed material and lower-quality local base to be used for many projects. These projects would otherwise require more expensive crushed stone to be transported to the jobsite. ROADBOND EN 1 saves time, transportation costs and natural resources.

Untreated And Treated Roadbase, Magnified 60 Times And Viewed Through A Microscope.



Notice the larger segments of soil particles. The black spaces are void areas.



The larger segments are dissolved and dispersed with almost no voids. Crystallized mineral salts and natural cements fill the voids and the soil particles are bonded together.

Advantages:

- Increases strength and strength improves over time
- More compaction & density
- Longer durability
- Increases load-bearing capacity
- Reduces permeability
- Less dust and erosion
- Saves time, money and natural resources

Texas DOT Loop 820 - Fort Worth, Texas

At construction

14 years later

GREEN ADVANTAGE

REDUCE CONVENTIONAL STABILIZERS | REINFORCE ROADBASE

ENVIRONMENTAL IMPACT OF CONVENTIONAL STABILIZERS

Growth and construction have a profound impact on our environment, economy and productivity. ROADBOND EN 1 is a well established, proven product that addresses some of the important challenges of our time. These challenges include the reduction of:

- Construction use of water and natural resources
- Greenhouse gas emissions
- Dependence on non-sustainable sources of energy
- Carbon footprint of projects

Conventional stabilizers are high environmental impact products that are principally derived from the mining and calcination of limestone. This process requires limestone to be fired in kilns at over 1200 degrees C and for every ton of lime produced:

- Over 8 tons of limestone must be quarried [1]
- 2000 kWh of energy is consumed [2]
- 1.3 tons of CO2 is emitted [3]

Also, the EPA has identified the lime manufacturing industry as a major source of hazardous air pollutant emissions. [4] These emissions include:

- Hydrogen chloride
- Arsenic
- Chromium
- Lead
- Mercury

[1] Dept of Energy Report "Energy and Environmental Profile of the U.S. Mining Industry", [2] Climate Change 2007, Mitigation of Climate Change, Bert Metz, Intergovernmental Panel on Climate Change, [3] Miner and Upton, 2002, [4] Federal Register / Vol. 69, No. 2 / Monday, January 5, 2004 / Rules and Regulations), [5] Energy Information Administration, [6] EPA 420-F-00-013, [7] GreaterGood.org

A SUSTAINABLE ENVIRONMENT

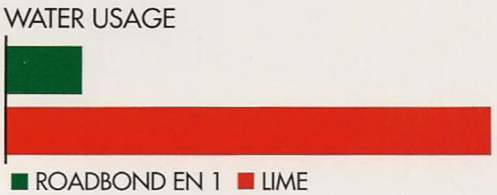
ROADBOND EN 1 contributes to a sustainable environment in a number of important ways and may qualify for LEED™ credit under "Innovation in Design." ROADBOND EN 1 uses less water, energy and lowers CO2 emissions and because it is concentrated:

- One 5-gallon pail replaces 12 tons of lime (1 1/3 truck loads)

For instance, a 54,000 square yard project requires 300 gallons of ROADBOND EN 1 or 730 tons of lime. (80 truck-loads or more) In this scenario, the use of ROADBOND EN 1:

Saves Water:

- ROADBOND EN 1 uses 60,000 gallons of water
- Lime requires 405,000 gallons of water
- 675% less water

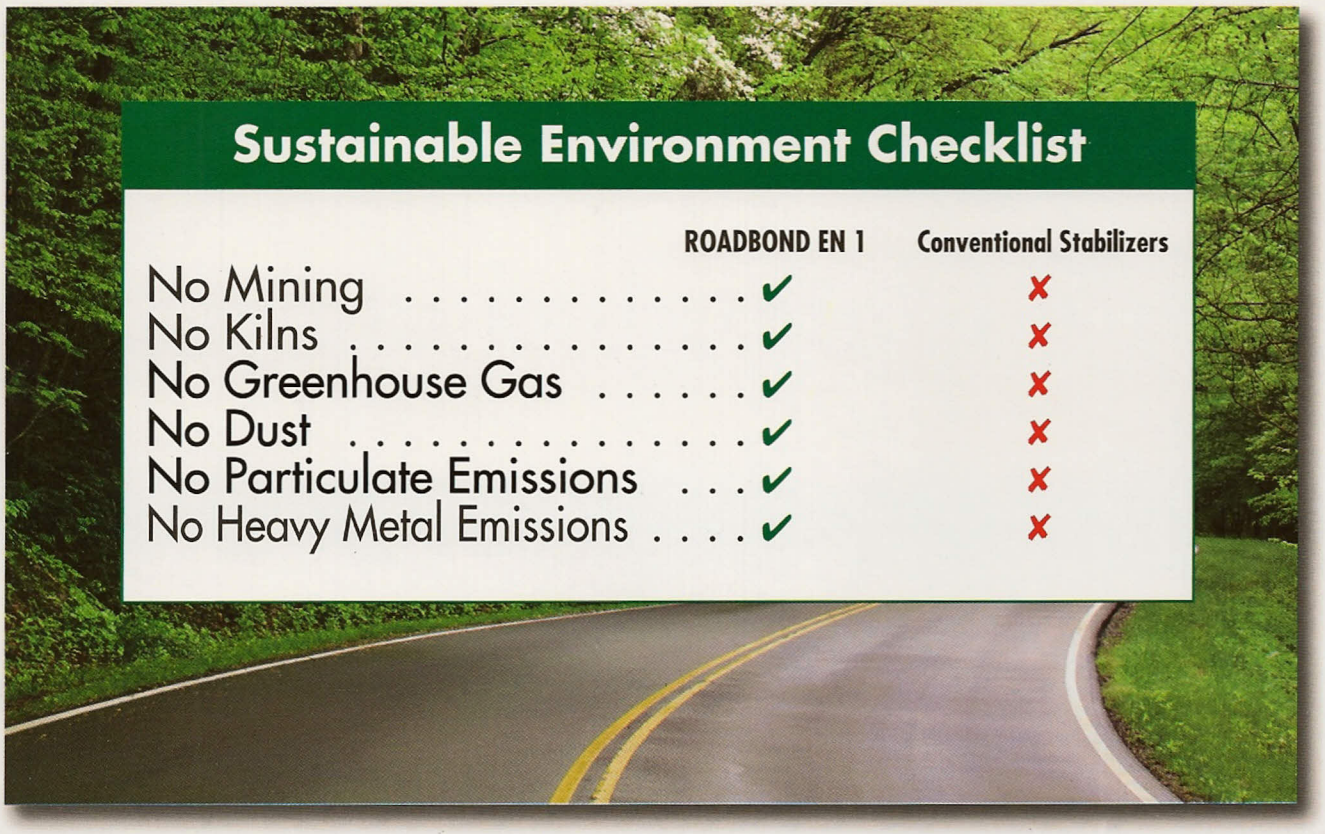


Saves Energy:

- ROADBOND EN 1 saves the energy consumed by 960 homes in one month
- Lime consumes 2,000 kWh of electricity per ton produced [3]
- Average home uses 936 kWh of electricity per month [5]

Reduces green house gas:

- ROADBOND EN 1 offsets CO2 emissions by 936 tons [2]
- That's like parking 1,650 cars for 1 month [6]
- And not driving 1.7 million miles [6]
- Or planting 312 fast growing pine trees [7]



Here's what our Customers Experienced...

"The use of ROADBOND EN 1 to stabilize the existing material resulted in a $25,000 to $35, 000 savings and it still is holding up well after two years."

- Ralph Apodaca
Texas Department of Transportation

"The performance of test sections through September 1991, shows an exceptional improvement over non stabilized control sections... Roadbond EN 1 has been particularly outstanding, in some cases extending maintenance frequencies from bi-weekly to bi-annually... Roadbond EN 1 is environmentally harmless when diluted with water at the recommended ratios of 200:1 to 600:1."

- Douglas E. Scholen
Engineering Directorate, USDA Forest Service

"We have used Roadbond EN 1 soil stabilizer with remarkable success on several street rehabilitation projects in the City of Lake Dallas. Prior to utilization of Roadbond, pavement rehabilitation projects in this area required 6% Portland cement in the stabilization of the base material. However, with Roadbond the cement is reduced by one half. This reduction in cement saved money, reduced the amount of cement dust particulate released into the air, and significantly reduced the amount of block cracking."

- Tom Hoover P.E.
Thomas Hoover Engineering, LLC