

PERMA-ZYME®

PRODUCT
BOOKLET
Perma - Zyme



RHS

SOLUTIONS POWERED BY ENZYMES

Road Hardening Solution Ltd
Makepe Missoke, Douala
Littoral Region, Cameroon

Tel: 678113017

info@roadhardeningssolution.com

www.roadhardeningssolution.com

Perma-Zyme Exclusive Reseller in Cameroon

RHS IS A VISIONARY ON THE LOOK - OUT FOR NEW WAYS TO INNOVATE, GROW AND ENHENCE OUR INDUSTRY



RHS is committed to providing pertinent and active engineering documentation on our product. This is a crucial part in helping customers understand the uses for product and how to leverage the full benefits of the RHS product line - and it's one that we take seriously. Because of this commitment, we are expanding our brand identity to create a transparent company built on trust, collaboration and exceptional customer service. As we move forward, RHS will continue to make this company synonymous with the exceptional product and services that got us where we are today.

CONTENTS

Perma-Zyme Overview	5
Earth Road Construction with Perma-Zyme	7
Paved Road Construction with Perma-Zyme	9
Perma-Zyme Road Construction in 10 Easy Steps	11
Cost Comparison: Perma-Zyme vs. Traditional	15
Perma-Zyme Testing Results	17

PERMA Δ -ZYME[®]

The original Perma-Zyme is a unique enzyme-based soil stabilizer.

Perma-Zyme uses RHS's unique permantation[™] process to harden earth roads, strengthen roadway foundations and water lining soil while reducing construction costs and aiding in dust control



RHS

CONTACT: 678-113-017

Product Overview

Reduce Construction Costs

The original Perma-Zyme is a soil stabilizer that produces bonded, high density earth road surfaces with lifespans exceeding 10 years. Perma-Zyme uses native soils, therefore it reduces the need to import material and reduces project costs to a fraction of that associated with conventional road construction when used as the foundation in chip seal or asphalt-based roads

Perma-Zyme is a user- and environmentally-friendly compound that requires no special tools to apply. Perma-Zyme's unique permantation™ process occurs on its own - all you need is a blade, mixer/reclaimer, water truck, and roller. And, because native soil can be used, there's no need to import additional material.

Enzyme-Driven Catalytic Bonding

Perma-Zyme is an enzyme based soil stabilizer designed to harden soil particles into cement-like material while improving dust control. When mixed with water and applied during compaction, Perma-Zyme acts upon the soil's organic fines and produces a strong cementation effect to produce a durable, water-resistant mix that can be used as a subbase or primary surface

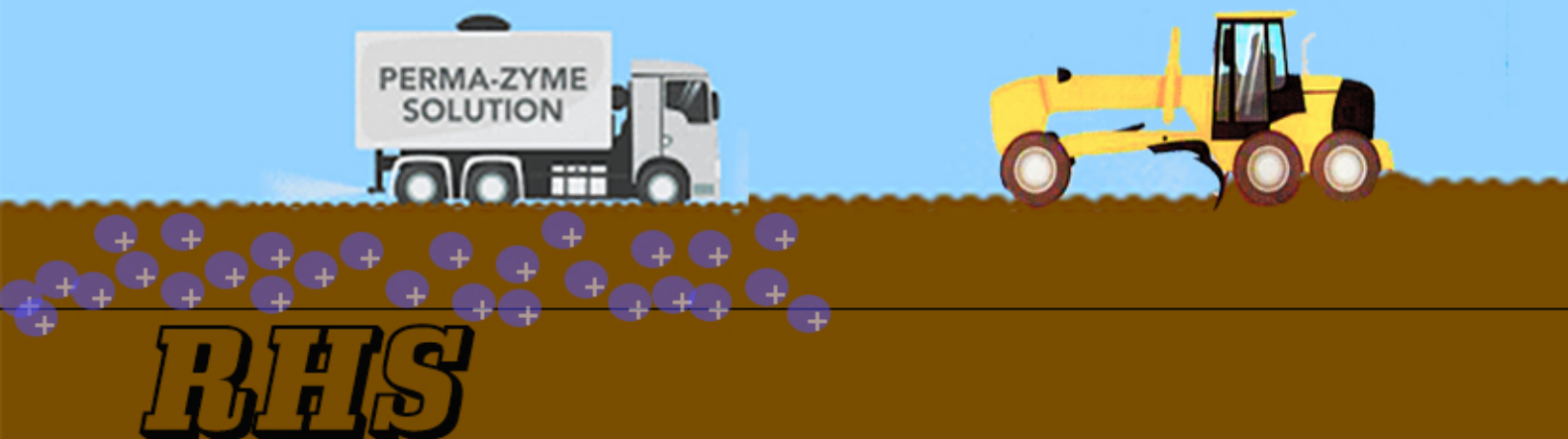
Eco-Friendly

Perma-Zyme is a natural soil stabilizer, it is manufactured with organic compounds that treat and solidify soil in an environmentally-conscious manner. It's completely non toxic organic, 100% natural, and roads last longer than when using traditional materials. Perma-Zyme will aide in dust control when used on earth roads thus decreasing the dust in the environment.

EARTH ROAD CONSTRUCTION WITH

PERMA-ZYME[®]

Perma-Zyme is known for its ability to harden clay particles, thus creating a concrete-like surface perfect for earth roads that has a long lifetime, often in excess of 10 years. Perma-Zyme's proprietary permentation™ process works by bonding the clay particles in a way available nowhere else on the market today.



- ★ Only standard road construction equipment required
- ★ Concrete-like surface when cured
- ★ Greatly reduces dust
- ★ Surface is capable of handling vehicles of all shapes, sizes, and weights
- ★ Compatible in a variety climates



PAVED ROAD CONSTRUCTION WITH

PERMA-ZYME[®]

One of the most expensive parts of traditional road construction is the base because the old material must be hauled out and new aggregate trucked in. By using Perma-Zyme you can use the native soil as the road base which reduces the cost up to 70 percent.



RHS

- ★ Very stable base, no shifting or failing
- ★ Top coats last exponentially longer
- ★ Only standard road construction equipment required
- ★ Use of native soil introduces large cost savings
- ★ Non-toxic, non-hazardous, environmentally friendly



CONTACT: 678-113-017

roadhardening.com

ROAD CONSTRUCTION IN 10 EASY STEPS WITH **PERMA-ZYME**®

1 Soil Test



Ideal soils have at least a 20% clay content.

2 Calculate



221 m²

Typical roads constructed with Perma-Zyme are 30cm deep

3 Purchase

RHS

4 Commence Construction



45°F



Excavate your future road by using a Grader to rip and mix the soil. Ensure the soil has been excavated to the desired depth of the road.

RHS

CONTACT: 678-113-017

5 Apply Perma-Zyme

Apply Perma-Zyme on the soil using a water truck.



6 Mix The Soil

Use a blade attachment on a grader to mix and coat the soil with the Perma-Zyme solution.



ROAD CONSTRUCTION IN 10 EASY STEPS WITH **PERMA-ZYME**®

7

Compaction

Using a Compactor, compact the soil in 3-6" lifts. Once the soil has reached nearly optimum compaction, use a Drum Compactor to complete the compaction and leveling.



8

Let the unique Permantation™ Process Begin

Once the soil has been compacted, the road is ready for light traffic. The soil will be cured within 72 hours.



72 Hours



RHS



9 Apply a Top Coat (Optional)

To apply a top layer to the road such as chipseal or asphalt, you would follow the traditional procedures for those products. Prior to the application, wet the soil lightly with a highly diluted (10,000 parts water to 1 part Perma-Zyme) mix.

10 Celebrate!



CONTACT: 678-113-017

roadhardeningssolution.com

13

COST COMPARISON / TRADITIONAL

Construction with Asphalt (1 mile long)

Equipment Required



Hauler



Grader



Loader



Drum Roller

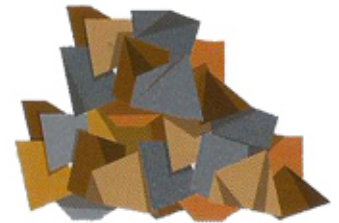


Water Truck



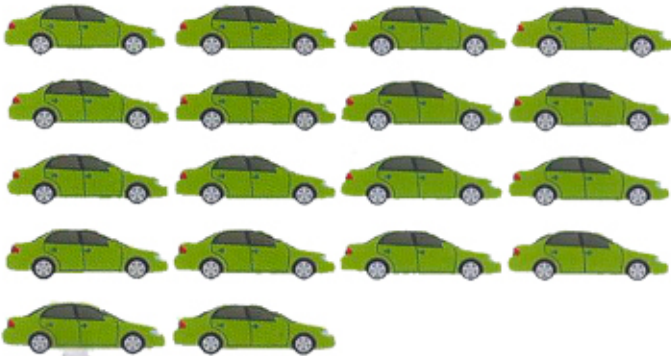
Sheepsfoot Roller

Material
Required



Aggregate

Days to Completion



18 Days

Cost



\$266,000

RHS

**All costs are estimates*

COST COMPARISON / PERMA-ZYME

Construction with Double Chip Seal (1 mile long)

Equipment Required



Grader



Water Truck



Drum Roller



Sheepsfoot Roller

Materials Required

PERMA-ZYME



Clay



Days to Completion



15.5 Days

Cost



\$85,000

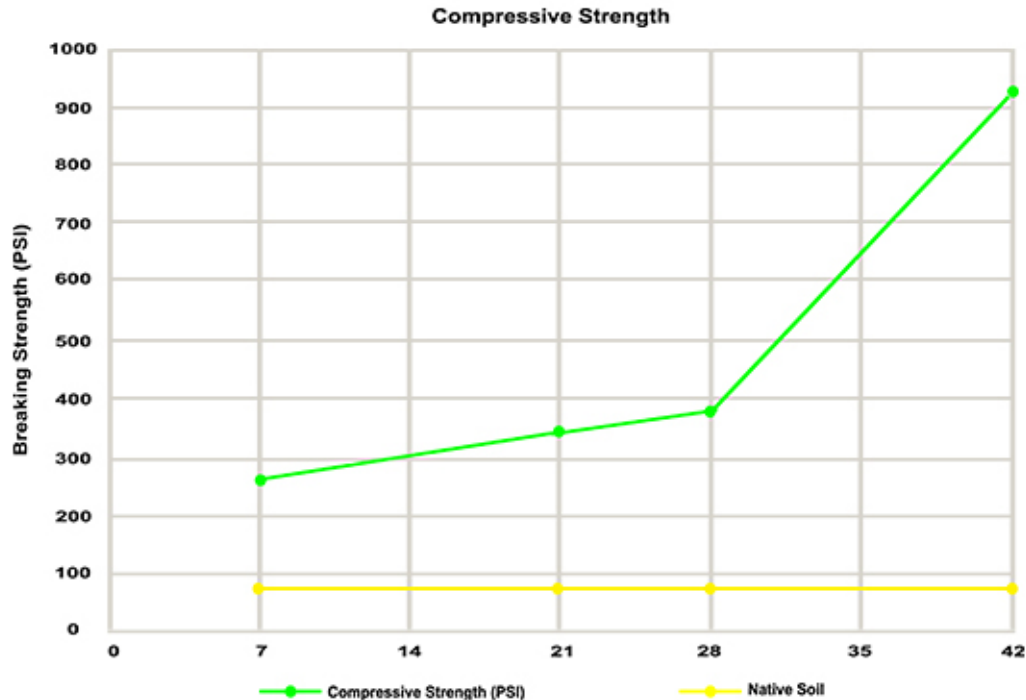
CONTACT: 678-113-017

roadhardeningssolution.com

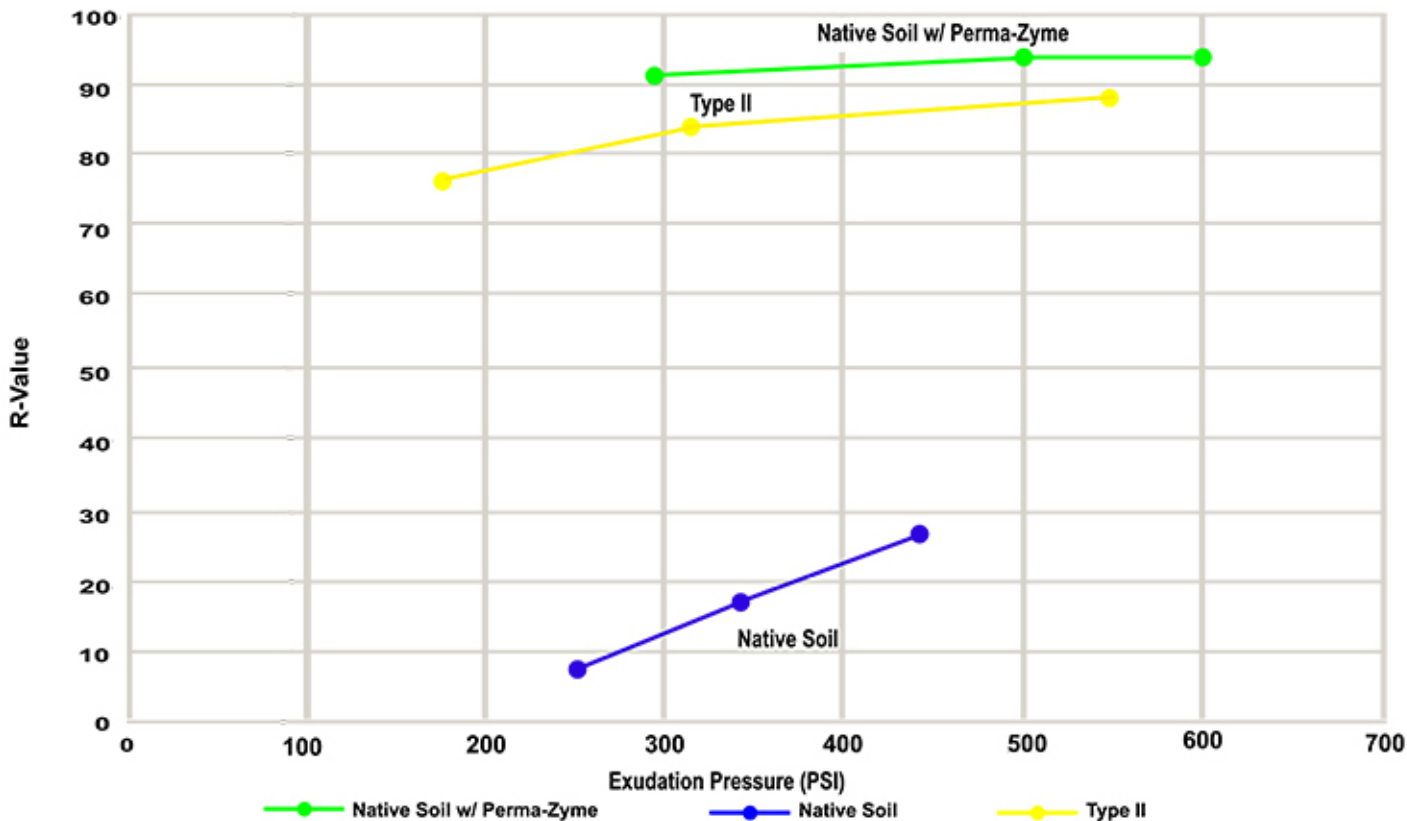
PERMA-ZYME TESTING RESULTS

Native soil with Perma-Zyme

RHS is committed to providing all of the engineering data necessary to determine Perma-Zyme's applicability. We are always working on new tests and testing Perma-Zyme's use in new applications. All of RHS's engineering data and testing results are provided by a third party, independent laboratory.



R - Value Test



Sample	R-Value *
Native Soil	13.9
Type II Aggregate	81
Native Soil w/ Perma-Zyme	92

* R-Value at 300PSI exudation pressure

PERMA-ZYME.

FOR GOVERNMENT ENTITIES

Solve your toughest road maintenance and construction problems with Perma-Zyme, the unique enzyme-based soil stabilizer that last 10+ years



STABILIZE YOUR SOIL

Whether it's crumbling farm to market roads or secondary roads that can't stand up to traffic, it's time to tackle your toughest soil challenges head-on.



PROBLEM: ERODED ROAD SURFACES

Washboarding, potholes, dust, mud, ruts, erosion...
An unpaved farm to market road can have as many craters as the moon. It's nearly impossible for road commissions to repair them all!



PROBLEM: NOT ENOUGH MANPOWER

Maintaining roads takes hundreds of man hours, but with worker shortages there aren't enough crews to do it all. So, small problems go unchecked and turn into big ones.



PROBLEM: LACK OF EQUIPMENT

Even if you have the people to do the job, many governments don't have the equipment to put them in, and restricted budgets often mean you can't afford to buy it.

SOLUTION:

PERMA-ZYME[®]

Perma-Zyme eliminates the need for large crews, regular maintenance, and long, drawn-out projects

- **One-time application takes as little as one day**
- **The hard, concrete-like surface lasts 10+ years**
- **Treated areas need little to no maintenance—no constant grading**
- **You need minimal equipment to apply Perma-Zyme**
- **You can easily make substitutions for equipment you don't have**



With Perma-Zyme, you can reduce and even eliminate common road construction costs.

- **One application eliminates costly repeat treatments**
- **Perma-Zyme strengthens native soil without importing and exporting**
- **Perma-Zyme makes soil into a strong subbase, allowing a thinner subbase and less chipseal**
- **Maintenance costs are near zero for 10+ years**
- **Save an average of 60% compared to traditional road construction methods on all roads (and up to 80% on paved roads)**



DUST CONTROL:

Perma-Zyme also helps control dust on dirt or gravel roads for several years at a time.

