

# NATURALPAVE® COMPLETE SYSTEMS

## MIDWEST'S INNOVATIVE GREEN ROAD TECHNOLOGIES



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# SOIL STABILIZATION SYSTEMS



## NATURALPAVE®

ENGINEERED STABILIZATION SYSTEM

# NATURALPAVE® COMPLETE SYSTEMS

## **The effective, earth friendly process in Road Design.**

NATURALPAVE stabilization technology offers advantages in a wide variety of road applications from unpaved roads that will remain un-surfaced to roads that will receive running surface treatments. Roadbed stabilization treatments include blending our proprietary organic emulsion SSEF base into native roadbed soils, old graveled roads, or recycled roadway surface materials to create a superior structure that maximizes potential road strength and extends the useful life of the road bed.

## **NATURALPAVE Stabilized Un-surfaced Roads: NATURALPAVE is a natural organic two-part system to improve secondary roads.**

Midwest's NATURALPAVE construction system uses in-place soils in conjunction with Midwest's green products SSEF Base and SSEF Chip to engineer improved roadways by stabilizing the sub-base and providing a chip seal running surface without relying on any asphaltic products. While producing roadways that perform as well as conventional asphalt surfaces, NATURALPAVE is by far the more Earth- friendly process, just one reason it is successfully challenging the traditional reliance on asphalt for building and maintaining unpaved roads.

NATURALPAVE's components were formulated to be as gentle on the environment as they are effective on the roadway – at only a fraction of the cost. Like all Midwest products and services, the NATURALPAVE system is reliably consistent and consistently reliable month to month, season to season, and year to year.

**The NATURALPAVE process eliminates the need to import costly base or aggregate materials to build a sub-base for subsequent paving or chip sealing.**

# NATURALPAVE® COMPLETE SYSTEMS

- NATURALPAVE Complete System is a natural organic two part process to improve secondary roads.
- SSEF is a polymer enhanced resin based organic emulsion formulated to be as gentle on the environment as it is effective on the roadway.
- SSEF Base is formulated specifically to stabilize the in-place sub-base soils to maximize road bed potential and to increase loading capacity (CBR), improve structural integrity, and to deliver a stronger, longer, lasting road surface as a lower cost than conventional road design.
- SSEF Chip is an organic polymer enhanced resin based binding agent formulated to bond the aggregate chips to produce a superior running surface. SSEF Chip offers excellent skid resistance and is a true alternative to conventional asphaltic paving utilizing GREEN technologies.



# NATURALPAVE® STABILIZATION SYSTEMS

## Why Roadbed Stabilization?



# NATURALPAVE® STABILIZATION SYSTEMS

Both in the private and public sectors road engineers are faced with tightening budgets and increased environmental compliance challenges. Traditional methods of building a roadway are becoming more and more costly. Road department budgets, particularly maintenance related are shrinking annually. Environmental regulations demanding dust and sediment control for unpaved roadways and shoulders continue to tighten. Common soil amendments such as gravel or road base for improving road structure are becoming less available and increasingly expensive. Transportation costs to import these amendments have also sky rocketed.

SSEF Base is a natural, organic, stabilizing system to improve the sub-structure of secondary unpaved roadways. Whether a road is going to remain un-surfaced or receive a surface treatment, it will be vastly improved by an SSEF Base stabilization installation.

SSEF Base Soil Stabilizer can significantly enhance the properties of the in place soils to provide more cost effective stronger construction of road infrastructure. A better and longer lasting road with increased loading capacity (CBR) and reduced permeability will lower a roads construction and maintenance costs while improving the overall quality of the roadbed structure and running surface and longevity of the running surface.



# NATURALPAVE® STABILIZATION SYSTEMS

**SSEF Base Stabilization.** Midwest blends its proprietary organic emulsions into the existing base of native soils, graveled roads, or recycled roadway surface materials to create a superior structure that maximizes potential road strength and extends the useful life of the road bed. The process eliminates the need to import costly base or aggregate materials to build a sub-base for subsequent paving or chip sealing.

SSEF Base's new advanced soil stabilization technology increases the flexural strength of the sub base layers to reduce roadbed movement from vehicular loading which will stress road surfaces. Dramatically reduced surface stress translates to reduced maintenance costs.

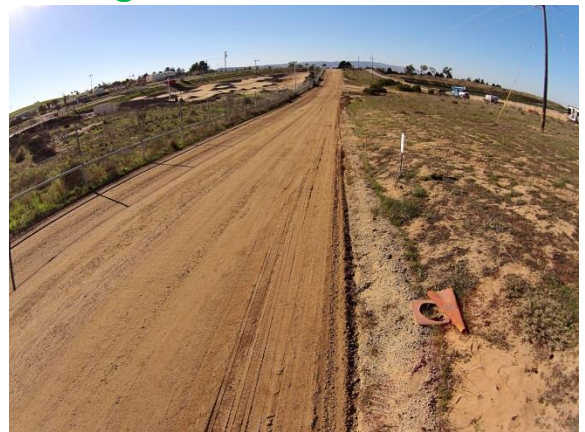
Stronger flexural strength equals a longer economic life for road surfaces as a result of fewer potholes and rutting on un-surfaced roads and less cracking and loosening of the surface on roads with a surface coating of asphalt or chip seal.

The result is a superior roadbed quality and a longer economic life than you get with conventional road construction techniques.

Before installation



During installation



After





# NATURALPAVE® STABILIZATION SYSTEMS

SSEF Base soil stabilizers are a powerful way to utilize in place soils, or reclaimed asphalt blended with in place soils to:

- Increase loading capacity (CBR)
- Improve structural integrity
- Reduce harmful moisture penetration.

Deliver a stronger, longer lasting road surface at a lower cost than conventional road design.

Prior to installation



Chips



Completed roadway



# NATURALPAVE® STABILIZATION SYSTEMS

**NATURALPAVE stabilization process, a natural; organic system to improve secondary and rural unpaved roadways.**

**Midwest's SSEF Base stabilization emulsion will:**

- Provide stabilization for roads that will remain un-surfaced, or roads that will receive surface treatments.
- Utilize native and in place soils.
- Improve the mechanical qualities of local road construction soils
- Increases loading capacity (CBR)
- Provide longer economic life of the roadbed.
- Reduce maintenance costs.
- Lower road constructions costs.
- Extends the life of asphalt pavement and other surfaces.

SSEF Base Stabilization is successfully challenging the traditional reliance on aggregate and asphalt for building and maintaining unpaved roadways. The NATURALPAVE systems components were formulated to be as gentle on the environment as they are effective on unpaved roadways at only a fraction of the cost.

Like all Midwest products and services, the NATURALPAVE system is reliably consistent and consistently reliable month to month, season to season.



# ROADS THAT WILL RECEIVE A SURFACE COURSE...

Chip seal or asphalt pavement life can be greatly extended by stabilizing base and sub-base layers, whether local in place soils or imported base soils are used.



SSEF Base stabilizers will add performance and longevity to the roadbed structure.



# NATURALPAVE® CHIP SEAL PROCESS



Stabilized Base

Chip Seal Surface

# NATURALPAVE® ORGANIC CHIP SEAL SYSTEMS

NATURALPAVE chip sealing process offers a true alternative to asphaltic surfaces utilizing true **GREEN** technologies, SSEF Chip. The SSEF Chip sealing process delivers a natural, warm, visually-pleasing running surface. One of the oldest and most successful road-surfacing methods chip sealing uses a binder covered with an aggregate to produce a strong, resilient running surface.



Conventional binders are a liquid asphalt, which turns into a black heat-absorbing road surface. At installation a conventional chip sealed surface must be swept resulting in the loss of as much as 20% of the chips installed. Midwest's SSEF Chip process has eliminated the use of asphaltic products, using instead an organic polymer-enhanced resin based binding agent. It creates a **GREEN** superior running surface and requires no post-installation sweeping to remove loose chips and added costs.

# NATURALPAVE® CHIP SEAL PROCESS



# NATURALPAVE® CHIP SEAL SYSTEMS

## NATURAL • ORGANIC • PAVING SYSTEM

### SSEF Chip

Challenging the traditional reliance on asphalt for building and maintaining unpaved roads.

#### Compaction



#### Completed SSEF Chip Roadway



#### ADVANTAGES:

- Environmental: **GREEN**, natural products vs. asphalt and oils.
- May be applied over native sub-base stabilized soils
- Unnecessary to wash aggregate as with asphalt chip.
- Wider range of suitable temperatures for installation vs. asphalt chip.
- Natural warm surface vs. black, heat absorbing surface.
- No post-installation sweeping as with conventional chip sealed surfaces which can lose as much as 20% of the chips installed.
- Offers excellent skid resistance.
- More cost effective than conventional asphalt.

While producing roadways that perform as well as conventional asphalt surfaces SSEF Chip is by far the more earth-friendly process.

# NATURALPAVE® CHIP SEAL SYSTEMS

In many countries chip seal is used for high volume roadways. In the U.S.A. it is often used for pavement preservation and rehabilitation. Chip seals are used for restoring skid resistance to worn surfaces, protecting aging asphalt surfaces, eliminating dust and sealing gravel and stabilized roadway surfaces.



## **If the shoe doesn't fit....**

One size fits all does not always make a good fit; unique problems require unique solutions. Midwest is a particle-control pioneer, not a me-too company. Our product development begins with a challenge and ends when we produce a solution that proves its worth in the field. Off-the-shelf is fine when it works, but when it does not, Midwest has the capability and tenacity to customize a formula for your specific needs.

## **More reasons to choose Midwest....**

Midwest is the world leader in environmentally sound, dust-control technology for every application where fugitive dust is a problem. We bring our customers more solutions, documentation and support than any other manufacturer. On a daily basis, we challenge ourselves to become even more accessible problem-solvers so we can set a new industry standard for proactive and responsive services. Pushing the envelope is part of our corporate DNA, and we strive, always, to develop the cutting-edge processes, products and services; stay on top of the learning curve, educate our customers for our mutual success.



# NATURALPAVE® CHIP SEAL PROCESS



# NATURALPAVE® CHIP SEAL PROCESS



# NATURALPAVE® CHIP SEAL PROCESS



# NATURALPAVE® SYSTEMS

## NATURALPAVE vs. Other Processes

Criteria	NATURALPA VE	Conventional Chip Seal	Conventional Asphalt	Aggregate Sub-Base
Natural green products	✓			✓
Utilizes in-place soils	✓			
Increases CBR and loading strength	✓		✓	✓
Superior traction	✓	✓		
Heat reflective	✓			N/A
Installation below 50° F	✓			✓
Will not harm vegetation	✓			✓
Does not require washed aggregate	✓		N/A	N/A
Does not require post-installation sweeping	✓		✓	N/A
Creates smooth running surface	✓	✓	✓	
Creates dust-free surface	✓	✓	✓	

*Make an objective comparison between Midwest's NATURALPAVE process and conventional asphalt approaches, and the benefits of NATURALPAVE are clear.*

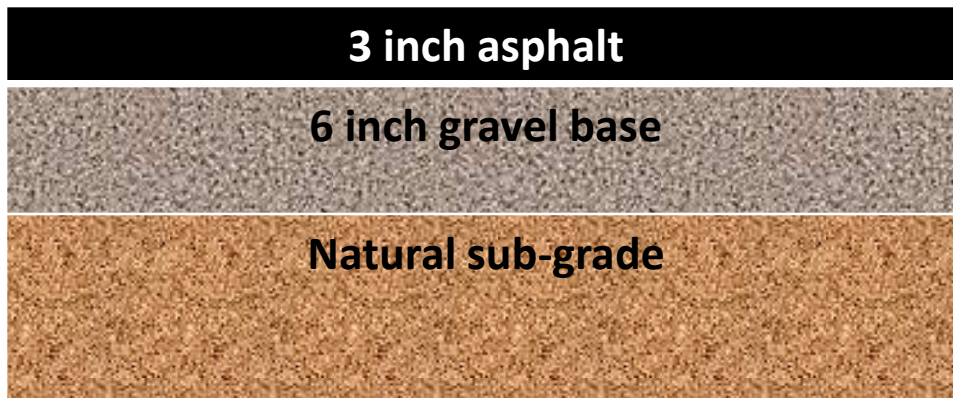
# NATURALPAVE® ECONOMICS..

## Cost Effective NATURALPAVE® Systems

### NATURALPAVE® offers significant cost savings to standard road designs

Road stabilization and surfacing with NATURALPAVE systems offer significant economic alternatives to standard road designs. Following NATURALPAVE road options are compared to standard road designs. Note that design strength has been maintained while costs have significantly been reduced.

Standard Road Design :



**Structural strength = 100%**

**Construction cost = 100%**

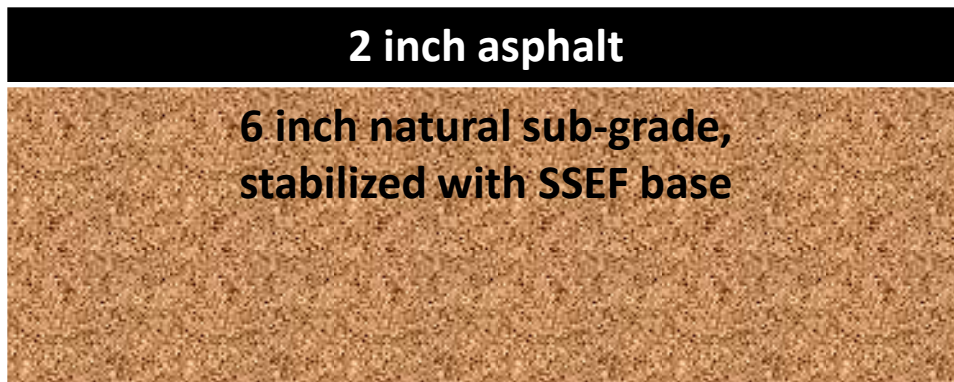
AASHTO Structural Number modeling is supported by lab and field tests of stabilized materials to verify strength comparisons between design options. Using published correlations standard test measurements are related to CBR values and structural coefficients, allowing cost comparison between design of similar strength.

# NATURALPAVE® ECONOMICS..

## Cost Effective NATURALPAVE® Systems

This NATURALPAVE design can save up to 40% compared to standard road design.

NATURALPAVE Alternative #1:



**Structure strength = 100%**

**Construction cost = 60%**

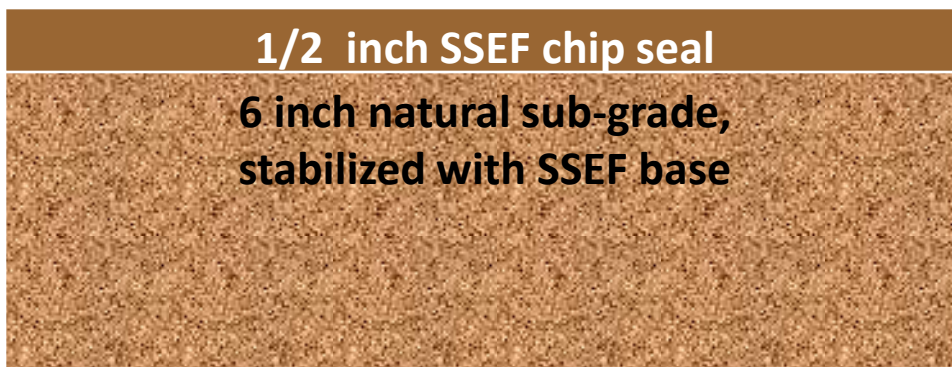
Improves standard design through stabilization of available materials blended to optimize gradation and plasticity. The result is a maximum increase in stabilized strength. Savings of 40% are possible by thinking outside the box of standard design and road materials.

# NATURALPAVE® ECONOMICS..

## Cost Effective NATURALPAVE® Systems

This NATURALPAVE design can save up to 60% compared to standard road design.

NATURALPAVE Alternative #2:



- **Structural strength = 100%**
- **Construction cost = 40%**

Provides an effective, earth friendly process of Road Design. NATURALPAVE construction systems use in place soils and **GREEN** products to produce roadways that perform as well as conventional asphalt surfaces.

# NATURALPAVE® SYSTEMS

The complete NATURALPAVE process delivers stronger, longer lasting roads at lower costs than conventional road designs without taxing the environment.

NATURALPAVE a construction system developed by Midwest for engineering improved roadways by stabilizing their in place sub-base with SSEF Base and providing a long lasting chip seal running surface without using any asphaltic products by utilizing our newly developed SSEF Chip process. Utilizing in place soils in conjunction with Midwest's GREEN products, NATURALPAVE is successfully challenging the traditional reliance on asphalt for building and maintaining roadways.



The system components were formulated to be as gentle on the environment as they are effective on the roadway at only a fraction of the cost. Like all Midwest products and services the NATURALPAVE system is reliably consistent and consistently reliable month to month, season to season, year to year.





# NATURALPAVE® SYSTEMS

## NATURALPAVE at a glance:

- Utilizing true **GREEN** technologies SSEF Base and SSEF Chip, the NATURALPAVE systems offers alternatives to asphalt paved surfaces.
- SSEF Base may be installed utilizing in place soils, convenient and cost effective.
- SSEF Base improves long-term performance of surfaced and un-surfaced roads.
- SSEF Base improves the mechanical qualities of local road soils so that stronger, more durable roads can be built.
- SSEF Base improves structural integrity and loading capacity of the roadbed, and reduces the occurrence of defects such as potholes, rutting, and wash-boarding, resulting in lower maintenance costs.
- SSEF Chip offers excellent skid resistance.
- SSEF Chip does not require washed aggregate for chip seal process.
- SSEF Chip creates or restores a smooth running surface on deteriorated surfaces.
- The NATURALPAVE System optimizes secondary roads, rural dirt and gravel roads, military, forest and park roads.

### SSEF Base Stabilized Roadway



### Completed NATURALPAVE System



### Work in progress

