Soil Stabilization Technology for Road Construction
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TerraDura polymer emulsion is a powerful, high-tech bonding agent chemically engineered to bond soil and aggregate particles together at the molecular level.

The result is a 100% ecosafe soil or sand based cement ideal for constructing roads, parking lots, driveways, trails, landing strips, helipads, land fills, ponds, canals and levies. Other applications include dust control, slope stabilization, brick/block manufacturing and as a tackifier for hydro-seeding.

TerraDura polymer is a liquid concentrate that is diluted with any type of water and cures when the water additive evaporates. The product can be used with all soil types and is easily applied using anything capable of spraying water, from small handheld agricultural sprayers to pressurized water trucks.

When mixed with soil or sand the polymers fills the void spaces between the soil/sand particles and re-crystallizes as water dissipates, chemically bonding the particles together to form a strong waterproof flexible solid-mass.

Unlike competitive products, TerraDura is the only soil stabilizer made of 100% newly manufactured polymers and developed by a top U.S. polymer producer specifically for the soil stabilization. Our products never use recycled/waste polymers, vinyl acetate copolymers or any petrochemical asphalt bitumen mixes thereby delivering the most reliable and environmentally safe product on the market.

TerraDura has been thoroughly lab tested and certified to conform to “world road standard specifications”. Lab testing data is available upon request.
Road Construction
A true industry innovation for road construction; TerraDura greatly reduces costs, has superior load strength and exceptional durability against weather and water damage than conventional road construction materials.

**Cost-Efficient**

Using TerraDura for road construction reduces costs 20% to 50% as an economical alternative to concrete slurry and quarried rock aggregate. This considerable cost savings is possible as the *in situ* soil (on site) is used as the aggregate to create durable roads, circumventing the need for expensive excavation and importation of high-cost quarried construction aggregates. The soil underfoot become the aggregate. Polymer applications cure within a day allowing road projects to be completed far quicker than currently used constructions methods.

**Superior Strength**

Polymer technology pavements have superior load-bearing capacity and can support the heaviest traffic. Lab tested, it equally or surpasses conventional hot mix asphalt pavement in structural strength and durability with higher resistance to rutting, displacement and failure.
Road Construction

Weather/Water Resistant

TerraDura is radically more resilient to weather and water damage than conventional construction materials. Once cured, the treated area becomes impervious to water and will not break apart or wash-off in heavy rain or flood conditions. Nor will it absorb water, effectively protecting against damage from shrink-swell and freeze-thaw caused by moisture infiltration.

SUSCEPTIBILITY TO MOISTURE INFILTRATION IS THE PRIMARY CAUSE OF ROAD FAILURE.

World Standard Road Specification

Certified to conform to “world road standard specifications”, TerraDura applications use regular road building equipment and are laid similar to hot mix asphalt, as a flexible pavement in continuous joint-free layers.
Infrastructure Solution

One of our primary objectives is to introduce this technology to countries where road construction accounts for a significant share of public expenditure. As industrial cost continue to rise globally, so does the need for innovative solutions for infrastructure demand. For urban roads and streets, TerraDura can be used as a sub-base slab of aggregate underneath a thin blacktop asphalt top layer or in rural or mountainous roads as a replacement to gravel or cement slurry.

Polymer-based soil stabilization technology offers the following advantages:

1. Reduced Costs (20% to 50%)
2. Reduced Construction Time
3. Greater Load Strength
4. Greater Durability
5. Greater Environmental Responsibility
Road Construction

Urban Roads & Streets

TerraDura soil stabilization is a simple and cost saving solution for provincial and city street construction.

A TerraDura® slab is a road layer (base course or sub base) of aggregate, stabilized with TerraDura® polymers. Because of it’s strength, water resistance and flexibility you can construct durable roads at low cost using in situ soils (on site).

The TerraDura® slab is constructed as you would construct a traditional sub base layer or a gravel road, adding the TerraFirm® slab polymers with the water required for optimum compaction.

Use a TerraDura slab as you would use crusher stone under a premix asphalt seal or under any light seal as required. A TerraDura slab can even be used without a black top seal for lighter traffic, serving as an all weather wearing course that does not have to be graded.
**Rural Country & Mountain Roads**

*TerraDura* is ideal for township, rural or nature reserve roads and can be used with or without a bituminous seal.

A durable gravel road seal can be constructed with a “brown top” plus a light bituminous seal in and on the gravel road surface. Mix 75mm or 100mm *TerraDura* into the surface, let dry and add a light bituminous seal. It needs no grading, is inexpensive and can be easily maintained. *TerraDura* hardens 90% of all *in situ* soils and makes them water resistant. Construction locations often have 97% of the building materials on site, costing very little or nothing.
Polymer Road Development

*TerraDura* applications use standard road construction equipment and can be phased over a period, as budgets allow. It provides a workable surface within budget until full engineering standards can be achieved.

Use Polymer slabs, seals and bitumen seals as required, saving costs and ensuring durability. Easy low cost maintenance further creates employment in local communities.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
<th>Step 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil is well compacted by feet, cars, trucks, and rain.</td>
<td>Spray 0.75 inches polymer seal on and compact with tires.</td>
<td>Add sand seal 0.25 inch, compact with tires.</td>
<td>Add polymer slab 3 inches, compact.</td>
<td>Add 4 inch polymer slab with nature top compact.</td>
<td>Add blacktop seal or more slabs.</td>
</tr>
</tbody>
</table>

Ensure adequate support.

Light traffic.

Seal reduces abrasion.

Mini soil slab, thinner, lighter dosage.

Soil slab, thicker, higher dosage, with extra chemicals in top layer.

Full design for heavy traffic.
# TerraDura Facts

<table>
<thead>
<tr>
<th>Material:</th>
<th>&quot;Prime&quot; material, made of reacted polymers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curing:</td>
<td>Cures when the water additive evaporates.</td>
</tr>
<tr>
<td>Cure Time:</td>
<td>Usually within 10 hours at 65°F/18°C in dry weather, longer cure time with wet, damp and cold weather.</td>
</tr>
<tr>
<td>Freezing:</td>
<td>Cannot be used when freezing. Once cured TerraDura is unaffected by freezing temperatures.</td>
</tr>
<tr>
<td>Depth:</td>
<td>0.5” to 4&quot; (2 cm to 10 cm) deep depending upon traffic, desired load capacity and other variables.</td>
</tr>
<tr>
<td>Maintenance Time:</td>
<td>Usually 18 to 24 months before the first scheduled maintenance.</td>
</tr>
<tr>
<td>Maintenance Amount:</td>
<td>Usually 15% to 20% of the original amount is recommended for future maintenance.</td>
</tr>
<tr>
<td>Product Life:</td>
<td>Uncured material has a shelf life of approximately 12 months depending on the storage temperature.</td>
</tr>
<tr>
<td>Soil Type:</td>
<td>All soil types can be used. The Polymer mix is customized to the soil type.</td>
</tr>
<tr>
<td>Weather:</td>
<td>Once cured, TerraDura is not affected by the weather; hot, cold or rain.</td>
</tr>
<tr>
<td>Water Dilution:</td>
<td>Can be diluted with any type of water including fresh water, sea water and grey water.</td>
</tr>
<tr>
<td>Other Benefits:</td>
<td>Major cost savings, ecologically and environmentally safe, biodegradable, water resistant, non-hazardous, non-corrosive, very easy to apply. Standard road building equipment used, no special equipment required. Easy learning curve for construction companies and their employees. Safe for all animal, plant and marine life. Perfect for all secondary and country roads.</td>
</tr>
</tbody>
</table>
### TerraDura Approximate Product Usage – U.S. Customary System

<table>
<thead>
<tr>
<th></th>
<th>Single Lane</th>
<th>Two Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Traffic Roads</strong></td>
<td>over 500 vehicles a day</td>
<td>over 500 vehicles a day</td>
</tr>
<tr>
<td>no heavy trucks</td>
<td>heavy trucks</td>
<td>very heavy trucks</td>
</tr>
<tr>
<td>per Square Foot</td>
<td>per Square Foot</td>
<td>per Square Foot</td>
</tr>
<tr>
<td>4 Inches deep</td>
<td>6 Inches deep</td>
<td>8 Inches deep</td>
</tr>
<tr>
<td>0.04 Gallons per Square Foot</td>
<td>0.066 Gallons per square Foot</td>
<td>0.08 Gallons per Square Foot</td>
</tr>
</tbody>
</table>

Single lane road is approximately 12 Feet wide = 63,360 Square Feet per Mile
Two lane road is approximately 24 Feet wide = 126,720 Square Feet per Mile

### Usage Rates

- **Low Traffic Roads**
  - up to 500 vehicles a day
  - no heavy trucks
  - per Square Foot
  - 4 Inches deep
  - 0.04 Gallons per Square Foot

- **High Traffic Roads**
  - over 500 vehicles a day
  - heavy trucks
  - per Square Foot
  - 6 Inches deep
  - 0.066 Gallons per Square Foot

- **Freeway**
  - over 500 vehicles a day
  - very heavy trucks
  - per Square Foot
  - 8 Inches deep
  - 0.08 Gallons per Square Foot

### Note:
- If asphalt topcoat is applied reduce polymer usage by 25%.
- 20 ton vibrating compactor at 95% compaction is necessary.
### TerraDura Approximate Product Usage – Metric System

<table>
<thead>
<tr>
<th>Low Traffic Roads</th>
<th>High Traffic Roads</th>
<th>Freeway</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 500 vehicles a day</td>
<td>over 500 vehicles a day</td>
<td>over 500 vehicles a day</td>
</tr>
<tr>
<td>no heavy trucks</td>
<td>heavy trucks</td>
<td>very heavy trucks</td>
</tr>
<tr>
<td>per Square Meter</td>
<td>per Square Meter</td>
<td>per Square Meter</td>
</tr>
<tr>
<td>10 Centimeters deep</td>
<td>15 Centimeters deep</td>
<td>20 Centimeters deep</td>
</tr>
<tr>
<td>1 1/2 Liters per Square Meter</td>
<td>2 1/2 Liters per Square Meter</td>
<td>3 Liters per Square Meter</td>
</tr>
</tbody>
</table>

Single lane road is approximately 4 Meters wide = 4,000 Square Meters per Kilometer

Two lane road is approximately 8 Meters wide = 8,000 Square Meters per Kilometer

### Road Construction

**Low traffic roads**: up to 500 vehicles a day, no heavy trucks, per Square Meter 10 Centimeters deep, 1 1/2 Liters per Square Meter

**High traffic roads**: over 500 vehicles a day, heavy trucks, per Square Meter 15 Centimeters deep, 2 1/2 Liters per Square Meter

**Freeway**: over 500 vehicles a day, very heavy trucks, per Square Meter 20 Centimeters deep, 3 Liters per Square Meter

### Table: Product Usage

<table>
<thead>
<tr>
<th>Traffic Type</th>
<th>Single Lane</th>
<th>Two Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low traffic roads</td>
<td>6,000 Liters per Kilometer</td>
<td>12,000 Liters per Kilometer</td>
</tr>
<tr>
<td>High traffic roads</td>
<td>10,000 Liters per Kilometer</td>
<td>20,000 Liters per Kilometer</td>
</tr>
<tr>
<td>Freeway</td>
<td>12,000 Liters per Kilometer</td>
<td>24,000 Liters per Kilometer</td>
</tr>
</tbody>
</table>

**NOTE:** If asphalt topcoat is applied reduce polymer usage by 25%.

20 ton vibrating compactor at 95% compaction is necessary.
Dust Control
For long-term **Dust Control**, TerraDura polymer is a revolutionary solution that greatly reduces the cost of controlling dust compared to using water applications.

Only one application of TerraDura polymer will stop dust for months, not days as water applications quickly evaporate and dust returns. Controlling dust emissions with daily water truck operations is wasteful and very costly considering the fuel, equipment, water and labor used with never-ending water applications. Using the same water truck, polymer applications are absorbed by the dust particles and cure to form a tough protective top film, binding loose soil preventing even the lightest particles from becoming airborne. It doesn’t require pre-watering and cures within hours, avoiding the need for road closures and easily washes off of equipment and vehicles. Furthermore, routine maintenance reapplications are done at a much lower rate resulting in a truly long-term efficient dust control program.

Perfect for roads, aprons, shoulders, landing strips, helipads, haul roads, demolitions sites or any high traffic area, TerraDura controls dust, mud and water/wind erosion.
**TerraDura** polymers are cold-manufactured, cold-applied, non-toxic and use less water, energy and lower CO² emissions than traditional road materials in production and application.

**TerraDura** polymers are produced in an indoor sanitary controlled laboratory. No smoke stacks! As opposed to traditional road construction materials, polymer manufacturing produces no emissions of airborne pollution, greenhouse gases or damage to countryside from quarry blasting. Our polymers are non-toxic, not flammable, non-carcinogenic and use no solvents to corrode equipment or contaminate land and water. Non-hazardous to plant, animal and marine life; and impervious to water after curing, there is no chemical surface wash-off or toxicity threat to land or adjacent waterways.
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