



AVIJEET AGENCIES



IT PAYS  
TO GO  
**GREEN**

**TerraZyme**  
OPTIMAL SOIL STABILIZER

**TerraZyme - A low cost alternate of GSB and WMM for roads.**

**Accredited By IRC**

## ADVANTAGES

The main feature of TerraZyme is the cost saving aspect. TerraZyme saves cost upto 40% in comparison to conventional system of road construction and maintenance cost of roads is reduced by 75%.

- Cuts construction cost by 5% - 20%.
- Higher CBR value / higher road strength : TerraZyme base structures have a higher CBR value.
- Lowers the maintenance cost by 30 - 50%.
- Saves construction time by 50%
- The life-cycle of TerraZyme treated roads increase by 200–300%.
- Pavement thickness is reduced by 30- 50%, being semi rigid in nature.
- Environment friendly and bio-degradable product.

## USES OF TERRAZYME

TerraZyme can used anywhere where GSB and WMM are used in construction as it replaces them.

- Highways
- All weather rural roads
- Internal roads in townships
- Service roads
- Factory roads
- Parking Lots and Yard area
- Sealing of ponds, landfills
- Temporary access roads
- Subgrade improvements
- Floor bases
- Road shoulders
- Construction roads

## SUCCESSFUL TESTING OF TERRAZYME IN INDIA

We have been working with all reputed institutes across India for the past twelve years. Some major institutions that have associated with us are :

- Central Road Research Institute ( CRRI )- Delhi
- IIT Roorkee
- University Of Bangalore - Pavement Engineering Lab
- University of Bangalore - Soil Mechanics Lab
- NITK - Suratkal
- Anna Univeristy - Chennai
- SASTRA - Tanjore
- NIT - Calicut

## INDIAN CLIENTS AND REFERRALS

We are proud to state that TerraZyme has been used across India, on various soil, climatic and traffic conditions. In every project TerraZyme has proved that it is cheaper than conventional methods and long

- NH-66 , NH Department (Chennai circle)
- NH4A, NH Department (Goa)
- Semac Potential Consultants
- Panvel rural road
- Orissa rural road
- Torrent Pharma
- Grainspan
- Renault Nissan
- SPR & RG Construction
- Pacifica Group
- Wipro Ltd
- Sobha Developers
- Rico Auto India Ltd
- Tata Housing
- Hiranadani Constructions
- McDonalds
- Advanced Warehousing
- Visteon
- Ennore Port
- Triton Valves
- Mantri Developers
- Orchid Health Care
- ASI, HAMPI
- Mott Mac India
- Infosys
- Daimler Trucks
- Ozone India Group
- PMC Projects

[www.avijeetagencies.com](http://www.avijeetagencies.com)





**A COST-EFFICIENT  
ECO FRIENDLY ALTERNATE FOR  
GSB AND WMM ROADS**

Avijet Agencies is a civil engineering firm, which has always been in the forefront bringing innovative, eco friendly technologies into India. We are the pioneers in the use of TerraZyme - a green, eco friendly, road construction technology, which replaces GSB and WMM at a lower cost. We have successfully used TerraZyme to construct highways, rural roads, internal roads, yard area and factory floors over the past twelve years in India.

TerraZyme, manufactured by Nature Plus Inc - USA, is an excellent replacement for GSB and WMM. The use of TerraZyme leads to a saving of 5% to 20% - per Sq.mt in road construction. TerraZyme is a bio degradable product made from plant and vegetable extracts. It helps in the workability of soil by improving the engineering properties of the soil like CBR value, ITS, Densities. It also helps in reducing OMC, Plasticity index of soil and its permeability.

**APPLICATION PROCEDURE**



**Design Comparison CBR 6, MSA 20, As per IRC 37**

Conventional Design	thk. in mm
GSB	260
WMM	250
DBM	99
BC	40
<b>TOTAL</b>	<b>649</b>

TerraZyme Design	thk. in mm
Subgrade Improved WMTZ	150
Existing Soil + TZA + Metal 20%	100
Good Soil + TZA + Metal 30%	150
WMM	50
DBM	25
BC	25
<b>TOTAL</b>	<b>625</b>



**KENPAVE ANALYSIS**

Pavement's Ratio varied from 0.2 to 0.4  
Values for each layer were taken from the above table.  
Elastic modulus of subgrade  $E_s = 17.6 \times CBR_1 \times 0.64 \text{ MPa}$   
Elastic modulus of granular sub-base  $E_{gs} = 0.2E_s \times (h_{gs}/h_s) \times 0.45 \text{ MPa}$   
 $h_s$  is the thickness granular sub base.  
Elastic modulus of granular base  $E_b = 0.2E_s \times (h_b/h_s + h_b) \times 0.45 \text{ MPa}$   
 $h_b$  is the thickness granular base.  
For stabilizer material  $E_s = 1000 \times \text{USI} \text{ MPa}$   
USI for stabilizer material = 1000kPa

**CALCULATION**

As per IRC 37 - 2011 (MSA 20 and CBR 6%)  
 $E_s = 17.6 \times CBR_1 \times 0.64 \text{ MPa}$   
 $E_{gs} = 0.2E_s \times (h_{gs}/h_s) \times 0.45 \text{ MPa}$   
 $E_b = 0.2E_s \times (h_b/h_s + h_b) \times 0.45 \text{ MPa}$   
 $E_s = 1000 \times \text{USI} \text{ MPa}$   
USI for stabilizer material = 1000kPa

**IRC 37 Standard case**

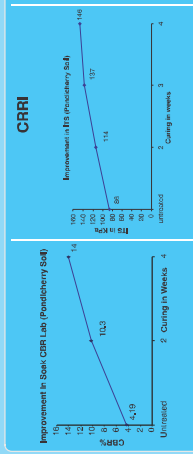
Vertical Coordinate	Vertical Subgrade	Vertical Stress	Vertical Strain	Radial Stress	Radial Strain	Tangential Stress	Tangential Strain
0	0.08721	500	-0.545E-04	1672.149	3.27E-04	1672.149	3.27E-04
4	0.08047	519.783	-1.01E-04	219.267	-0.908E-05	219.267	-0.908E-05
13	0.08311	311.81	-1.03E-03	-298.148	-2.04E-04	-298.148	-2.04E-04
38	0.06587	81.792	5.79E-04	-54.177	-2.78E-04	-54.177	-2.78E-04
64	0.04566	28.389	3.82E-04	-26.306	-2.16E-04	-26.306	-2.16E-04

**TerraZyme Modified case**

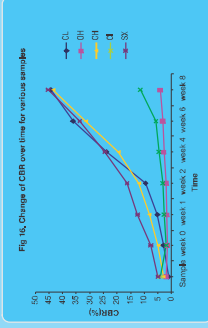
Vertical Coordinate	Vertical Subgrade	Vertical Stress	Vertical Strain	Radial Stress	Radial Strain	Tangential Stress	Tangential Strain
0	0.04986	500	-1.21E-04	722.094	9.05E-06	722.094	9.05E-06
4	0.04961	499.29	-1.87E-04	231.725	-2.87E-05	231.725	-2.87E-05
13	0.04119	222.759	2.21E-04	2.622	-4.79E-05	2.622	-4.79E-05
38	0.03868	107.409	1.51E-04	-54.248	-5.59E-05	-54.248	-5.59E-05
62.5	0.03723	27.738	1.05E-04	-71.534	-1.16E-04	-71.534	-1.16E-04
64	0.04527	15.175	1.95E-04	-26.473	-1.17E-04	-26.473	-1.17E-04

From the above table it can be observed that the vertical stress at centre line of loading is 500 kPa (at vertical coordinate of 0). When the depth of the pavement increases the stress reduces and it become 27.738 kPa at 62.5 cm from the top surface. The observed maximum stress is 500 kPa, whereas the theoretical maximum stress is 500 kPa. The observed maximum stress is 500 kPa, whereas the theoretical maximum stress is 500 kPa. The observed maximum stress is 500 kPa, whereas the theoretical maximum stress is 500 kPa.

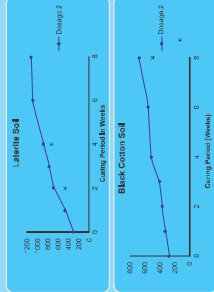
**TEST RESULTS**



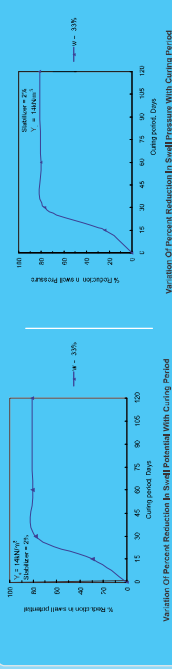
**University of Bangalore**



**UCS Results - NITK Surathkal**

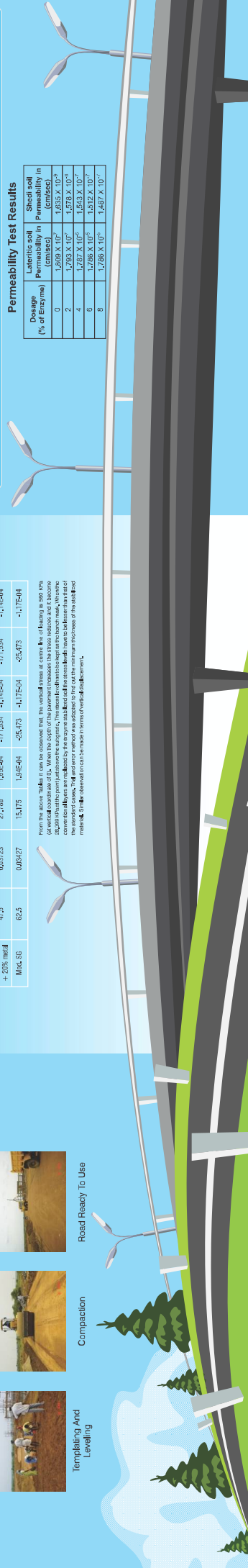


**Improvement Black Cotton Soil**



**Permeability Test Results**

Design	Lateritic soil Permeability in (cm/Sec)	Shed soil Permeability in (cm/Sec)
0	1.809 X 10 <sup>-7</sup>	1.635 X 10 <sup>-7</sup>
2	1.793 X 10 <sup>-7</sup>	1.578 X 10 <sup>-7</sup>
4	1.787 X 10 <sup>-7</sup>	1.513 X 10 <sup>-7</sup>
6	1.786 X 10 <sup>-7</sup>	1.512 X 10 <sup>-7</sup>
8	1.785 X 10 <sup>-7</sup>	1.507 X 10 <sup>-7</sup>



## ROADS CONSTRUCTED IN INDIA



NH 66 - Tindivanam



Reitzel India Factory



Parvel Rural Road



NH 4A - Goa



Orissa - DRDA Road



Schwing Stetter Factory



McDonald



Torrent Pharma

### INTERNATIONAL APPROVALS

- Pennsylvania Highway Department
- Canada PWD
- Brazil Highway Department
- Paraguay
- Russia
- Phillipines
- Malaysia
- Uganda
- Equador
- China
- Japan
- Honduras
- USAID Projects
- World Bank Approved

#### CONTACT US

We deliver timely and professional support for any issue regarding the product TerraZyme. Please contact us at the below location or email us at [info@avijeetagencies.com](mailto:info@avijeetagencies.com)

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