Dimensionally Stable
Flexible & Strong
Water Impermeable
Durable Stabilized Bases

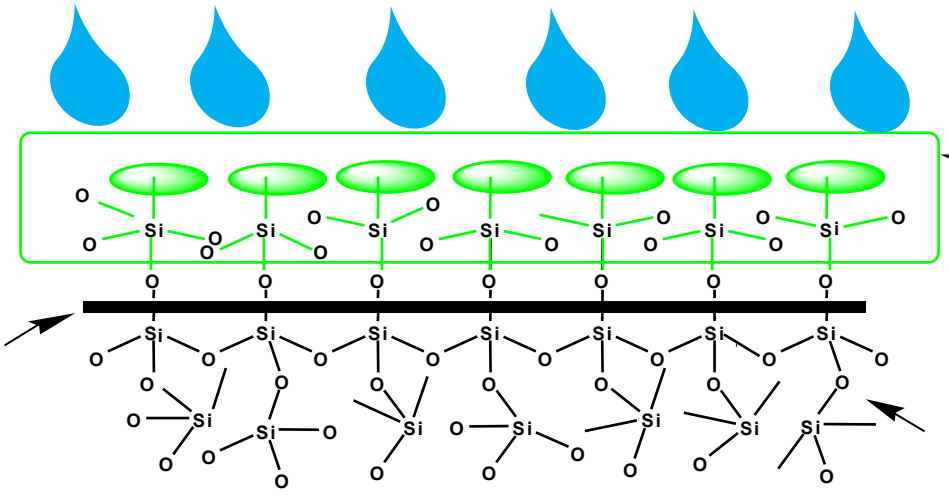
Zydex Nanotechnology

ADVANTAGES OF STABILIZED BOUND LAYER VS UNBOUND LAYER

- Lower Deflection
- Lesser Undulations and Cracks in Upper Layers
- Dimensionally Stronger and Stable Bases
- Improved Fatigue Resistance

SWELL CONTROL AND COMPACTION MECHANISM

Organosilane creates molecular level hydrophobic zone (water repellent)



4 - 6 nm Alkyl Siloxane surface

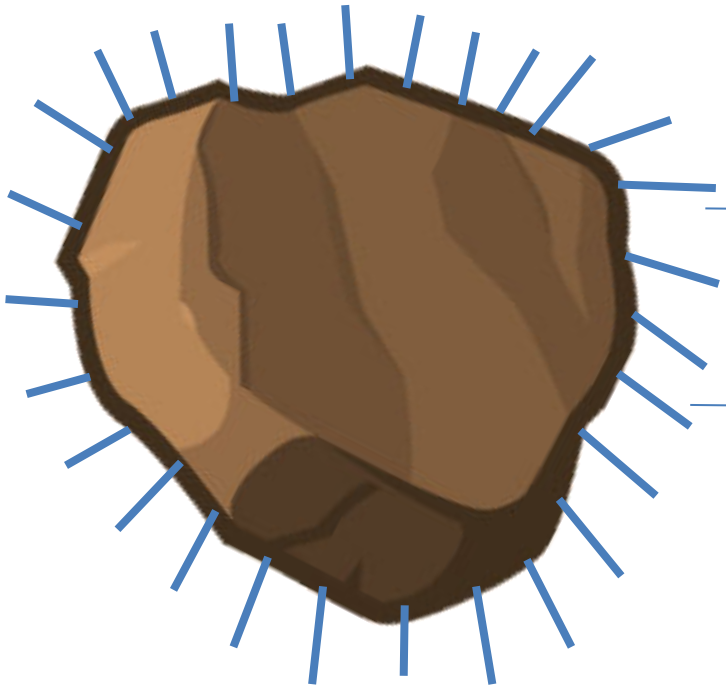
Particle surface

Internal Siloxane bonds

Soil / Clay / Sand / Aggregate surface silicate structure after Organosilane reaction

SWELL CONTROL AND COMPACTION MECHANISM

Improved compaction an additional benefit



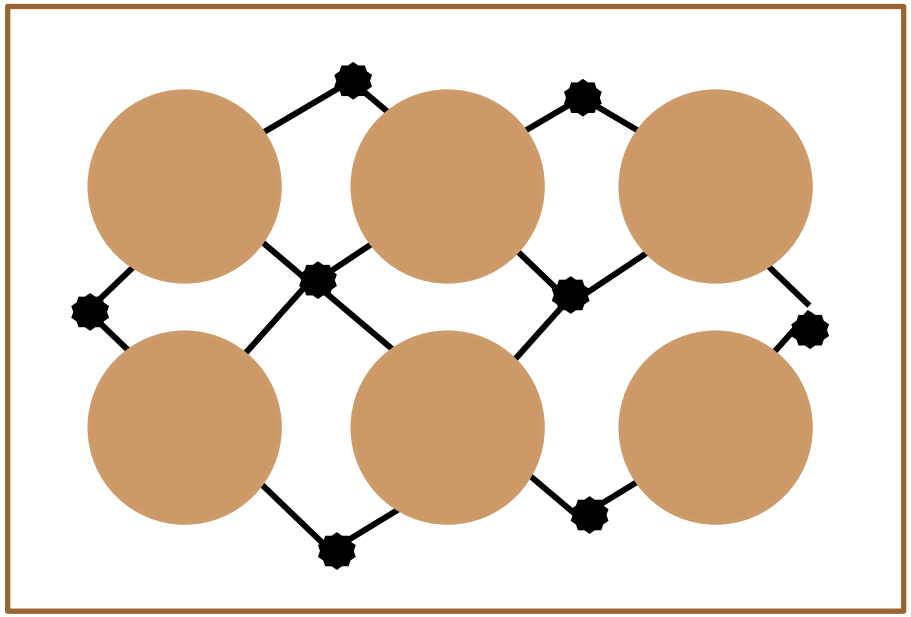
Charge shielding and oil (alkyl) lubrication

Enables optimum compaction

Field proctor density of 100 to 105 have been observed

NANO BONDING WITH FLEXIBILITY, DURABILITY & IMPROVED STRENGTH

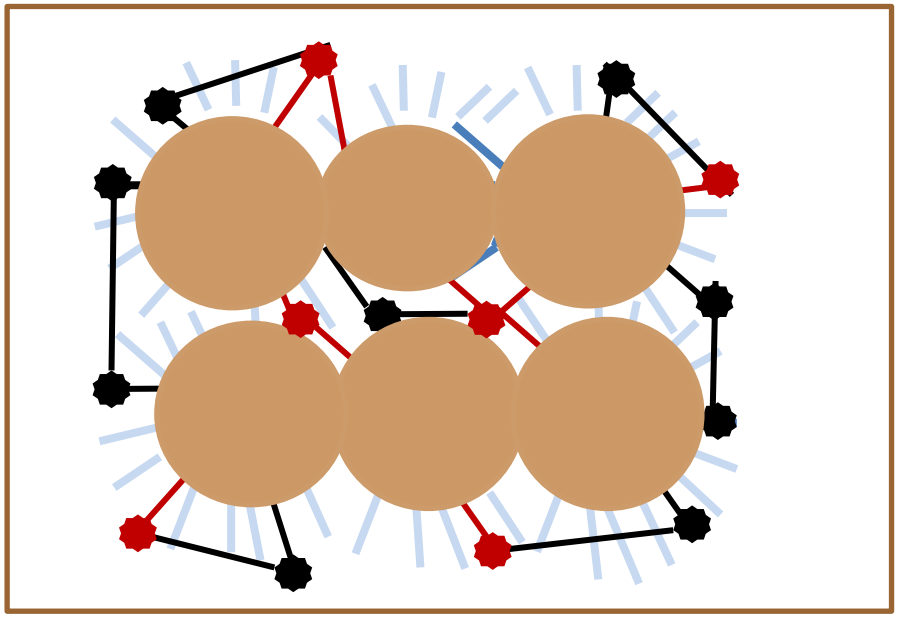
Cement Soil Stabilization



- Proctor 95
- Cementitious bonds degrade with time and lose strength due to wet and dry cycles - Low durability

Cement Particle

Silane + Nano Polymer + Cement



- Proctor 100 to 105
- Unaffected by wet and dry cycles due to hydrophobicity - High durability

ZycoBond Particle

TECHNOLOGY DELIVERABLES → IN LAB

Sr	Parameters	Unit	Value for stabilized Bases	Test Code
1	Swell Control	%	< 2	IS 2720 Part 40
2	CBR for GSB Replacement	%	50+	IS 2720 Part 16
3	CBR for Stone Base Replacement	%	100+	IS 2720 Part 16
4	Durability (Wet – Dry Cycles)	No.	12	IS 4332 Part 4
5	UCS	MPa	> 1.5	IS 4332 Part 5

Next Generation Specifications can be adopted as ' New Standards for Construction of Bases'

TECHNOLOGY DELIVERABLES →IN FIELD

S No	Parameters	Unit	Value for Stabilized Bases	Test Code
1	Field Proctor Density	%	> 97	IS 2720 Part 18
2	Water Permeability	Pour water	Water should stand for more than 20 minutes. Permeability between 10^{-7} to 10^{-8} cm/sec	
3	Depth of Water Resistant Layer	Scratch surface till 5 mm depth, pour water	Water should stand for more than 20 minutes	
3	In-situ Soil CBR DCPT*	%	35	IRC 37-2012
4	BBD*	mm	< 1000 micron	IRC 81:1997

* Dynamic Cone Penetration Test (DCPT) & Benkelman Beam Deflection (BBD) Test to be done after 4 days water ponding and 1 hour drying

Next Generation Specifications can be adopted as ' New Standards for Construction of Bases'

APPLICATION PROCESS AND OUTCOMES

S No.	Outcome of Application	Application Process
1	Controlling Swell	Rotovate, Scarify and Spray Organosilane solution on loose soil and dry the treated soil
2	Get Wet Strength	Spread and mix Cement in Treated Soil by Rotovator
3	Uniform Nano Flexible Bonding	Spray nano acrylic copolymer solution, Rotovate and Compact by Vibro Roller one pass
4	Water Resistant, Flexible Bonding	Spray Organosilane & Nano acrylic copolymer Solution on the above Semi-Compacted Base
5	Grit Layer	Spread Grit (13.2 mm & down size) for making 20 mm thick layer. Compact by vibro-roller single pass followed by nano acrylic copolymer solution spray twice. Do a final compaction with vibro roller to achieve desired density

Thank You