

NaturalPave Case Study

Stabilization of Native Soil in Columbia



Project Background

The Government of Antioquia, the University of Antioquia, Medellin, and University Network Innovial conducted a field study in Columbia to assess the performance of different alternative stabilization technologies when constructed into roads. The goal of the study was to monitor and evaluate the performance and structural response of the road in terms of strength and durability over time and determine which stabilization technologies were viable options for use in Colombia. To evaluate the performance in various climates and soils present throughout Antioquia, the research study was carried out in five sub-regions of Antioquia: Middle Magdalena, Urabá, Southwest, Northern and Middle Subregion.

Soil Sement Engineered Formula 89PBc (SSEF89PBc) was selected to participate in the research study. A stabilized test section of road was installed in native soil to a depth of 15cm in each of the five subregions. No surface course layers were installed on top of the SSEF89PBc stabilized soil. The construction and product applications were performed by the technical team of the participating institutions.

Dynamic Cone Penetrometer (DCP) testing was performed on the stabilization sections and compared to pre-installation test results to evaluate the strength improvements realized with SSEF89PBc.

SSEF89PBc

Soil Sement Engineered Formula 89PBc is an environmentally friendly polymer emulsion used to stabilize roads, pathways and any other unpaved trafficked area that requires structural improvement. SSEF89PBc is engineered to achieve superior strength, durability, and longevity with all types of soils and aggregates. SSEF89PBc's water resistant properties are specifically designed to improve the strength performance of moisture susceptible soils in wet climates or areas with poor drainage. When blended into native soils Soil Sement Engineered Formula creates a hardened soil layer with superior strength, weatherability and resilience. The SSEF89PBc stabilized layer can be used as a final surface coarse or as a stabilized base.



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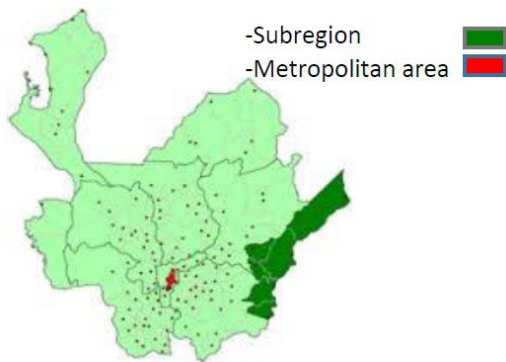
Middle Magdalena Subregion

Soil Sement Engineered Formula 89PBc was installed in native soil to a depth of 15cm in a section of road between Puerto Berrío and Bodegas. The installation equipment included a bulldozer, backhoe, vibratory compactor, and reclaimer.

CBR Prior to SSEF89PBc Installation = 4

CBR After SSEF89PBc Installation = 49

% CBR Improvement = 1,125%



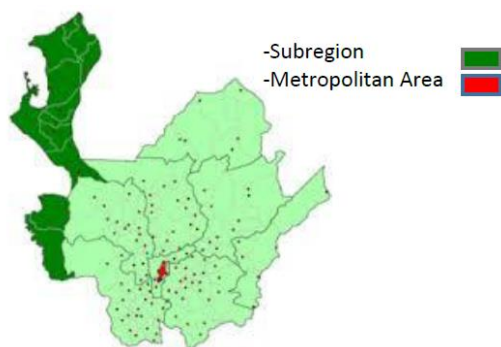
Urabá Subregion

Soil Sement Engineered Formula 89PBc was installed in native soil to a depth of 15cm in a section of road between El Bobal and San Pedro de Urabá. The installation equipment included a bulldozer, backhoe, and a vibratory compactor.

CBR Prior to SSEF89PBc Installation = 8

CBR After SSEF89PBc Installation = 104

% CBR Improvement = 1,200%



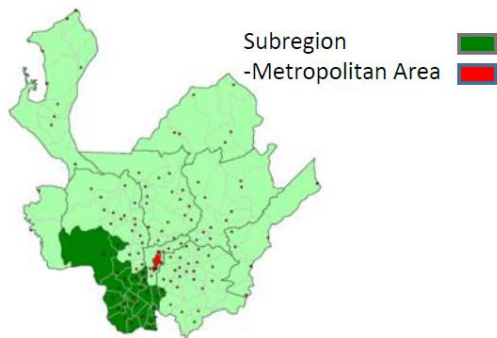
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Southwest Subregion

Soil Sement Engineered Formula 89PBc was installed in native soil to a depth of 15cm in a section of road between La Clarita and Angelópolis. The installation equipment included a bulldozer, backhoe, and a vibratory compactor.

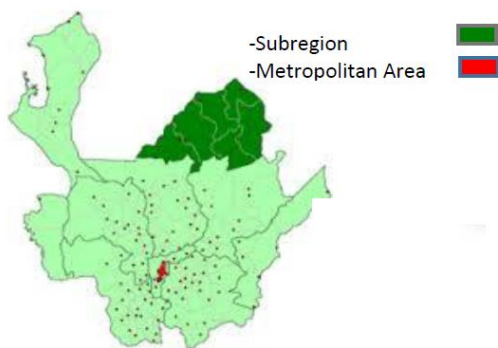
CBR Prior to SSEF89PBc Installation = 5
CBR After SSEF89PBc Installation = 296
% CBR Improvement = 5,820%



Northern Subregion

Soil Sement Engineered Formula 89PBc was installed in native soil to a depth of 15cm in a section of road between Labores and San José del la Montaña. The installation equipment included a bulldozer, backhoe, and a vibratory compactor.

CBR Prior to SSEF89PBc Installation = 7
CBR After SSEF89PBc Installation = 81
% CBR Improvement = 1,057%



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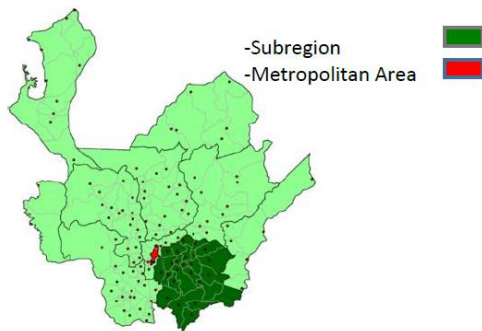
Middle Subregion

Soil Sement Engineered Formula 89PBc was installed in native soil to a depth of 15cm in a section of road between Abejorral and El Cairo. The installation equipment included a bulldozer, backhoe, and a vibratory compactor.

CBR Prior to SSEF89PBc Installation = 17

CBR After SSEF89PBc Installation = 44

% CBR Improvement = 159%



Summary of Results

Based on the results of the Dynamic Cone Penetrometer testing performed before and after the SSEF89PBc installations, the incorporation of SSEF89PBc improved the strength of the in situ soil by an average of 1,872% compared to the untreated in situ soil.

The largest strength improvement (5,820%) was realized in the Southwest Subregion.

The smallest strength improvement (159%) was realized in the Northern Subregion.

Comparison of CBR Values
Pre-Stabilization vs Post Stabilization

