

# NaturalPave Case Study

## Stabilization of Village Roads in Senegal, Africa



### Project Background

The Senegal Ministry of Transportation needed a new alternative paving method that could strengthen the quality of village roads in Senegal, which are crucial to the transport of food, livestock, supplies, and services.

Much of the country's transportation networks that connect villages and towns to major highways aren't paved, which means that seasonal changes can have hugely detrimental effects on commerce. When washboarding, rilling, and potholes occur, roads become unreliable and even dangerous, causing damage to vehicles, and heightening the risk of accidents.

Durable, all-season roads also dramatically improve the quality of life for rural Senegalese communities by improving ecological health and reducing hazards to human, plant, and animal life. Specifically, water, wind, traffic, and other factors can push large, PM10 and PM2.5 dust particles into streams and rivers, where they may impact water quality. Loose dust kicked up by unpaved roads can also harm air quality and negatively impact surrounding ecosystems.

All these factors made an improved road building solution a key priority for the AHA, which contacted Midwest Industrial Supply, Inc. in search of an environmentally friendly stabilization solution.

### Challenges

The following challenges were identified:

- **Constant Traffic** - The road being considered for stabilization is a major thoroughfare between villages, which meant that residents were almost always walking and driving down them, as well as herding cattle, sheep, pigs, and goats. Shutting down this network for even a day could greatly inconvenience the people who used them.
- **Poor Soil** - Most of the material composition of the roadway being treated was formed with non-acceptable soils. The surface was made up four inches of fatty clay soils; below that there was four inches of caliche soils; and under that were four inches of good soil.
- **Lack of Proper Equipment** – The rural village lacked the proper equipment necessary for an ideal installation.



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### Solution

Midwest's team of experts decided that Soil Sement Engineered Formula (SSEF) would be the perfect fit for the Senegal Ministry of Transportation. Soil Sement Engineered Formula is Midwest's innovative soil stabilization solution for road construction. It uses high-tech binding agents to blend natural soils into a durable, pavement-like surface without the need for aggregate. This approach allows for stabilization at a shallower depth than traditional methods thereby stabilizing the road at a lower cost.

The Midwest team worked on only one side of the road at a time so that heavy loads like herds of cattle could pass through while construction was ongoing. And to help accelerate the process, residents would join hands along the side of the road to keep cattle diverted away from the construction activity. Neighbors also stopped by the site to offer whatever equipment they could drop off -- a few children even offered to lend a hand in the application.

### Installation

Completing the entire scope of the project was a three-step process:

**Step 1:** Cut one foot deep into the road and blade mixed the three different types of soil, combining them to create an acceptable road material.

**Step 2:** Worked in four-inch lifts and built an eight-inch base in two lifts, adding moisture and compaction.

**Step 3:** Soil-Sement Engineered Formula was applied and incorporated into a four-inch surface lift, graded, and compacted.

**Step 4:** The stabilized and compacted road surface was topically treated with Soil Sement Engineered Formula to provide a durable and dust free surface course.

In the days following the installation, traffic and cattle were diverted off to the side of the road as much as possible to allow the treated surface to cure.



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### Results

When the project was finished, the result was a surface that was clearly more stable, safe, and visually pleasing than what had existed previously. The revitalized road network has already improved the quality of life for those living in rural Senegal, strengthening a key aspect of the country's infrastructure by connecting citizens in remote communities both to one another and to major urban centers of commerce.

Midwest's stabilization techniques and products will actually improve the stabilized road's strength as they're used over time. That means that this network of roads will be free of potholes, dust, and washboarding long after the project's official completion.

