

GeoSpike® Restores Stability Without Disrupting Rail Operations



NS Bridge Approach CNOTP

Ludlow, Kentucky

CHALLENGE

A section of Norfolk Southern track near the bridge over Deverill Road in Ludlow, Kentucky, had begun exhibiting mud-pumping and noticeable track dips near the bridge and embankment transition. The project focused on approximately 80 ties of track on both sides of the bridge, where repeated heavy rail loading had contributed to deteriorating subgrade performance. Beneath 12 inches of ballast, softened fine-grained soils created the need for a long-term stabilization solution.

SOLUTION

Geopier's GeoSpike® system was selected to strengthen the existing railway subgrade without removing the rail, ties or ballast. GeoSpike elements were installed between the ties and driven through the weakened soils into the underlying very stiff clay and mudstone, creating confined aggregate columns that transferred loads into more competent bearing layers. GeoSpike elements were also installed along the bridge approach to address localized mud-pumping and track settlement while supporting the heavy loading demands of the rail corridor.

RESULTS

The Geopier® GeoSpike® system provided a targeted, efficient solution that:

- Restored stiffness and stability through the problem area
- Improved load transfer beneath the track
- Reduced the need for ongoing maintenance associated with weakened subgrade conditions
- Minimized disruption to railroad operations
- Provided an efficient alternative to more disruptive repair methods

GEOPIER®



PROJECT TEAM

Owner

Norfolk Southern Railroad

Engineer

Will Graham

Contractor

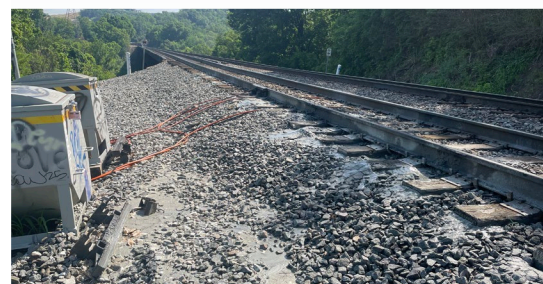
Southeast Unlimited

Product

Geopier® GeoSpike® System

Installation

2026



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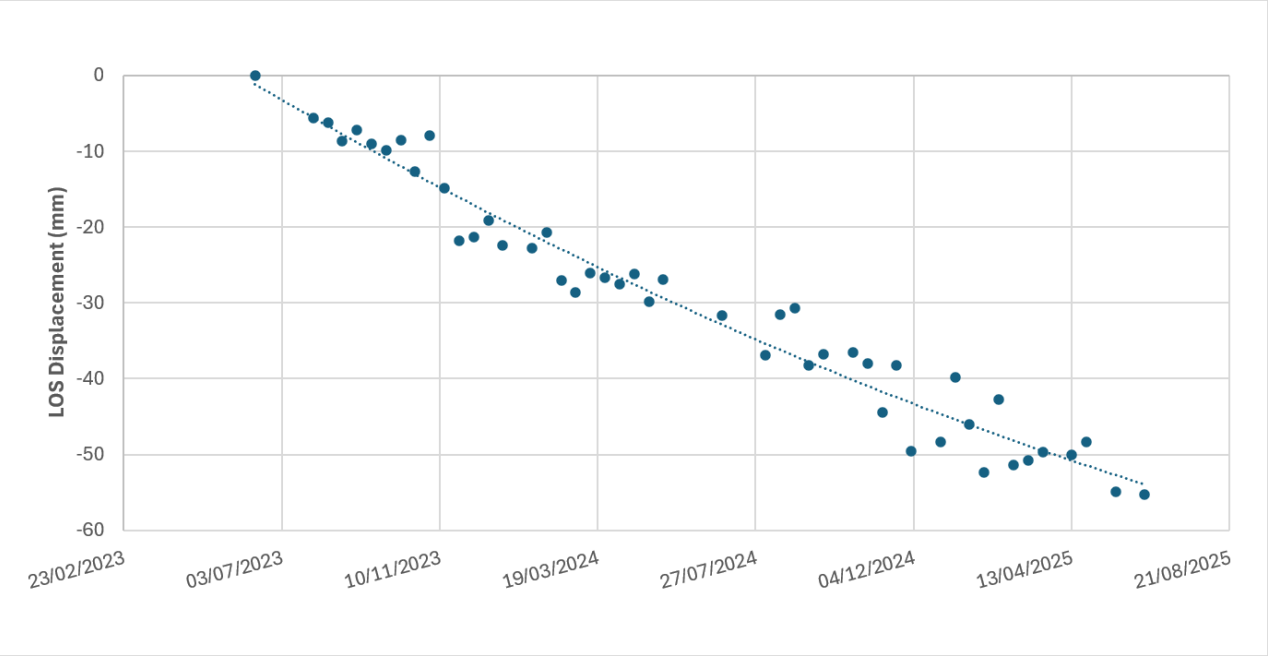


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Independent Monitoring Confirms Reduced Ground Movement

Independent InSAR monitoring conducted before and after the installation of Geopier GeoSpike® elements revealed a clear reduction in ground movement at the bridge approach. The following graphs compare displacement trends over time, illustrating how movement rates stabilized after treatment and providing third-party validation of the solution’s performance.

Before Installation



After Installation

