

# GEOPIER®

## RAILWAY SUBGRADE IMPROVEMENT Technology - Success Story



### CLIENT'S CHALLENGE

Katoen Natie (KTN) was looking for an alternative option to solve this subgrade issue that had been a persistent issue. KTN considered removing the track, excavating and replacing the subgrade. However, this option was expensive and would greatly impact their operation. Geopier® was selected to provide a solution unlike methods used in the past. An onsite inspection was performed focusing on a 800ft section of track having a history of surface defects and repeated maintenance. The site inspection revealed soft, wet molded clay soils below the ballast that were indicated by track deformation and mud pumping.

### GEOPIER® SOLUTION

The Geopier solution for this project consisted of 5-7 ft GeoSpike<sup>SM</sup> elements installed so that the GeoSpike apexes were 1 ft below the existing ties. The GeoSpike elements were installed in pairs spaced every tie to resist a Cooper E-80 derived working load of 16kips per GeoSpike. Approximately 800 GeoSpikes were installed in the 800' section in about 10 days using a hyrail excavator with vibratory driver. Geopier was able to work in-between trains and clear the track for traffic. The project was completed in conjunction with the switching operations with minimal impact on the revenue service. After the installation a sample load test was conducted on an installed element, resulting in .17" deflection at 150% of design load. The track was surfaced after the installation of the GeoSpikes.

### INSTALLATION RESULTS

A Load Test was performed following installation to confirm that elements were supporting the measurable load without deflection. Results were as expected. A follow up inspection was performed six months after installation. The inspection included a motion capture of the vertical deflection using a laser and high-speed camera. The test showed 1/8" of vertical deflection.



### Katoen Natie Industrial Track

Baytown, Texas

#### Katoen Natie

Owner

#### Raba-Kistner Consultants, Inc

Geotechnical Engineer

#### Mainline Railroad Contractors, Inc

Contractor

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KTN Industrial Track Before Installation



KTN Industrial Track After GeoSpike<sup>SM</sup> Installation