



UNITED STATES

CSX Rail Yard Elizabeth, NJ



Owner
CSX

Engineer
French & Parrello Associates

General contractor
Atlantic Management and Construction, Inc.

Dates of work
December 2018 - December 2018

Main figures

Rapid Impact Compaction
50,000 Drop(s)



Description

CSX Transportation, a Class I freight railroad operating in the eastern United States and the Canadian provinces of Ontario and Quebec, operates approximately 21,000 route miles of track. Included in that total is nearly 1,000 miles of track in New Jersey, where CSX maintains nearly 70 public and private grade crossings and operates five major rail yards and five intermodal terminals.

In Elizabeth, NJ, CSX proposed the construction of five new rail lines, along with the installation of heavy-duty pavement, totaling 65,800 sq ft. Due to the compressible and loose nature of the soils at the site, Menard USA was contracted to provide ground improvement – the selected technique was rapid impact compaction (RIC).



Ground conditions

The soil is characterized by 8 to 10 ft of loose/compressible fill with medium dense to dense sands with pockets of silts and clays and debris -- including concrete slabs, coal, ash, tile, and glass. The site required improvement of loose fill soils for increased bearing capacity and settlement control.

Solution

Overexcavation was considered for foundation support. However, Menard, which had previously worked with CSX, provided an economical and time-saving solution with RIC. This technique had a two-fold benefit: It eliminated the need for deep excavation; it avoided the creation of contaminated spoils that would require special management and disposal. RIC is a technique that yields shallow ground densification through the use of energy waves from a hydraulic hammer weighing 7.7 to 9.9 tons that rapidly and repeatedly impacts the ground at 40 or more blows per minute.

At this site in Elizabeth, Menard densified the soil with 50,000 drops to increase the density of the upper 10 ft of fill. The energy delivered was of 52 k-ft per sq. ft. Ground lowering of 12 inches was targeted as the treatment criteria. The biggest challenge Menard faced was performing RIC adjacent to existing buildings. Constant monitoring ensured no issues with the surrounding structures.

To support the construction of five new rail lines, along with the installation of heavy-duty pavement, Menard successfully performed RIC to densify a variable fill layer.