

Capping of the Excavation Cut for a New High-Speed Railroad Line in Spain

In high speed railroad lines, continued rainfall periods may cause problems due to the presence of soils sensitive to moisture changes. The ground can respond by shrinking (settlement) when it dries, or swelling (heave) when it becomes wet again. This may result with instability of excavation cuts. Many railroad structures and embankments founded on such sensitive, unprotected soils require constant monitoring and remedial measures to prevent a potential failure.



PROJECT DETAILS

Construction of new railroad line Cordoba – Malaga

LOCATION

Railroad section Puente Genil – Herrera, Spain

PRODUCTS USED

BENTOMAT AS,
CETCOCELL
(geocell system)

CHALLENGE:

Cordoba – Malaga railroad line belongs to Madrid – Southern Spain high-speed railroad system, one of the most important transportation networks in Spain. The original construction design for the new line did not call for a lining solution. After an uncommon period of heavy rain, studies based on topographical survey and volumetric analysis demonstrated slope geometry changes and instability hazards. Detailed investigation identified soils sensitive to moisture changes. The footprint of exposed susceptible soils was 90 000 m², mainly on slopes inclined at 3H:1V and 2H:1V. Length of each slope varied from 10 to 80 m.

SOLUTION:

CETCO engineers recommended to cutoff sensitive soils from potential rainfall by using a BENTOMAT AS geosynthetic clay liner. For steeper slopes a cellular confinement system (CETCOCELL) was also recommended to be installed on top of BENTOMAT AS, to prevent surface runoff or severe erosion problems. This proposed solution was benchmarked against other lining systems but CETCO GCL solution proved to be the most efficient and reliable liner for this application. BENTOMAT AS and CETCOCELL turned out to be the most durable, competitive and cost-efficient solution.

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RESULT:

As the construction was already delayed the installation of BENTOMAT was carried out rapidly and allowed for consecutive works to be progressed without further delays. BENTOMAT proved to be extremely efficient and feasible for this kind of emergency works.

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