



Attack the Threat



CASE STUDY

Mitigating Moisture in Railway Subgrade

PRODUCT

Mirafi[®] H₂Ri and RS580i

APPLICATION

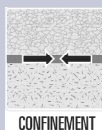
Railway Reinforcement

LOCATION

Edmonton, Alberta



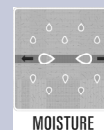
DRAINAGE



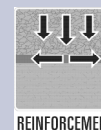
CONFINEMENT



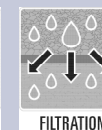
SEPARATION



MOISTURE
MANAGEMENT



REINFORCEMENT

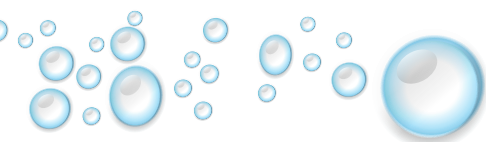


FILTRATION

THE CHALLENGE

Alleviating moisture and mud-pumping in the railway subgrade

Canadian Pacific's (CP) continuous rail maintenance and safety program identified a section of track on a site located 30 minutes, northeast of Edmonton, Alberta that was subject to track settlement resulting in cross level variations. CP implemented a 10 mph speed restriction on the section of track and scheduled it for immediate repair. Field investigations showed that a significant amount of moisture was present in the subgrade and surrounding area. Signs of mud-pumping (movement of subgrade material into the coarse ballast) were apparent along the track surface, indicating that the wet conditions were accentuating the process of subgrade attrition and that the sub-ballast was no longer performing as originally intended.

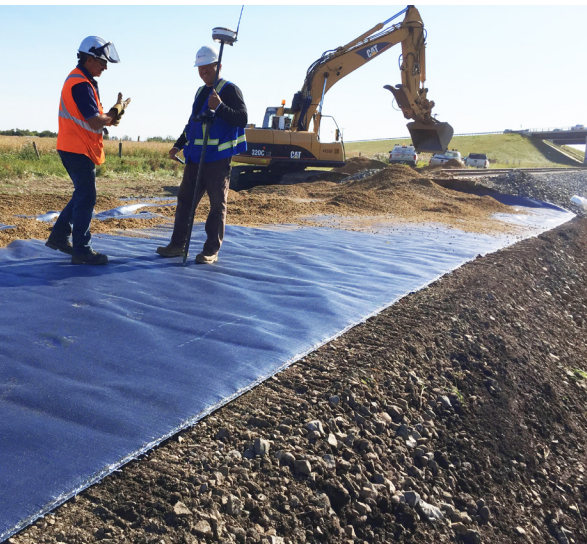


JOB OWNER Canadian Pacific (CP)
ENGINEER Clifton Associates
DATE OF INSTALLATION 2016

TENCATE
GEOSYNTHETICS

THE DESIGN

CP and Clifton Associates had successfully used a combination of non-woven geotextile, triangular geogrid, and cellular confinement products to rehabilitate similar sections of rail. TenCate's solution for the subgrade condition incorporated Mirafi® H₂Ri moisture management and reinforcing geosynthetic at the subgrade and Mirafi® RS580i reinforcing geosynthetic at the sub-ballast/ballast interface for redundancy. Generally, the weaker the subgrade, the more benefit the robust geosynthetic provides. In this instance, the inclusion robustness of the 2 layers of Mirafi® geosynthetic resulted in a 43% reduction in the amount of ballast and sub-ballast required which would also correspond to a significant savings in time related to placement, spreading, and compaction.



THE CONSTRUCTION

Repair of the first 22 meter-long section was completed in just under 7 hours. Removal of the track panel and excavation/removal of the existing rail embankment was completed in approximately 1 hour. Mirafi® H₂Ri was rapidly placed on the prepared subgrade, backfilled with sub-ballast, and compacted in under 90 minutes. The sequence of events from this point onward was placement of the Mirafi® RS580i, reconnection of the track panel, ballast placement, ballast compaction, and grade correction with the regulator. Placement of the geosynthetic was a minimal amount of the 4 hours required to perform these last steps.

THE PERFORMANCE

CP will be monitoring the track performance on the repaired subgrade over the next few years. The expectation is that they will know the level of performance after the first Spring freeze, when the subgrade is expected to have the maximum moisture content and the robustness of the section will be most evident.

