



GEO-FOUNDATIONS Contractors Inc.

CN Dundas



Date: 2002
Technology: Soil Nailing

A 250-metre long section of the CN Rail line near Dundas, Ontario was stabilized by Geo-Foundations using a soil nailing system designed for CN by Alston Associates. The rail tracks along this section had experienced chronic settlement problems due to 'toe bulge' occurring at the foot of the embankment. The soil nailing installed incorporates 133 soil nails each installed 12 metres deep, through the embankment at angles ranging between 15° and 30° from horizontal, over a 500 m² area.

Access to the steep (34°) embankment slope was gained by descending from the rail tracks at the crest of the embankment, with the only available construction support laydown area 1 km away. Soil nails were installed over a 2-week period using a 2200 kg pneumatic crawler rig supported by guy cables anchored to temporary micropiles installed within the rail track footprint. The soil nails consist of hollow-core Titan 30/11 tendons installed using continuous grout flush, and feature zinc-metalized treatment of their uppermost 3-metre bar lengths and their washers and nuts. The soil nails' bearing plates are galvanized.

Before the final application of mulch and hydroseed to the slope face, the soil nail bearing plates were secured to an enmeshing layer of biological matting and geogrid, in order to protect the slope from weathering and to connect the embankment facing to the new, deep stabilization elements. Full serviceability of the railway was maintained at all times throughout construction.



Soil nail construction proceeding while full service of railway is maintained



Soil nail construction ongoing with completed soil nail array in foreground



Slope face treatment – plates, geogrid, biomats - prior to final soil layer applications