Permeation Grouting Using Polyurethane and Acrylate Resins in a Silty Sand (SM); Injection Methods, In-Situ Verification Testing Methods and Laboratory Results.

Polyurethane and acrylate resins are routinely injected into soils to gain strength and control water flow. However, most published data regarding these materials' performance is derived from laboratory samples created under ideal conditions. In this study a large container was filled with a silty SAND (SM) to simulate in-situ soil conditions frequently found in Vancouver BC and British Columbia's Lower Mainland. The injection pressures, volumes, lift heights, and other details have been compiled to evaluate this methodology for permeation grouting. In-situ and laboratory testing will be used to verify the material performance and the strength of the soil/resin composite. Dynamic cone penetrometer (DCP), Consolidated Isotropically Undrained Triaxial (CIU), Unconfined Compressive Strength (UCS) and Direct Simple Shear (DSS) testing has been performed on the polyurethane and acrylate soil composites. The soil type, compaction methods, injection methods, and testing performed have been documented and are presented in the final paper. Initial testing results indicate considerable strength gain with polyurethane treated soil versus untreated soil, and the applicability of acrylate treatment in support of soil excavation projects.