

# Case Study

## Curtain Grouting Calgary Transit



**STRAYCAT**  
INDUSTRIAL SERVICES Ltd

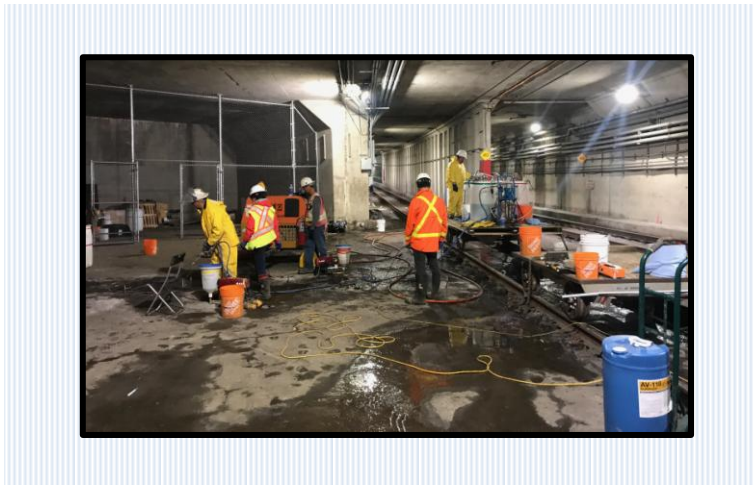
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## Project: Curtain Grouting

**Location of Project:** CP Tunnel, downtown Calgary, Alberta



**Description of Application:** Stray Cat was engaged by Graham Construction to assist in solving persistent groundwater infiltration issues inside a tunnel in Calgary Transit's light rail transit (C-Train) network. Working with ECO Grouting Specialists Inc., who designed and supervised the grouting program, we successfully injected an acrylamide grout into seven tunnel joints over two separate weekends during the summer of 2017. First, holes were drilled in the concrete walls and floor of the tunnel. Certain holes were drilled at a ~45 degree angle, which were designed to contact the tunnel joint, in order to inject polyurethane to seal the joint prior to injecting acrylamide grout. Other holes were drilled at a perpendicular 90 degree angle through the floor and walls into the soil/bedrock beneath, which were up to 5 feet deep in the floor sections. The 45-degree holes were flushed with a phosphoric acid/water solution to clean out any debris, and then injected with a polyurethane grout to seal the joints. Next, the 90 degree holes were injected with the acrylamide grout, which has the same viscosity as water and can permeate anywhere water travels before curing as a gel, forming an effective and long-lasting water barrier.

## Details



**Manufacturers:** Avanti International

**Size:** Approx 50 lineal feet per joint (7 joints)

**Length of Project:** 3 days, 3 nights in May and 2 days, 3 nights in September

**Crew Size:** 4 on day shift, 4 on night shift

**Equipment on Site:** Titan pumps for acid/water and polyurethane injection, Wiwa stainless dual-component pump for acrylamide injection, Dynamix agitators, Graco transfer pumps, 50-gallon mixing drums, hammer drills

**Type of Structure:** Concrete tunnel for light rail transit

**Condition of Structure:** Leaking water in joints between concrete tunnel sections

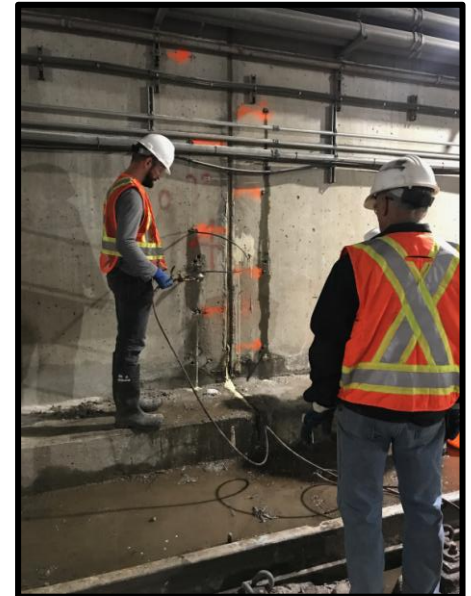
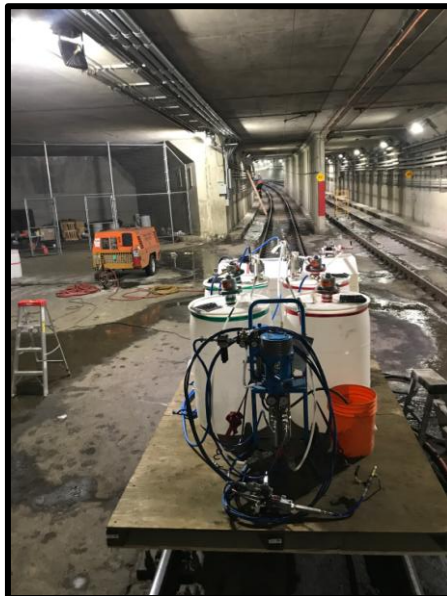
**Date of Application:** May and September, 2017

**Product Used:** Avanti AV-118, Avanti AV-101, Avanti AV-103

**QA/QC Tests Performed:** Prior to commencing acrylamide injection, the grout plant was tested with water to ensure that there were no leaks in the system and that the 2-component acrylamide injection pump was accurately injecting the A and B components of the acrylamide-based grout at a ratio of 1:1. Tests of the grout mixture were taken throughout the injection program to ensure that proper cure times were being achieved.

**Unique Conditions or Experiences During Project:** This project was on a strict timeline, as Calgary Transit had suspended train service for the weekend only. All work had to be completed and all people, equipment and materials removed from the tunnel, in time for power and other services to be restored to the tunnel for the morning commute at the beginning of the following week. Safety precautions were of utmost importance, as the catalysts for the A side and B side of the acrylamide solution were combustible and explosive if mixed, and thus proper storage and handling was essential.

**Opinion of Project Owner – Product, Applicator Performance and Projected Future Use:** As a result of the success of the initial pilot project in May, another grouting program was undertaken in September, for which Stray Cat was again contracted to handle the grout injection. The City of Calgary will now monitor the results over the winter and spring before deciding whether to proceed with a full-scale grouting program inside this tunnel.



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