

Edmonton SLRT.2 Water Inflows Solved by Grouting Specialists from Multiurethanes

By Vreneli Wall, Marketing Co-ordinator, Multiurethanes Ltd.

An extension of the South Light Rail Transit (SLRT) system for the City of Edmonton was completed by a tunnelling contractor in 2004. The twin tunnel extension brought the SLRT from 6 metres below grade up to street level to extend the SLRT system to the south side of the city.

Design challenges associated with SLRT twin tunnel extension included strict settlement control due to sensitive structures (including University of Alberta and adjacent hospital structures) and tight radius curves due to alignment requirements. The ground conditions were soft, silty sands with a high water table that increased drastically during spring thaw. Precast gasketed tunnel segments were installed to provide final twin tunnel diameters of 10 metres each.

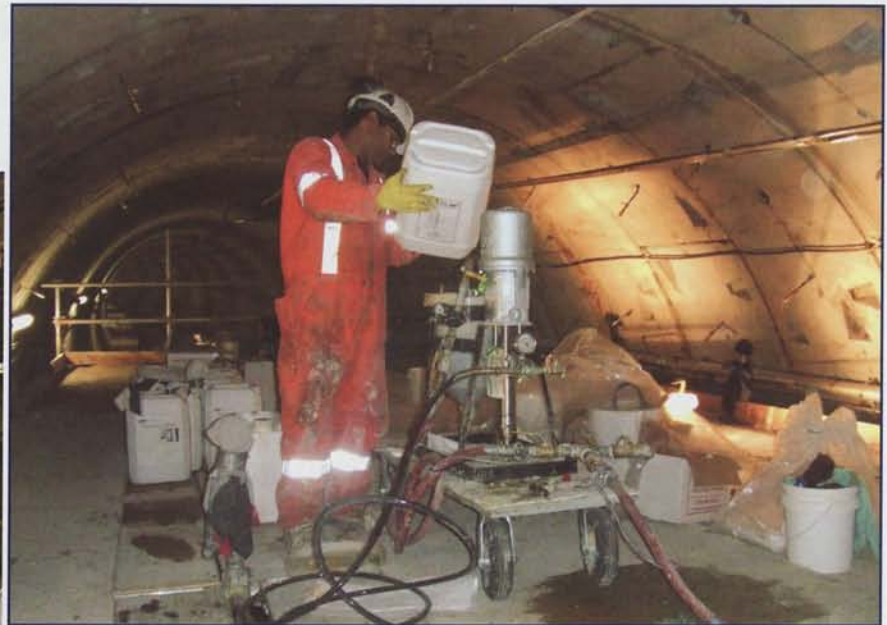
From completion of tunnel construction to 2007, various water leaks occurred between the precast segments, from grout

ports, as well as at the interface of the twin tunnels and the underground SLRT station bulkhead. Local contractors performed regular maintenance procedures on behalf of the tunnelling contractor with limited success. Injection of polyurethane resin was used at various locations throughout the entire length of the tunnel. This method succeeded for most of the twin tunnels except for the final 15 metres where the tunnels interfaced with the underground station. This section experienced higher water inflows compared to any other location in the tunnel, compounded by a high water table level at this location.

The tunnel contractor retained Multiurethanes, a full-service engineering

firm specializing in difficult and challenging water inflow and soil stabilization projects, to deliver a final resolution to these troublesome water inflow problems. Multiurethanes mobilized two grouting crews (with four technicians per crew) to troubleshoot the situation during two weekend SLRT system shutdowns (one tunnel per weekend) from Friday night to Sunday night.

Two chemical grouting methods were used to stop the water inflows; precise injections into the most problematic areas (i.e., tunnel/station interface and grout ports) and wide spread injection to deal with the leaking joints of the precast segments. The second method (overcoming water inflows at the tunnel



A pneumatic chemical pump is used to mix and deliver grouting material.

Multiurethanes universal resin is injected into grout ports through the precast tunnel segments as well as the bulk head at the tunnel-station interface (as shown in the background).



Technical grouting requires experience. Multiurethanes technicians can provide training for your team on grouting fundamentals.



Multiurethanes Universal Resin is used to stabilize soil and cut off water flowing from leaking joints of precast tunnel segments.

segment joints) involved an advanced grouting application for sand stabilization and water cut-off using Multiurethanes Universal Resin. Both methods were successful due to the knowledge of chemical grout application techniques and the use of appropriate grouting equipment

for the site conditions. Experienced project planning and technical expertise of the Multiurethanes' crew, successfully completed the project on behalf of the tunnelling contractor within the time constraints set by the SLRT system.

High-volume, high-pressure water

inflows are routinely resolved by Multiurethanes' grouting crews. For innovative solutions, material selection advice and technical support, call us anytime at 1-800-663-6633 or in an emergency call 416-254-5212.

We're here to help! ●

J.D. John Caufield, P. Eng.
President



SCHAUENBURG INDUSTRIES LTD.
MINE, MILLING, TUNNELLING, FORESTRY & CONSTRUCTION
INDUSTRIAL VENTILATION PRODUCTS

1904 BOND STREET
NORTH BAY, ONTARIO
P1B 4V6

TEL: (705)472-2851
CEL: (705) 499-8422
FAX: (705) 472-4127

Email: jdcaufield_schnburg@onlink.net
www.schauenburg.ca



Global Solutions
in Engineering



Our Resources: Over 3,500 employees in 80 offices in Canada and overseas.

Our Vision: To apply sustainable development principles to all projects.

Our Central Focus: To partner with clients and deliver their projects on time and on budget.

Buildings | Municipal Infrastructure | Environment
Transportation | Power | Industrial

Markham 905-475-7270 | www.genivar.com



ROKTEK
SERVICES INC.

Rock and Tunnel Contractor

Specializing in Civil Underground Projects

CTA
Member

1-877-564-9011

www.roktekservices.ca

Prince George B.C. Canada

MSCCA
Member

"In the middle of difficulty lies opportunity" ~ Albert Einstein