

# An Innovative Water Cut-off Solution for a Hard Rock Tunnel

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

**H**ard rock tunnels present a unique set of challenges, especially when constructed through water-bearing fractured ground conditions. A large tunnelling contractor found itself in a difficult situation with a large flowing water leak in a new rock tunnel 20 metres underground. The tunnelling crew was experienced in managing small water leaks through the use of conventional cement grouting and chemical grouting methods. This particular situation, however, was more complex and required assistance from the experienced grouting specialists at Multiurethanes.

During tunnel construction, localized areas of bad ground conditions were encountered, characterized by heavily fractured rock. Conventional cement grouting was used by the tunnelling contractor to control water inflows in some of these areas. Typical solutions to water infiltration involves multiple hole grouting where several holes are drilled

to intersect the water-bearing fracture and the leaks are cut off by cement grout injection.

An evaluation of the particular site conditions by the Multiurethanes' crew determined that debris and broken ground made it impossible to accurately identify the primary water-bearing fracture, as experienced by the tunnelling crew, when initial injections were washed out by the large water inflow. An innovative solution involving chemical grouting through single grout hole injection while isolating and identifying nearby localized leaks, was successfully implemented.

The specialized nature of the water cut-off grouting work required a combination

of materials, equipment and experience, including Multiurethanes Universal Resin, a pneumatic chemical pump and skilled grouting techniques performed by experienced Multiurethanes technicians. One member of the grouting crew focused on mixing and pumping the material while the other members identified and sealed nearby localized leaks as the grouting process was underway. This tedious process was systematically undertaken until the water inflow gradually stopped and the tunnel became dry.

The secret to this successful water cut-off project was the application of appropriate grouting techniques, equipment and materials for the existing site conditions. After conventional cement



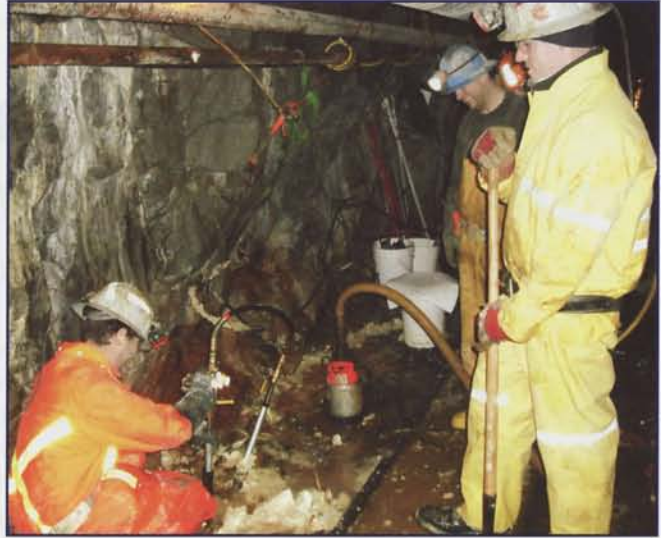
Experienced grouting technicians work together to stop the most difficult water flows.



From high volume flowing water to a dry tunnel. Call Multiurethanes when difficult ground conditions are experienced on your jobsite.



*Grout plugs are installed to allow high pressure injection of Multiurethanes Universal Resin.*



*Flowing water makes tunnelling work very difficult. Multiurethanes has the experience and technical support to resolve challenging water cut-off situations.*

grouting injections had washed out, it became clear that an experienced grouting approach, including patience instead of brute force, would win this battle. It's how you do the job – not how

much pressure you use – that leads to a successful conclusion!

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! ●