



SIKA AT WORK

NIAGARA TUNNEL, NIAGARA FALLS, CANADA

BUILDING TRUST



NIAGARA TUNNEL, NIAGARA FALLS

INTRODUCTION

The main scope of the Niagara Tunnel project is the design and construction of a tunnel 140 meters below ground, with a total length of ~ 10.2 km and a diameter of 14.4 meters. Other structures for the project include the intake and the outlet of water. The tunnel will be operated for electricity generation, optimizing the use of water from the Niagara River. This represents the major upgrade of the existing Sir Adam Beck Hydroelectric Generating Stations, with an increased power generation of around 150 MW. In August 2005, after an intensive 8-month international procurement process, a \$600 million design-build contract was awarded to Austria's Strabag SE.

MAIN DESIGN FEATURES

Excavation of the tunnel involved the use of the world's largest hard-rock boring machine at that time, named "Big Becky". The 14.4 m tunnel diameter is about 1.5 times larger than the Euro Railway Tunnels under the English Channel.

The Tunnel, bored in the Queenston Formation shales with potential high deformations, was reinforced with a combination of steel ribs, wire mesh, rock bolts and shotcrete, which varied based on the actual rock conditions encountered along the tunnel route. As construction progressed, a waterproof TPO membrane with a life service expectancy of 90 years and the final cast-in-place concrete liner were installed.



SIKA KING SOLUTIONS

Wet-mix shotcrete was used during the TBM excavation providing initial support for the 14.4 m wide and 10.2 km long tunnel. The contractor elected to use King's MS-D3 X2 (dry mix shotcrete) to repair fall out of the wet shotcrete in order to bring the contour back to profile for waterproofing and also to rehabilitate large unstable ground portions occurred during the construction. More than 11,000 tonnes of product were used.

The use of both wet and dry-mix shotcrete played a critical role in meeting the immediate ground support requirements of the project and also supported the long-term durability of the tunnel lining. King's MS-D3 X2 (dry-mix) shotcrete provided a smooth finish that allowed for a waterproofing membrane to be applied (a critical feature of the tunnel design).

SIKA - KING PRODUCTS

- MS-D3 X2, dry-mix shotcrete
- Sikaplan® WT 2200/2220, flexible TPO membrane system
- Sika TunDrain A
- SikaQuick® 1000 repair mortar
- SikaFix® PU injection
- 2 x Aliva AL-252 shotcrete machines



BUILDING TRUST



NIAGARA TUNNEL, CANADA



PROJECT PARTICIPANTS:

Consultant: ILF Consulting Engineers

Contractor: Strabag SE

Client: Ontario Power Generation Inc.

Date of Completion: 2012

Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



SIKA SERVICES AG
Tueffenwies 16
CH-8048 Zurich
Switzerland

Contact
Phone +41 58 436 40 40
www.sika.com

BUILDING TRUST

