

Deep Hard Rock Shaft

Niagara Falls, Ontario

If there's a difficult challenge and/or a tight schedule, contractors such as Strabag SE, European tunneling experts, know they can count on Birmingham people to get the job done on time. That's why they enlisted Birmingham's assistance for the inlet structure for the Sir Adam Beck Tunneling project in Niagara Falls.



Birmingham's Project Manager, Todd Barlow, explains the overall project. "A 50 foot (15 m) diameter tunnel was advanced by Strabag to carry water from just upstream of Niagara Falls to the generating station. They required a 3 m (10 foot) diameter air supply shaft at approximately kilometer 6 of the 11 kilometer tunnel profile. This vertical shaft had to drill down through 50 feet of overburden, then 83 m through hard bedrock and intersect the tunnel at a

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very precise location.



Initially, a 10 ft. (3 m) diameter casing was driven/drilled and seated and sealed into the bedrock, and a two foot (600 mm) diameter pilot hole was drilled 270 feet (83 m) to intersect the roof of an adit room (constructed by Strabag off the side of the main tunnel) using down-the-hole hammer techniques and reverse circulation drilling methods. The pilot hole was within 8 inches (200 mm) of the theoretical centre of the hole when the adit was penetrated.”

Birmingham engineered, manufactured and utilized a custom drill and drill mast to advance a 2.740 m diameter hole 83 m thru the bedrock using a roller cone rotary bit, with input from the Steven M. Hain Company on the unique tapered bit. The “top down” drilling approach was successful because the large diameter bit followed the guide/pilot hole directly to the adit roof for breakthrough and cuttings that were deposited into the adit room were mucked out by Strabag during the tunneling operations.

BCL was the site General Contractor. “Since timing and scheduling was critical, our approach to this job was to self-perform all

the work,” says Barlow. “BCL and our client were not willing to have any scheduling risks by employing sub-contractors that would utilize conventional raise boring techniques that are generally used on this type of project.”

Once the hole was complete, an 8 ft diameter liner was lowered and spliced to the base and secured in place by grouting between the liner and the rock interface. Strabag also intends to use the access for water supply and a concrete delivery point for the tunnel lining work which follows the TBM.



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