NIAGARA TUNNEL FACILITY PROJECT (NTFP)

Niagara Tunnel Facility Project (NTFP)

Ontario Power Generation (OPG)

The 10.2km long tunnel beneath the city of Niagara Falls with an outer diameter of 14.4m is channeling water from the Niagara River to Ontario Power Generation's (OPG) Sir Adam Beck Generation Station, with the water travelling at a rate of 500m^3/sec.

Scope

- 10.2km long diversion tunnel
- Water flow 500m^3/s

Challenges

- Difficult geological conditions
- Excavation bore diameter of 14.4m
- Biggest open gripper TBM of the world
- Watertight tunnel
- Pre-stressed unreinforced lining (interface grouting)
- Just in time monitoring of lining deformation in sub millimetre range due to pre-stressing by use of high performance laser scanner
- All works (pre-stressing, monitoring etc.) were done under full construction operation

Amberg Services

- Design optimization during construction phase
- Technical support for the pre-stressing works
- Evaluation and Interpretation of monitoring data of pre-stressing works (deformation, pressure, flow rate etc.)
- Back analysis of the monitoring data

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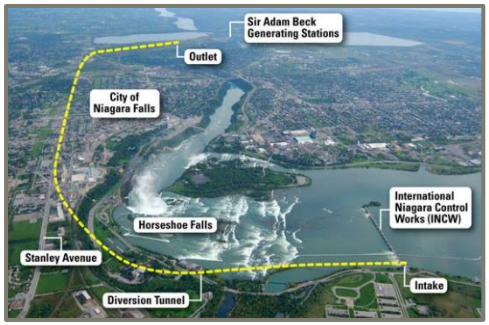
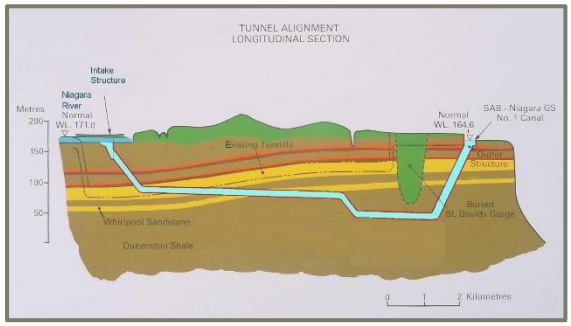
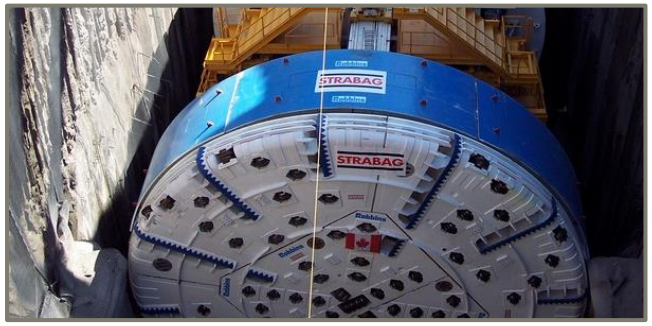


- Line of diversion tunnel



- Geological longitudinal section



- Open gripper TBM

AMBERG FACTS

Contracted value Amberg

- Total Amberg: EUR 4 Mio.

Project Phases & Duration

Design optimization	2008 – 2011
Technical support on site	2011 – 2013
Construction works	2005 – 2013

Project details

Tunnel

Tunnel length:	10.2km
Max. overburden:	140m
Bore diameter:	14.4m
Final inner diameter:	12.6m

Pre-stressing final lining

Numbers of bays (l=12.5m):	814
Number of laser scanners:	6
Interface grouting volume:	7 million liters
high pressure grouting pumps:	6

CLIENT FACTS

Overall costs

- Total Amount CAD 985 Mio

Overview project

- The Niagara Tunnel Facility Project (NTFP) in the province of Ontario, Canada is an extension of the Sir-Adam-Beck-Power plant, built 19th century.
- The project comprises the construction of a diversion tunnel, which will feed the existing power plant with additional 500m³/s

Geology

- Palaeozoic strata that overlie pre-cambriam rocks
- Shale and Sandstones

Project awards Niagara Tunnel

- "Canadian Project of the Year 2013" by the Tunnelling Association of Canada
- "North American Project of the Year 2013" by the International Water Power & Dam Construction

Contact Person

Dr. Ernst Gschnitzer
Project Manager
STRABAG AG, Vienna, Austria
Tel.: +43 1 224 22 0

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AMBERG KEY PEOPLE INVOLVED

Dr. Karl Grossauer
Civil Engineer
Project Manager

kgrossauer@amberg.ch

Dr. Roman Wahlen
Civil Engineer
Geotechnical site engineer

rwahlen@amberg.ch

Gerd Wieland
Civil Engineer
Geotechnical site engineer

gwieland@amberg.ch

AMBERG TEAM @ WORK

AMBERG SPECIALIST' TESTIMONY

“ Working for the Niagara Tunnel Facility Project was very challenging from the technical point of view. Nobody before pre-stressed such a big water tunnel. We combined well known construction techniques with new innovating technologies to reach the project requirements. ”

Wieland Gerd
Geotechnical Site engineer

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