



Inside The Tunnel Boring Machine

Background

Construction for the Evergreen Line includes a two-kilometre bored tunnel with tunnel portals located in Port Moody and Coquitlam. The bored tunnel is being constructed using a 10-metre diameter tunnel boring machine (TBM).

To build the tunnel, a tunnel boring machine (TBM) was assembled and launched in Port Moody in March 2014. The Evergreen Line TBM will make one pass, creating a large tunnel that will then be divided into inbound and outbound tunnels. The tunnel has a depth of up to about 50 metres at the deepest point, with depths ranging between 17 and 50 metres. The excavated materials from the tunnel are removed by a conveyor belt to the tunnel work area. Trucks are used to haul the tunnel spoils to a designated site in Port Coquitlam.

The TBM is 10 metres in diameter and 11 metres long. It extends to 85 metres when attached to trailing gear that uses a conveyor belt system to remove tunnel spoils and assists in the installation of concrete tunnel liner rings. The TBM cutterhead alone weighs 130 tonnes and has replaceable cutting teeth.

Fun Fact

Traditionally, tunnel boring machines are christened and given a name. The Evergreen Line TBM is named Alice after the great Canadian Alice Wilson born in 1881 in Cobourg, Ontario. Alice was passionate about geology, and overcame gender barriers to become the first woman to hold a professional position at the Geological Survey of Canada in 1911.



In the TBM control centre, the TBM operator can monitor key information like pressure on the cutterhead and TBM progress.



Any material dislodged by cutter teeth flows through the cutterhead into a chamber behind the cutterhead.

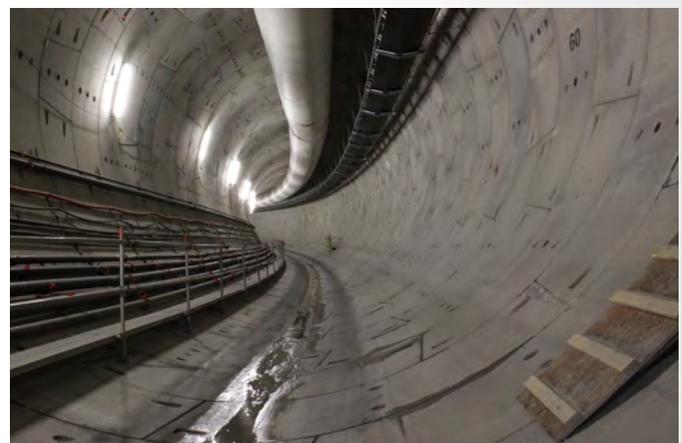
The precast, concrete tunnel liner ring segments are delivered by a ring segment conveyor to the ring erector. The erector picks up segments and moves them into position. Hydraulic jacks around the edge of the TBM retract for liner insertion and expand to hold segments in place. The TBM pushes against the ring segments to move forward and steer left, right, up or down. As earth is removed and the tunnel rings are installed, grout is injected between the exterior of the tunnel and the earth around it.

During tunnel construction, an operator inside the TBM can monitor the progress of the TBM as well as key information such as pressure on the machine's cutterhead.

During tunnelling, the TBM provides data on excavation and grouting which crews monitor continuously. Periodically tunnel boring operations stop so crews can perform regular maintenance on the TBM. It is common to switch the cutterhead tools to adapt to varying soil conditions when tunneling.



The ring segment conveyor delivers precast segments to the ring erector.



Constructed concrete lined tunnel.



A screw conveyor moves the material back to the TBM's trailing gear.



The erector picks up segments and moves them into position.

If you would like to learn more about the Evergreen Line Project or have your name added to the information email subscription list, please visit the Project Office (2900 Barnet Highway, Coquitlam) weekdays from 8:30 am to 4:30 pm or contact us:

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