U.S. Department of Transportation Federal Highway Administration
WSDOT
King County
City of Seattle

This tunnel boring machine is 50.6 feet in diameter and is similar to the machine we will use to create the SR 99 bored tunnel.

A world of experience

Learning from local and international tunnel projects

WSDOT, King County and the City of Seattle plan to replace the central waterfront portion of the Alaskan Way Viaduct and Seawall with an approximately 1.7 mile-long deep bored tunnel beneath downtown, a new waterfront surface street, transit investments, and downtown waterfront and city street improvements.

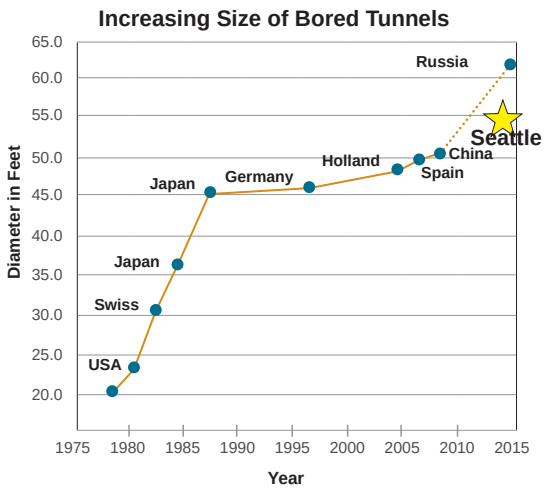
As we design the bored tunnel, we will benefit from lessons learned by other tunnel projects that have been completed or are underway. Several international tunnels have been completed in similar environments and with sizes comparable to the proposed SR 99 bored tunnel. From projects in the United States, including Seattle's Sound Transit Beacon Hill Tunnel and the downtown transit tunnel, to projects in Germany and Russia, advances in tunnel technology and experience are being made around the world.

Tunnels with similar sizes

There are a number of successful tunnel projects with sizes similar to the proposed SR 99 bored tunnel. The bored tunnel will be designed with an outside diameter of approximately 54 feet and a length of 1.7 miles. The tunnel's depth will range from 100-130 feet through downtown and 200 feet under Belltown. Tunnel projects of similar sizes include:

- Shanghai Yangtze River (China): Includes two bores, each 4.6 miles long with a 50.6 feet diameter.
- Fourth Elbe River Tunnel (Germany): Includes a single bore with a length of 1.6 miles and a 46.6 feet diameter.
- Lefortovo Tunnel (Russia): Includes two bores, each 1.4 miles long with a 46.6 feet diameter.
- Madrid M30 (Spain): Includes bores with a length of about 4.6 miles and a 49.9 feet diameter.

A tunnel boring machine.



Fact sheets are available on other projects, including:

- Column Safety Repairs
- Electrical Line Relocation
- South End: S. Holgate Street to S. King Street Viaduct Replacement Project
- Transit Enhancements and Other Improvements

For More Information:

Visit the Web site at:
www.alaskanwayviaduct.org

Call the hotline:
1-888-AWV-LINE

Send an e-mail to:
viaduct@wsdot.wa.gov

Send a letter to:
Alaskan Way Viaduct and Seawall Replacement Program
c/o Washington State Department of Transportation
999 Third Avenue, Suite 2424
Seattle, WA 98104

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Tunnels constructed in similar environments

Numerous tunnel projects, including several in Seattle, have successfully excavated ground conditions similar to those anticipated for the viaduct replacement. The ground conditions along the proposed tunnel route include soft soils at the tunnel's southern entrance, then hard and dense glacier-deposited soils toward the tunnel's north entrance. During tunnel construction, we also expect to find materials normally present in glacial soils, such as small rocks and boulders.

More than 150 tunnels have been completed in Seattle since 1890, mostly in glacial soils. International and local tunnels constructed in similar soil as the bored tunnel replacement include:

- Sound Transit Beacon Hill Tunnel, downtown transit tunnel and Denny Way Combined Sewer Overflow Tunnel (Seattle): Ground conditions of glacial sand, silt, clay and other soils similar to the hard and dense soils along most of the proposed SR 99 bored tunnel alignment.
- St. Petersburg Metro Tunnel (Russia): Ground conditions of glacial sand, clay and silts.
- Shanghai Yangtze River Tunnel (China): Ground conditions of clay, sand and rubble that are similar to soils at the south entrance of the SR 99 bored tunnel.
- Fourth Elbe River Tunnel (Germany): Ground conditions of sand and clay with boulders and obstructions.

Advances in technology

As more projects are completed, tunnel boring technology will continue to experience advances and improvements. Tunnel boring machines have been developing at a rapid rate with a major increase in diameter, better ground control, and improved reliability. These machines can now safely excavate almost any type of soil, rock or groundwater conditions.

Technological advances can be expected to continue into the future. For example, a 63-foot diameter boring machine is in design to construct a Russian tunnel.

Advances in technology, as well as lessons learned from other tunneling projects, will help us build the bored tunnel safely, efficiently and successfully.

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