

Mom Chung and Big Alma

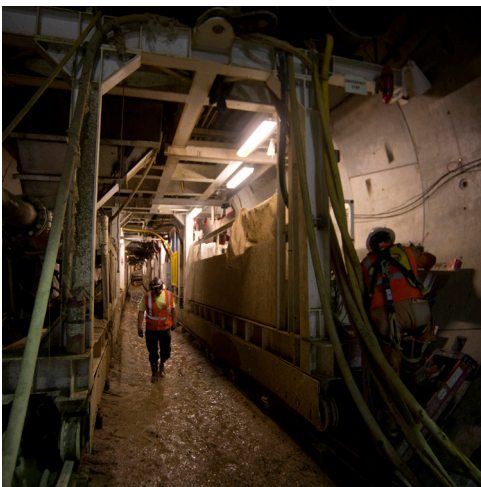
The Central Subway's Tunnel Boring Machines

What Is a TBM?

Tunnel boring machines (TBMs) are state-of-the-art machines used worldwide to excavate and construct tunnels. The Central Subway's two TBMs, named Mom Chung and Big Alma after historic San Francisco women, were custom-made for the project and for San Francisco's unique geology. One will construct the tunnel for southbound T Third Line trains, and the other will build the tunnel for northbound trains.



The Tunneling Journey



The Central Subway tunnels run between SoMa and North Beach. To build them, Mom Chung and Big Alma have traveled beneath 4th Street, Stockton Street and Columbus Avenue, each TBM having excavated and constructed 8500 feet of tunnel along the way.

The TBMs traveled north through two major ground formations: the Franciscan complex, a bedrock formation that forms Nob Hill; and the Colma formation, a dense mixture of sand and clay. The TBMs have mined far beneath the surface, at depths between 40 and 120 feet underground. As a result, there was no noise, and no vibrations were felt above ground.

Parts and Functions

Each TBM consists of a rotating cutter wheel (the cutter head), a cylindrical steel shell (the shield) and a 300-foot train of tunnel-building mechanisms (the trailing gear). A crew of about seven people operates the machine and welds the tunnel segments together.

The cutter head, a spinning excavator at the front of the machine, pumps out an environmentally safe, soap-like foam to soften the ground as it cuts through the earth like a cheese grater. Once loosened, spoils pass through a hole in the center of the cutter head and onto a large screw, called an auger screw. Spoils are then transported onto a series of conveyors within the trailing gear and removed from the tunnel.

The machine stops every five feet to install the prefabricated concrete segments that make up the lining of the tunnel. The concrete segments are installed within the back of the TBM's cylindrical shield. Crews weld them together – six segments per tunnel ring – and then the TBM begins excavating once more. Hydraulic jacks within the shield push off of the newly installed tunnel lining, propelling the massive machine forward.



Behind the Names

The Central Subway's TBMs are named Big Alma, after "Big Alma" de Bretteville Spreckels, and Mom Chung, after Dr. Margaret "Mom" Chung. The public selected the names in an online poll held in January 2013.

In tunneling tradition, the custom of naming TBMs is believed to bring good luck to tunneling projects. To learn more about the historic Big Alma and Mom Chung, visit:

www.centralsubwaysf.com/tbm-name.