

History Of The Caldecott Tunnel (Continued)

The fourth bore was excavated from both the Orinda and Oakland sides. The big road header started excavation from the Orinda side in August 2010. Because the Orinda and Claremont geologic formations were more stable than the Sobrante, about three-quarters of the tunnel were excavated from the Orinda side. The western side excavation began in March 2011. A smaller road header was used.

Excavation progressed about six feet per day with workers reinforcing the excavation before moving forward. The length of the excavated section was based on the surrounding geology. The harder the rock, the farther excavation could progress before support was needed.

Each worker from Tutor-Saliba, Caltrans, and all subcontractors were issued a brass tag for identification and were required to check in at the brass board, a vestige of the mining industry. When entering the tunnel the worker placed the brass tag with his/her name stamped on it on the "in" side of the board. When leaving, he moved his tag to the "out" side of the board. In case of fire or accident, the brass tags would identify which workers were inside the tunnel. Brass tags were used because brass has a high melting point.

After some of a section was excavated, workers applied shotcrete to walls and installed steel rods around the perimeter of the excavation. The shotcrete and steel rods provided temporary support. The depth and strength of the tunnel roof was tested after shotcrete had been applied and hardened. Excavation of the tunnel exposed a variety of geologic formations.

On the afternoon of November 29, 2011, crews operating the road header from the eastern side broke through the final chunk of rock to complete the excavation and join the top or crown portion of the east and west sides of the tunnel. (The middle section is called the bench, the lowest section the invert.)

After a section had been tunneled, front-end loaders moved the tunnel spoil to long, flat mining dump trucks. The trucks offloaded the spoil outside the tunnel portals. All spoils were tested for contaminated or hazardous materials before leaving the site. Clean spoils were hauled to Treasure Island in San Francisco Bay. Contaminated materials were transported to appropriate disposal sites. Naturally occurring hydrocarbons were the most likely hazardous materials found. Paleontology samples were sent to UC Berkeley for analysis.

Seven millimeters of yellow waterproofing membrane, made of a polymer-based material, were applied over the top of the smoothed shotcrete throughout the tunnel. For the final lining a wall of reinforced concrete was cast by assembling a rebar cage formwork to contain the concrete, pouring the concrete through holes in the form, and then plugging the holes when the wall space was filled.

Over 3.5 million pounds of steel rebar were used during construction of the fourth bore. This should enable the tunnel to withstand a strong earthquake on the Hayward fault.

Concrete was applied to the outside of the tunnel to create a portal entrance.

Once the tunnel excavation was completed, work on the outside and inside the bores progressed. Outside, moveable bridges offered an improvement over jumbos used in the original low level tunnel construction.

Stainless steel panels were installed along the entire length of the new tunnel. The panels were designed to help motorists focus on the road and to be easily cleaned.

Curbs and walkways along the roadbed were completed. Progress was slow. Finishing was done by hand.

Nineteen jet fans were installed to remove smoke from the tunnel in the event of a fire. The fans can be regulated manually or automatically and can direct air flow in either direction in the event of an emergency.

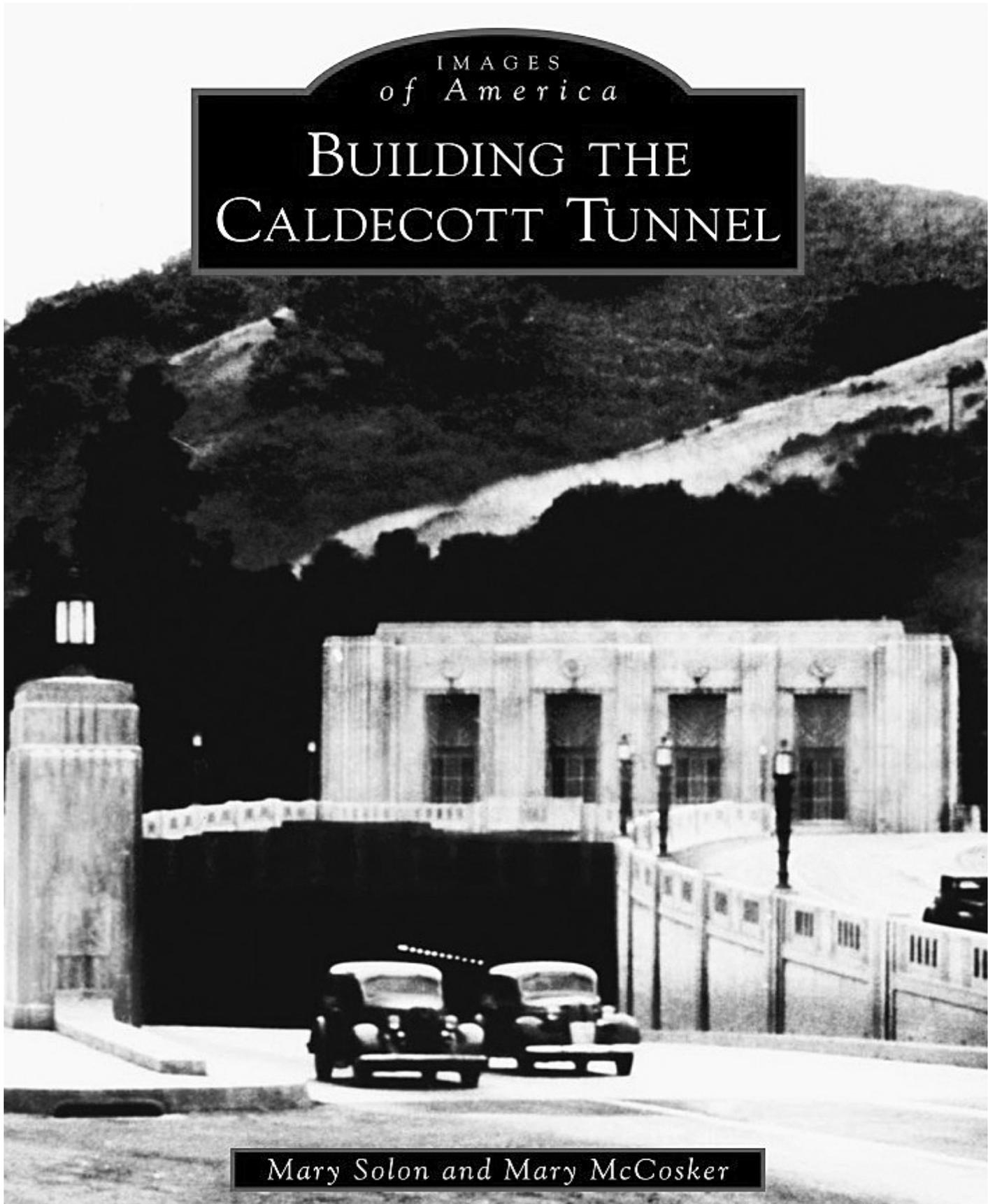
A state-of-the-art operations and maintenance control building (OMC) is the "nerve center" for the four Caldecott tunnels, as well as the Alameda - Oakland Webster and Posey Tubes. The OMC is staffed 24 hours a day, seven days a week by specially trained operators.

It was important to continue the medallion details above the portals. The Fourth Bore Project sponsored a contest for students in both counties. The six winning designs were used to create the medallions. The three medallions above the eastern portal were designed by three students from Contra Costa County. The three medallions above the west portal were designed by three Alameda County.

On November 15, 2013, a ribbon-cutting ceremony officially marked the opening of the fourth bore. Speeches were delivered. The completed medallions were unveiled and later installed. Thanks were given to those who made the project a success. It came in on time and under budget!

The year 2013 was a major milestone for San Francisco Bay Area commuters. The new span of the San Francisco/Oakland Bay Bridge opened in August. The fourth bore of the Caldecott Tunnel opened in November. Driving times between Contra Costa County and Alameda and San Francisco Counties again were shortened. Much like the opening of the Bay Bridge in 1936 and the Broadway Low Level Tunnel bores in 1937, people continue to be drawn to the areas east of the Oakland/Berkeley Hills.

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