

WATER RESERVOIR THAT SERVES 3,000 HOMES REHABILITATED WITH FYFE'S TYFO SYSTEM

Overview

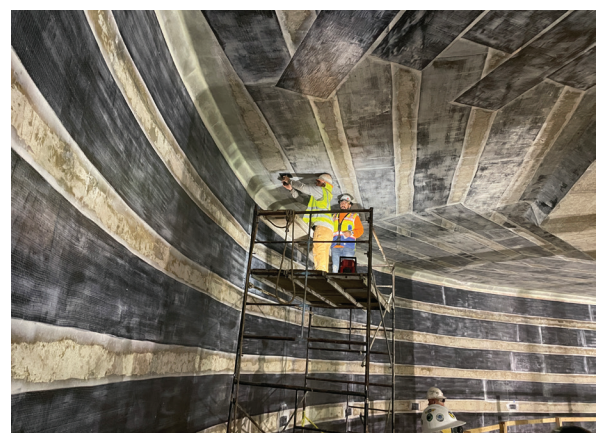
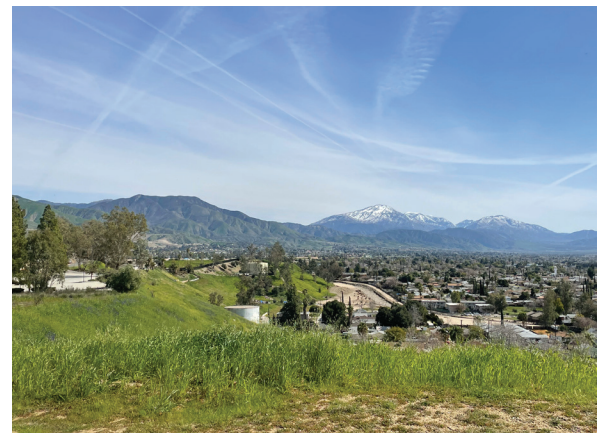
A non-ductile concrete tank built on a hillside in Southern California in the 1940s was identified as requiring a seismic upgrade. The reservoir provides water to more than 3,000 homes and has the capacity to supply 10 million gallons of water per day.

Solution

The reservoir's concrete walls and suspended slabs required additional shear capacity to provide a seismic rehabilitation. This was provided by installing Fyfe's FRP composite systems. After preparing the concrete surface to a CSP (concrete surface profile) of 2-3, Fyfe FRP's certified applicator began the rehabilitation work. The Tyfo SCH Systems, uni-directional carbon fiber wrap materials, were used to provide the additional in-plane shear strengthening on both the walls and the roof diaphragm elements. Additionally, bi-directional glass material, Tyfo BC, was used to enhance the shear transfer capacity at diaphragm-wall connections.

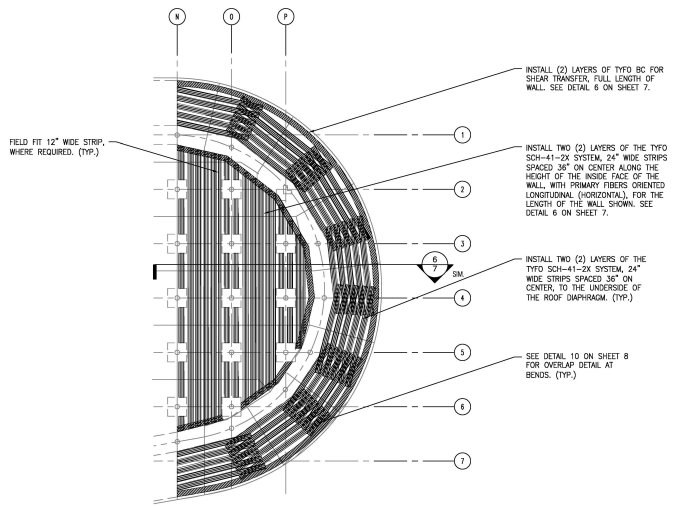
The installation was completed during the winter months with the concrete surface temperatures just below 60 °F on some days, therefore heaters were used post-installation to help with curing the epoxy which resulted in bond strength values way above specified 200 psi.

As a part of quality control for the installed FRP, ASTM D4541 and ASTM D3039 testing was performed which measured the tensile and bond properties of Tyfo systems, respectively.

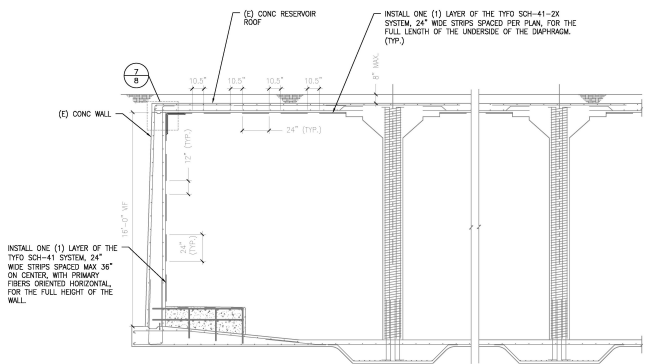


COMPLETED INSTALLATION

ENGINEERING DRAWINGS



Reservoir partial plan, showing Tyfo SCH-41-2X for seismic reinforcement of the concrete walls and slab diaphragm, and Tyfo BC at the wall-slab joints.



Reservoir cross section, showing more FRP strengthening details and spacing

In Conclusion

The Tyfo systems were applied on the interior of the structure to provide the missing seismic capacity and ensure long-term resilience. Other retrofit systems such as section enlargement via shotcrete or form-and-pour would have been more costly and a more time-consuming process.

The Tyfo systems are certified for NSF/ANSI for exposure to potable water and was found to be the ideal solution for strengthening this large water reservoir.