Content contributed by the San Diego County Water Authority (www.sdcwa.org), the City of San Diego (www.sandiego.gov) and Petr Masek Photography (www.masekphoto.com).

Sika... One Name. One Source. Worldwide.

San Vicente Dam

San Diego, California

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San Vicente Dam

- Construction Period: 2009 – 2014
- Owner: City of San Diego
- Engineer: Parsons Engineering
- Contractor: Shimmick Construction & Obayashi Constructors JV
- Concrete Producer: Shimmick Construction & Obayashi Constructors JV

Raising the Dam

San Vicente Dam, which is owned and operated by the city of San Diego, currently stands at 220 feet. The Water Authority will raise the dam an additional 117 feet – the tallest dam raise in the United States and the tallest of its type in the world. The raised dam will store an additional 152,000 acre-feet of water, more than doubling the reservoir's water storage.

This new water storage will serve two purposes.

- About two-thirds of the additional storage will capture surplus water during wet seasons for use in subsequent dry years.
- The other third of the new reservoir capacity will store water for use in an emergency if the San Diego region's imported water supply is cut off.

The reservoir after its completion will be more seismically sound, and will be able to withstand major seismic event.

Layers of roller-compacted concrete 24 inches thick completely cover the downstream side, producing a stairstepped surface. The new concrete is nearly equal in volume to the original dam.

Additional phases of the project include a new marina, a replacement pipeline, and restoration of project construction areas. They will begin, one at a time, after the dam raise is complete.

- Existing San Vicente Dam 220 feet
- Concrete Volume 680,000 cu. yds.
- Raised Dam +117 feet
- Total height 347feet
- Current reservoir Surface Area 1,100 Acres/90,000 acre-ft
- New reservoir Surface Area +500 acres/+152,000 acre-ft

Taking it Higher

The San Vicente Dam Raise project is being constructed in several phases from 2009 to 2014. The first task was to prepare the dam to receive concrete that will raise it 117 feet. The contractor excavated down to the existing dam's foundation, filled crevices with concrete, and installed a new pipeline through the existing dam. To create a good bonding surface for the new concrete, the contractor also removed about two inches of the downstream, or dry, surface of the dam.

The second construction stage focuses on manufacturing and placing massive quantities of roller-compacted concrete to raise the dam. This phase began in Summer 2010 and was been completed in Fall 2013. The raised dam is built to remain operational in the event of a major earthquake. Roller-compacted concrete takes less time and water than conventional concrete, but is just as strong. Concrete was transported by system of telescopic high speed conveyors from the plant directly to the final placement point, thus eliminating transportation by trucks and reducing project carbon footprint. This system also allows placement of concrete layers, one on top of another without any interruption and permits fast track construction 24 hours a day, seven days a week. The dam is built from the bottom up, starting at the newly excavated foundation on the downstream side of the dam.

- Foundation Preparatory Work Summer 2009 – Summer 2010
- Dam Raise Spring 2010 – Early 2013
- Replacement Pipeline Summer 2012 – Summer 2013
- New Marina Construction Summer 2013 – Summer 2014
- Site Restoration Summer 2013 – Summer 2014
- Reservoir Opens to Recreation Between Late 2014 & Late 2017

The Challenge

Due to aggressive construction schedule concrete had to be placed during varying weather conditions. With Summer temperature exceeding 110°F (40°C), low humidity and occasional high winds, concrete had to be transported and placed in a fast pace. Excessive concrete drying was a concern because improper bonding between 24 inch concrete layers could occur. A sophisticated system of high speed concrete conveyors and shoots was developed to assure concrete got to placement point as quickly as possible. To maintain setting characteristics necessary for required concrete bond, a single admixture Plastiment ES was used.

With production rates averaging over 2,000 cu.yds. of roller-compacted concrete per day, back up dispensing systems were put in place to assure continuous admixture supply in case of system breakdown. Sika Corporation provided round the clock technical, maintenance and calibration service for the San Vicente Dam Project. In addition to on-site services Sika Corporation also actively assisted during the mix design development and worked with the contractor to help achieve the desired performance. The main dam raise was successfully completed in early October 2012, after 11 months of concrete placement.

After Construction

San Vicente Reservoir is currently closed to all recreation, including boating and fishing, as construction continues. Once the dam raise is complete and the reservoir is refilled, the reservoir will reopen to recreation. This is anticipated between late 2014 and 2017, depending on rainfall and supply and demand for water. When the reservoir is reopened, the public will enjoy a number of enhancements, including an improved access road to the reservoir, an expanded boat ramp, a new parking area, new shade trees and picnic areas.