



Market

Building

Application

Concrete Repair & Protection

Focus

Crack Repair

Project: Baldwin Reservoir
Owner: City of Cleveland, Division of Water
Contractor: Able S.S.
Year: 1996 Project Review 2007

The Problem

The Baldwin Treated Water Reservoir was designed and constructed between 1918 and 1924 and placed in service in 1925. At 1,035 ft long by 500 ft wide and 40 ft high from the floor to the crown of the groined arch roof, the twin underground basins make for one of the largest covered concrete reservoirs in the U.S. Standing safe and sound for the last 80 years, the Baldwin Reservoir helps provide high quality drinking water every day to Cleveland and surrounding suburbs.

In February 1993, after a routine inspection, the Water District was notified that a large quantity of potable water was found in a nearby storm drain. It was later confirmed that this water was leaking through cracks in the floor of Baldwin Reservoir. A complete investigation further revealed a series of cracks in the non-reinforced concrete arched roof. The analysis indicated that the distress was due to seasonal thermal expansion and contraction of the roof structure. The seasonal movement cracked the roof and “naturally” created a three hinged arch mechanism that was able to accommodate the movement.

The Sika Solution

The goal of the repair was to maintain the function of the three-hinged arch mechanism, which had naturally formed most probably during the first thermal cycle shortly after the reservoir was completed.

The earthen fill was removed in May 1995 to expose the roof structure. 10,000 psi water blasting removed any dirt, debris and other foreign elements to insure proper penetration and bond of the resin to the concrete. The cracks were blasted from both the interior and exterior of the reservoir. Cracks that were considered to be critical to the hinge mechanism were injected with Sikadur a flexible epoxy. Cracks considered to be structural in nature and therefore desired to remain static, were injected with Sikadur high modulus, low viscosity epoxy. Cores were taken every 100 LF to verify full penetration of the resin.

To maintain the tight schedule, the hinge joint was installed directly behind the injection process, followed closely by the light weight concrete overlay. Once the overlay cured sufficiently, Sikadur Combiflex, a preformed flexible sheet joint system, was installed to keep the system waterproof. This project, completed in 1999, literally saved the reservoir from impending collapse from the rotating roof. The hinge joint is still functioning as designed and continues to allow the groined arch roof to move thermally while remaining water tight.

Case Study



Case Study

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