



ABOUT AKRON

Industry: Civil

Location: Akron, Ohio

The Akron Spillway Dam, located in Akron, Ohio, is one of three local reservoirs supplying over 300,000 residents with drinking water. The dam, which was constructed in 1913 to create the Lake Rockwell Basin, covers over 800 acres with the spillway, measuring 180 feet from bank to bank.



Akron Spillway Dam

The Challenge

Given the multiplicity of residents that rely on the Akron Spillway Dam for safe drinking water, it is imperative that the dam have an accurate and reliable structural health monitoring system (SHMS) to detect and prevent any failures or other possible damage. To complete this, Luna worked to integrate its innovative fiber optic sensing design approach into an already established optical network.

The Solution

Beginning in November 2012, Luna began working on a SHMS which was composed of a Luna's single optical interrogator (model sm130-700 dynamic interrogator), the os3610 long-gage strain sensors, as well as the optical accelerometers, the os4350 temperature sensors, and Fiber Bragg tilt meters for other crucial measurements. Luna's innovative sensing design approach was key to the success of this project. The os3610 sensors were mounted on the centerline in between buttresses and grouted directly into the concrete walls of the dam to better measure strain over this large area.

This design approach addresses one of the spillway's greatest risk factors, as the buttresses are the most likely points of failure. Likewise, the optical accelerometers were mounted on the face of the buttresses above the high-water line in order

to monitor for seismic activity and the effects of a train running nearby. The os4350 temperature sensors were mounted in each zone to monitor temperature throughout the internal portion of the spillway.

“This design approach addresses one of the spillway’s greatest risk factors, as the buttresses are the most likely points of failure.”

– **Jeff VanNatten**
City of Akron Water Supply (Water Plant Technician)

The Results

Serial installation of FBG sensors allowed for quicker install compared to conventional electric strain gages. FBG sensors have reduced data drift, as well as a longer sensor lifetime compared to electric gages. The pre-existing optical network allowed for integration of the FBG sensors with security cameras.

Luna’s sensing design was integrated alongside Chandler Monitoring Systems, providing the customer with the IntelliOptics Software Package—a customized graphical user interface software application package providing a single monitoring interface for all system components. Made possible by the highly accurate data provided by Luna’s sensors, the IntelliOptics software allows the user to make notes, check the layout of the sensors, and view the camera set up for security.



INSTRUMENTS USED

Luna’s os3610 long gage strain sensors, os4350 temperature sensors, optical accelerometers and Fiber Bragg Gage (FBG) tilt meters were utilized in this innovative sensing design approach. Ultimately there are three planned stages for installation of the fiber optic system. With stage one successfully completed, data collection has begun to determine necessary monitoring for the next stages.

