

Monitoring for the Kentucky Lock Addition

Client:

Thalle Construction

Location:

Kentucky Lake near
Paducah, KY

Services Provided:

- Instrumentation & Monitoring
- Risk Assessment

Value Provided:

- Provide real-time monitoring that satisfies the USACE requirements for assuring stability and operation of existing Lock throughout construction
- Provide real-time monitoring for Contractor to assure life-safety issues are mitigated during open cut excavation

Background & Project Challenges

The Kentucky Lock Addition project is a new 110-ft-wide by 1,200-ft-long navigation lock that will be located landward and adjacent to the existing 110 x 600-ft lock. Most of the tows using the 600-ft-long existing lock are longer than 600-ft.

Therefore, they have to perform a time consuming double lockage, a procedure that takes about three hours. These double lockages, along with the high traffic volumes experienced at Kentucky Lock, result in significant and costly delay for commercial vessels. From 1996–1998, the average delay time for a vessel at Kentucky Lock was about six hours. A new 1,200-ft lock will virtually eliminate these delays in the near future and significantly reduce them in the out years.



Geocomp is monitoring Cofferdam and Lock Wall movement

Geocomp Role & Accomplishments

Prior to construction of the new Lock, a cofferdam had to be built to act as a temporary dam to hold back upstream water (Kentucky Lake). Once the cofferdam was constructed, excavation began to remove soil material downstream from the cofferdam and immediately adjacent to the existing land-side lock wall. This leaves the cofferdam and existing lock wall unrestrained on the land side which could result in movements or instability that could cause closure of the existing lock.

Having both the water loads on only one side of both the cofferdam and existing Lock wall required installation of an autonomous sensor array to continuously monitor horizontal soil displacement (in-place inclinometers), water levels (piezometers) and Lock wall movement (tilt meters and joint meters).

Thalle Construction, the Contractor for the project retained the services of Geocomp to design and maintain a reliable sensor array to provide continuous real-time information to assure ongoing use of the lock and safety during construction. The various sensors were hardwired to remotely powered and remotely accessed data loggers that continuously monitor sensor response and post data onto Geocomp's *iSiteCentral*™ server. Data is reviewed in real-time through simple password-protected internet access.

Each sensor has limit values assigned that when exceeded, trip email messages to staff that allow for remote access and review of data for decisions related to changes in construction sequencing or implementation of contingency plans.

This type of monitoring system not only provides a measure of risk mitigation for construction activity and assurance of continued operation of an essential part of our waterway transportation system, but can be left in place for long-term maintenance of the new and improved structure.