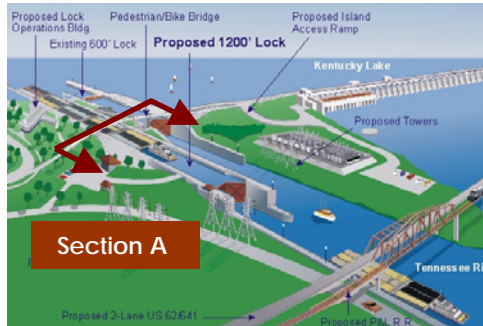


Kentucky Lock and Dam

Technologies to manage risk for infrastructure



Artist's rendering of project at completion

Kentucky Lock on the Tennessee River is a 600 ft. long navigation structure. It is the busiest lock on the river for both material passage and lock utilization. However, because most commercial shipping vessels with containers are longer than 600 ft. each transport must be moved through the lock using a time-consuming double-lift procedure; this results in average wait times of over 6 hours.

Construction of a new 1200 ft. long lock immediately adjacent to the existing lock will significantly reduce or eliminate delays. The total project cost is estimated at \$532M, with completion expected in 2010. Savings in transportation costs will be realized for businesses in 20 states that move goods through the lock. Successful construction necessitates that the existing lock remain open for river traffic at all times.

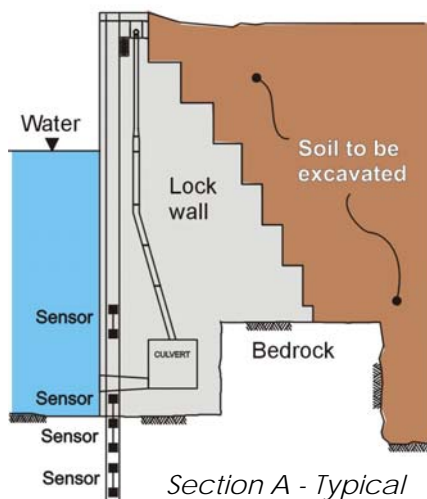
The construction program involves excavating soil behind the existing lock wall. The excavation effectively removes the lateral earth support against the wall that counters the water pressure inside the lock basin. This will generate new stresses on the lock wall.

In addition, the segmental nature of the lock structure (built as a series of large concrete monoliths

founded on bedrock) may result in distinct movements of each wall monolith. The individual responses will be influenced by construction sequencing, and the condition of soil and foundation rock along the length of the wall.

The Tennessee Valley Authority (TVA) and the U. S. Army Corps of Engineers (the lock owners and operators respectively) were concerned that a single monolith could shift or collapse if the excavation created an unstable situation, making the lock unusable. They decided that an extensive monitoring program was needed to control the construction and provide warning of unsafe conditions. In September 2002, the Army Corps awarded a \$1.3M instrumentation contract to Geocomp to develop and install an automated instrumentation system, and to monitor the lock over the 5-year project duration.

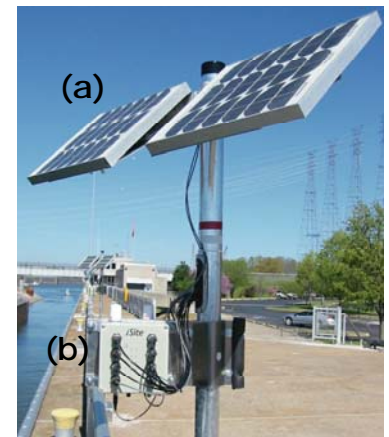
Geocomp worked closely with the Army Corps to select the most



Section A - Typical section through existing lock wall showing in-place inclinometer sensors

suitable instrumentation components. The sensors installed include in-place inclinometers and tilt meters to measure lateral movements at the monolith. They are connected to a wireless network of data loggers.

Instruments are scanned once per minute and each reading is compared to pre-defined alarm limits. Principals are notified within 5 minutes by telephone or email of the development of an alarm



Installed monitoring system: (a) solar panels, and (b) wireless data logger

status. Routine monitoring data are only recorded twice per day. Alarms and data collection are automatically processed by Geocomp's iSiteCentral™ web-based data collection and reporting system. The data are available to all authorized users over the Internet through a standard web browser.

Geocomp has provided the TVA and the Army Corps of Engineers with a robust monitoring system that is providing real-time feedback on the safety of the Kentucky Lock and Dam.