

Chickamauga Lock Replacement Upstream/Downstream Approach Walls

Chickamauga Lock, Tennessee

Owner: USACE, Nashville District

Description:

Chickamauga Lock Replacement Approach Wall Alternative Study: INCA Engineers, Inc., A Tetra Tech Company (INCA) designed and evaluated multiple approach wall alternatives, including fixed, floating, and float-in designs. Each alternative was designed for a consistent set of barge impact loads and earthquake loads. Consideration was given to construction sequence and schedule. Recommendations were based on the least cost alternative for the Chickamauga Lock. A combination of two alternatives were recommended in the study; float-in box beams were selected for the upstream approach walls, and precast panel walls were selected for the downstream approach walls

Chickamauga Lock Replacement Approach Wall P&S Phase 1: INCA is now designing the upstream and downstream approach walls, carrying final design recommendations of the Alternative Study forward into design. Approach walls are designed for anticipated environmental loads, barge impact, earthquake, and construction loads. Nose Piers are provided at the end of the approach walls to protect them from head-on barge collisions.

Analysis of the walls included application of environmental loads such as river flow, wind, and temperature as static loads, earthquake is modeled with a dynamic mode shape method, and barge impact is investigated both as a static load for local effects and as a dynamic load to capture global effects. The approach walls use post-tensioned concrete box beams. For the lower approach wall, a stack of three box beams will be used. For the upper approach wall, a stack of two box beams will be used. This design builds upon a value engineering design first developed by INCA in the 1990s on behalf of the contractor for the project.

