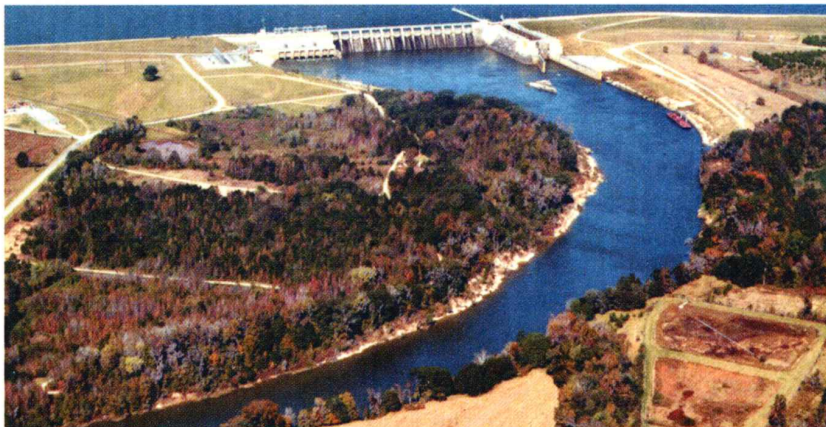


Rehabilitation of W.F. George Dam

Alabama - United States

**Underwater Cut-off Wall
Secant Piles Installation**



U.S. Army Corps of Engineers

Owner
US Army Corps of Engineers - Mobile District

Main Contractor
TREVIICOS - RODIO J.V.

Work Executed
Construction of one diaphragm wall 60 m deep, mostly built with secant piles by floating barge and, on land, by hydromill.

Contract amount
US\$ 50.873.000

Water has been seeping through porous limestone beneath the Walter F. George Lock and Dam, above, since it was first constructed four decades ago. In an effort to seal the ground beneath the dam, crews are constructing a secant wall that extends more than 90 ft (27 m) from the bottom of the dam to a layer of sand 5 ft (1.5 m) below mean sea level.





CIVIL ENGINEERING NEWS

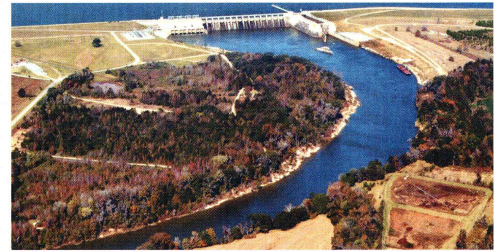
DAMS

Corps Seals Walter F. George Dam with Secant Wall

The U.S. Army Corps of Engineers is constructing one of the deepest secant walls in its history directly upstream from the Walter F. George Lock and Dam, located on the Chattahoochee River near Fort Gaines, Georgia. The wall—which will take two years and \$50 million to construct—is an attempt to eliminate seepage through a porous limestone formation beneath the dam.

With a minimum thickness of 2 ft (0.6 m), the wall will extend from a concrete projection at the base of the dam and pass through three distinct layers of limestone before reaching a depth of about 90 ft (27 m) below the lake bed. The wall will extend the entire length of the dam—1,830 ft (558 m). The water in the lake in this area is more than 100 ft (30 m) deep. Don Simpson, the resident engineer for the Corps's Mobile, Alabama, district, says the Corps has never before constructed a secant wall at such extreme depths.

The wall is being constructed as a series of overlapping drilled shafts, each



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50 in. (1,250 mm) in diameter. In June crews began lowering a 54 in. (1,350 mm) diameter steel casing from a barge to depths of up to 140 ft (43 m) to points on the lake bed where the secant wall is to be constructed. At each point crews lower a drill bit to the bottom of the cas-

ing, then drill through the limestone until they reach a layer of sand approximately 90 ft (27 m) below. During the drilling process the shaft is kept filled with water to maintain pressure on its interior. After the verticality of the shaft is checked with an inclinometer, crews

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The wall is being constructed as a series of overlapping drilled shafts, each 50 in. (1,250 mm) in diameter. In June crews began lowering a 54 in. (1,350 mm) diameter steel casing from a barge to depths of up to 140 ft (43 m) to points on the lake bed where the secant wall was to be constructed. At each point crews lower a drill bit to the bottom of the casing, then drill through the limestone until they reach a layer of sand approximately 90 ft (27 m) deep. During the drilling process the shaft is kept filled with water to maintain pressure on its interior. After the verticality of the shaft is checked with an inclinometer, crews fill the shaft with concrete. The concrete used to form this pile contains bentonite clay and has a strength of more than 1,600 psi (11,000 kPa).

With one pile in place crews leave a space of 16 in. (406 mm) before drilling the next shaft. After filling several shafts spaced in this way and allowing each to cure for approximately seven days, crews go back and drill a series of secondary shafts, also 50 in. (1,250 mm) in diameter, centered on the 16 in. (406 mm) gaps between the preliminary piles. The secondary shaft overlaps the two preliminary piles on either side of the 16 in. (406 mm) gap by about 10 in. (254 mm), thereby cutting out about 30 percent of the concrete from each. When the secondary shaft is drilled to the appropriate depth, it too is filled with concrete, closing the gap between the two preliminary piles and creating a section of the wall. The secant line between the two intersecting piles is required to be at least 24 in. (610 mm).

The secant wall was designed and constructed for the Corps by a joint venture between the Trevicos Corporation, based in Boston, and the Rodio Group, based in Milan, Italy. Simpson says the project is on schedule and should be completed in September 2004.

Greg Brouwer
(Civil Engineering - October 2002)