



wassara

**STRAIGHT
FORWARD
DRILLING**



(Photo by Courtesy Asset, U.S. Army Corps of Engineers)

WATER-POWERED DRILLING IN THE VERY SENSITIVE WOLF CREEK DAM

The rehabilitation of the Wolf Creek Dam in Kentucky, USA, started in 2007. Wassaras water-powered drilling equipment was chosen for the drilling of both the Ø 95 mm (4") boreholes for grouting as well as the Ø 200 mm (8") pilot holes. The water-powered technology proved to be both accurate and benign to the formation.

Max allowed borehole deviation for the project was 0.15%. Wassara both met the stringent requirements and kept the time schedule.

A troubled dam

The Wolf Creek Dam in Kentucky, USA is an earthen embankment and concrete gravity dam, 1 748 meters (5 736 ft) long. Chronic leakage problems originating from 1940's foundation construction methods were worsening and threatening the stability of the dam. In 2007, the U.S. Army Corps of Engineers placed the dam under a 'high risk for failure' classification, along with the Center Hill Dam in Tennessee. The Wolf Creek Dam Foundation Remediation is probably one of the most extensive and complex dam foundation remediation projects in the world.

Rehabilitation plan

In 2007, the contractor Treviicos Soletanche JV was contracted by the US Army Corps of Engineers, to construct a grout curtain at the Wolf Creek Dam. The contract is part of the major dam reinforcement project underway on the Cumberland River. The plan is to seal the leaks, using a cement-injected diaphragm wall in combination with a grout curtain that extends approximately 1 280 meters

(4 200 ft) along the entire embankment and some 84 meters (275 ft) down into the ground. When completed, a total of 1 144 000 m³ (251 600 000 gal) cement has been inserted in the dam.

Drilling with water-powered hammer best in test

The US Army Corps of Engineers and Advanced Construction Techniques (ACT) had previously evaluated and compared various methods very carefully as part of the McCook Reservoir Project in Chicago*. They determined that drilling with Wassaras water-powered down-the-hole hammer was the best-suited and most cost-effective method available for drilling deep holes. Wassaras water-powered drilling equipment was chosen for the drilling of both the Ø 95 mm (4") boreholes for grouting as well as the Ø 200 mm (8") pilot holes for the concrete wall.

** "STATE-OF-ART GROUTING FOR A GROUNDWATER BARRIER" by Black & Veatch and U.S. Army Corps of Engineers*



CASE STUDY

WATER-POWERED DRILLING IN THE VERY SENSITIVE WOLF CREEK DAM

Minimal deviation and minimized risk of pressurizing the dam structure

Max allowed borehole deviation for the project was 0.15%. The greatest advantage of drilling with a water-powered down-the-hole hammer is the possibility to drill deep, straight holes with a minimum of deviations. The Wassara drilling technology also minimizes the risk of pressurizing the surrounding formation, which ensures a minimum of disturbance to the surrounding formation and infrastructures within dams, urban areas, railways, etc. Other advantages include the fact that the method is environmentally friendly in terms of the pollution caused to the surrounding area, and that it enables a safer work environment.

Result:

During the whole drilling operation, Wassaras water-powered technology proved to be both accurate and benign to the formation. Wassara both met the stringent requirements and kept the time schedule.



The Wolf Creek dam
(Photo by Courtesy Asset, U.S. Army Corps of Engineers)

Equipment used	
DTH hammer	Wassara W80 for predrilling for grouting
	Wassara W150 for pilot holes
Drill bit	Ø 95 mm (4") and Ø 200 mm (8")
Pump	WASP 150 Diesel
Drilling fluid	Clean water from the river
Rig	Cubex for Ø 95 mm (4") holes
	Soilmec for the guided Ø 200 mm (8") holes
Borehole length	84 meters (275 ft)
Scope of drilling	54 000 meters (180 000 ft)
Geologic formation	Karstic limestone

January 2013



The W150 hammer, about to drill an Ø 200 mm (8") pilot hole



Series of Ø 95 mm (4") holes being drilled with the W80 hammer

CASE STUDY