

# **Dam Foundation Pressure Grouting Grout Curtain Installation**

Lockington Dam  
Piqua, Ohio

**Owner/Client:** Miami Conservancy District  
Geo-Con

**Engineer:** MWH Americas, Inc.

## **Project Features:**

- Two-Line Grout Curtain
- Fully documented, real-time, automated, grouting parameter monitoring and recording
- Remediation of earthen embankment dam and underlying rock foundation

## **Background:**

Armstrong Drilling Inc. was contracted by Geo-Con under the direction of the Miami Conservancy District (MCD) to mitigate seepage through the dam foundation and overburden.

## **Description of Work:**

Pressure grouting was performed both in the rock foundation and in the overlying layers of glacial outwash and till. The hydraulic core material, which comprises most of the dam embankment, is extremely soft and prone to damage/deformation. Protection of the hydraulic core during drilling and grouting activities was a top priority on this project.

To minimize the risk of damage to the core, Armstrong Drilling utilized its Sonic Drill rig to set casing through the hydraulic core. Sonic drilling uses high-frequency vibration, transmitted from a specialty drill-head through the drill string, to fluidize soil particles that are in contact with the bit. This allows for efficient penetration of the soil without the use of water or drilling mud.

Grout borings were installed by the following methods:

1. Drilling by Sonic methods through the soft hydraulic core material, and grouting PVC casing in place.
2. Advancing steel casing through the glacial outwash or till, to top of rock.
3. Drilling the underlying foundation rock by rotary destructive-drilling methods.

Borings were installed vertically, up to 112-feet below ground surface, and grouted in 10-foot (average) ascending stages. Stages were isolated with a grout packer apparatus that consisted of a single pneumatic packer attached to the bottom of an aluminum pipe string.

Following rock grouting, the steel casing was extracted approximately 10-feet at a time and the exposed stages of glacial outwash or till were grouted under pressure by setting a grout packer in the steel casing.

**Project Challenges:**

With as many as 6 drill rigs and two grouting crews simultaneously operating on the dam on a daily basis, limited access and spatial constraints, created unique challenges with task coordination and productivity. Diligent planning was required to keep this project running smoothly.

Start Date: May 2011  
Completion: November 2011

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