2024 Honorable Mention Project

Goose Pond Dam Improvements

By George Machikas

The rehabilitation of the Goose Pond Dam was initiated by the New Hampshire Department of Environmental Services to address significant leaking of the dam that threatened multiple downstream towns. Improvements included flattening the downstream slope, updating and improving the seepage collection system along the downstream toe of the dam, installing relief wells along the toe of the dam, installing an underdrain system below a new spillway apron, installing a cutoff sheet pile wall, installing a new concrete bridge over the spillway to accommodate vehicular traffic, replacing the gates, rehabilitating the concrete spillway, and repairing existing concrete.

Patriot Shotcrete was tasked with performing several aspects of the rehabilitation. Lining the box culvert running from the weirs to the outlet spreader presented a difficult situation due to both access and forming limitations. The 80 ft (24 m) long culvert's dimensions varied in both width and height and included both vertical and overhead linings. Shotcrete remedied the access problem and eliminated difficult forming which saved time and reduced costs.

The existing training walls were segmented and with varying heights. Using shotcrete to line the existing training walls eliminated formwork and extensive bracing. The weirs at the top of the spillway were placed with shotcrete to eliminate the need for a complex forming shape. The additional structural wing walls were an extremely difficult shape, which would have been difficult to form. Both wing walls required an 18 in. (450 mm) thickness at the top of the wall with a 1:12 batter. Since the top of the wall sloped, the bottom thickness varied continuously with the wall height. Shotcrete eliminated complicated formwork and bracing that otherwise would have been necessary. The stoplog wall was shotcreted as it had a variable thickness and was inaccessible by scaffold, plus there were no points to secure any formwork braces.

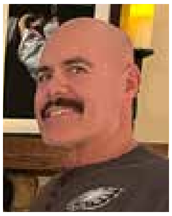
In every portion of the project where shotcrete was used, complex formwork and access problems were eliminated. The elimination of setting and stripping formwork saved approximately 66% of the time needed to complete the tasks assigned to Patriot Shotcrete. The time savings directly resulted in a proportional reduction in cost. Additionally, the elimination of formwork meant that no forming materials needed to be disposed of after the project, thus enhancing the environmental benefits of selecting shotcrete placement.

Shotcrete for box culvert lining walls

Shotcrete for box culvert lining ceiling

Segmented training walls, structural lining with a top cantilever

Downstream dam elevation revealing the culvert below and the training wall detail



***George Machikas** is the Director of Operations for Patriot Shotcrete LLC located in Somerset, NJ with over 40 years of experience in the concrete and shotcrete industries following graduating from Lehigh University. More recent endeavors over the last ten years have been focused on structural shotcrete work in the Northeast, providing shotcrete work for tunnels, bridges, dams, building foundations, building retrofits, and support of excavation.*

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Project
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Project Location
Canaan, NH

Shotcrete Contractor
Patriot Shotcrete, LLC*

Architect/Engineer
Gannett Fleming, Inc

Equipment Manufacturer
Western Shotcrete Equipment, Inc.*

Materials Supplier
Carroll Concrete

General Contractor
Michels Construction, Inc.

Owner
New Hampshire Department of Environmental Services

**ASA Sustaining Corporate or Corporate Member*