Project

Our experts satisfy regulators, ensure public safety during complex dam project

Summary

- A dam at a youth camp in New Jersey needed rehabilitation to meet minimum current state design standards for stability.
- The camp turned to Haley & Aldrich because of our 20 years of involvement with the dam, our rock engineering expertise, and our regulatory knowledge.
- We conducted core sampling and applied our rock engineering knowledge to characterize the bedrock structure and assess the rock stability at the abutments.
- Working with a team and many stakeholders, we developed a cost-effective design that would meet permitting requirements, preserve much of the dam's original design, and keep the dam and the lake it formed available for generations of campers to enjoy.

Client challenge

Bass Lake Dam at Princeton-Blairstown Center, a youth camp in Hardwick Township, New Jersey, is a valuable recreation spot. The dam, built in 1911, is a 100-foot-long, 30-foot-high concrete arch dam in a bedrock gorge — an unusual design for New Jersey, which has only a handful of arch dams. The dam impounds a lake, which is used for swimming, canoeing, and other camp activities. Campers also use the dam for rappelling.

The dam was classified as High Hazard, and the Princeton-Blairstown Center needed to rehabilitate it to meet minimum current New Jersey Department of Environmental Protection (NJDEP) Division of Dam Safety design standards. Specifically, stability analyses indicated that the dam could not provide an adequate Factor of Safety against sliding during the design storm event and under other design conditions such as ice loading.

Although the dam had been rehabilitated several times over its 100-year life, records of the original construction and the subsequent upgrades were unavailable. This introduced unknowns surrounding the existing condition and adequacy of the dam-rock interface. This, along with the fact that many stakeholders would be involved in the project — the owner, NJDEP, the structural engineer, and the contractor — presented additional complexities.

The Princeton-Blairstown Center turned to Haley & Aldrich because of our nearly 20 years of involvement with the dam, our rock engineering expertise, and our regulatory knowledge. Haley & Aldrich also recommended that Kleinschmidt Associates, who has a wealth of structural engineering experience working with older dams, join the project team.

Our approach

The Haley & Aldrich and Kleinschmidt team, along with the owner, sought a design approach that was cost-effective, would meet NJDEP requirements, and would preserve the recreational use of the dam and its picturesque character. To do so, Haley & Aldrich first conducted core sampling and applied our rock engineering knowledge, allowing us to characterize the bedrock structure and assess the rock stability at the abutments. Together with Kleinschmidt Associates, we recommended a design that included new concrete buttresses tied down with rock anchors to improve the sliding Factor of Safety and meet NJDEP standards. This also allowed us to preserve the original design as much as possible.

During construction, the biggest challenge was coordinating with the various stakeholders involved. Particularly when working with an older structure, details are often uncovered during construction that require collaboration to correlate the design intent to actual conditions. Some modifications were required during construction, especially relative to the variable and sometimes deteriorated rock surface at the toe and abutments. The Haley & Aldrich team kept communication open with all project stakeholders and, to facilitate group decision-making around these design changes, held regular, on-site check-ins and remote conference calls.

Additionally, the rehabilitation design helped ensure the dam did not just meet regulations, but also kept people and property out of harm's way. Most importantly, our client's dam is now in compliance with NJDEP requirements, will avoid additional enforcement actions, and can be enjoyed by campers for many years to come.

> *“Taking a 100-year old structure and keeping the design intact while still making it safe for people to enjoy into the future is a satisfying accomplishment.”*
>
> Laura Spann, P.E., Haley & Aldrich

Value delivered

- Used rock and dam engineering expertise to determine the most cost-effective dam rehabilitation design
- Used regulatory expertise to guide the owner through the NJDEP dam safety process
- Kept the project moving by employing effective communication methods amongst all stakeholders, including the owner, the contractor, and the NJDEP
- Provided guidance that ensured dam safety while preserving the original 1911 dam design

For more information, contact:

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