Projects

Penn Forest Dam

Bethlehem, Pennsylvania

HIGHLIGHTS

- **With a total of 360,000 CY of roller compacted concrete produced, the Penn Forest Dam represents the third largest RCC project in the United States.**
- **Three awards were won for this project: the National Grand Award, the Honor Award for Water Resources, and the National Rehabilitation Project of the Year Award.**

This project entailed the complete replacement of the Penn Forest Dam located in Bethlehem, Pennsylvania. It represented the last in a series of contracts at the site to replace the dam. Originally constructed in 1960, the Dam endured a series of complications from the start, including weep holes, seepage, and finally a fifteen foot sink hole. In addition to continuing to supply a source of water for the community by protecting the adjacent reservoir, the new structure was planned to assist in flood control for the area. The Dam walls were raised three feet to increase the spillway capacity. Upon completion, a total of 360,000 CY of roller compacted concrete, or RCC, were produced. Because of this statistic, this job represents the third largest RCC project in the United States.

The Plants

Conti's part in the reconstruction of the dam began in July of 1997. The initial activities surrounding the project consisted of the construction of two concrete plants and a conveyor system on site. These plants were set up to produce the roller compacted concrete, composed of a blend of both coarse and fine aggregate, cement, fly ash, and water. Because of the sophisticated computer system behind this plant, Conti crews were able to keep the exact concentrations of each of these ingredients constant throughout the length of the project. This ensured the strength and stability of the Dam floor. When the blend was perfectly mixed it was moved into a smaller hopper, then moved directly to the work area by way of a Rotec Conveyer System. Using this series of operations, Conti was able to run the plants six days per week, using two shifts, and producing approximately 4,000 CY of RCC per day, or 600 tons per hour.

The Dam

The Dam itself measures an impressive 2,000 feet long and 180 feet tall. Prior to laying the RCC, Conti personnel had to construct the Dam walls. More than 2,000 precast panels, each measuring six feet high, 16 feet wide and four inches thick, were used to line the sides of the Dam. These panels were set in place using a crane, as their weight surpassed 3,000 pounds per unit. While the new walls were constructed, the RCC was placed

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in layers across the width of the Dam, then leveled with a bull dozer and compacted with a roller. When hardened, the RCC replicates the feel of a rubber mat under foot.

Throughout this project Conti worked with a variety of subcontractors specializing in various phases of the construction. One such contractor was used to "grout" the RCC in order to eliminate cracks or gaps in the surface, thereby eliminating the possibility of seepage. In order to accomplish this grouting, 160 foot holes were drilled into the ground and the grout was then pumped in. A synthetic liner was also embedded in the precast panels on the upstream face of the Dam to prevent seepage through the structure.

Concerns Along the Way

Because of the fact that the project spanned several seasons, various environmental concerns arose during construction. The hauling of aggregate began in 1997, but as winter approached these huge piles had to be covered to protect them from the elements. By spring and summer the concrete mixture was being poured. This time heat became a factor, and large curtains were used to shade the piles of material, which could not be heated to more than 72 degrees and still be used for RCC. Conti was able to maintain all aspects of material maintenance throughout the project, keeping the job on schedule and within budget, without losing material because of the elements.

Utilizing two shifts of personnel and a six day work week, as well as superior systems and procedures, Conti was able to bring this project in as scheduled with as little disturbance to the surrounding area as possible.

The Penn Forest Dam has won three awards:

- ***National Grand Award*** - American Consulting Engineers Council
- ***Honor Award for Water Resources*** -Consulting Engineers Council of Pennsylvania
- ***National Rehabilitation Project of the Year Award*** - Association of State Dam Safety Officials

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