RIZZO INTERNATIONAL, INC.

ROLLER COMPACTED CONCRETE

OUR HERITAGE

With over 40 years experience in the Construction Management and Engineering fields, our award-winning staff at RIZZO International, Inc., has a fundamental commitment to provide more than just engineering consultation. We offer technical excellence, an awareness of regulatory agencies and public involvement, and the experience necessary to deliver the optimum total solution to complex mix design problems.

Our firm employs people with various skills which enable us to remain on the cutting edge of Construction Mix Design Programs. We offer unique and innovative views for any situation, with an eye toward a complete technical and economical solution. We are committed to providing work of the highest quality.

OUR COMMITMENT TO QUALITY

RIZZO has years of hands-on experience with RCC, an asset that we apply directly to every project. We establish a Minimum Design Strength for all Final RCC Mixes we produce based on Phase I and II laboratory testing conducted on various RCC mixes. Our Final RCC Mix Design will meet or exceed these minimum strengths.

RIZZO's Principal staff members have over 30 years of extensive experience with Roller Compacted Concrete (RCC), including the production and placing of Lean and High Paste RCC; Quality Control, Lab Testing, and Monitoring of RCC; mixing, conveying, and placing RCC; and selecting and permitting Crushing Plants, Mixing Plants, and Systems related to RCC production.

OUR EXPERTISE

Our engineers, managers, supervisors, and technicians have designed and managed the largest modern RCC Dams in the USA, including placing over 2.7 million cubic yards of RCC at Taum Sauk, 1.3 million cubic yards of RCC at Saluda Dam and 100,000 cubic yards of RCC at Bear Creek Dam.

RIZZO employees are well-versed in the following items that must be considered when utilizing RCC:

Seismic Design Basis • Loading Conditions
Finite Element Analysis • RCC Mix Design Program
Joint & Drain Design • Bedding Mix Application
Facing Options & Forming
RCC Transport & Placement Technology

We continually work towards gaining the most hands-on knowledge we can for this growing field.

RCC FEATURES & BENEFITS

Roller Compacted Concrete (RCC) offers many outstanding features for Construction Projects, including high compressive strength, high shear strength, high density with low absorption, low water content, aggregate interlock, no steel reinforcing or dowels, placement with or without forms or finishing, no formed or sawed joints, and a hard, durable, light-colored surface.

RCC can support heavy, repetitive loads without failure; eliminates rutting and subsequent repairs, even under freeze-thaw conditions; increases strength and reduces permeability to enhance durability; provides high shear resistance at joints; resists abrasion and eliminates the need for surface course; and speeds and simplifies construction to reduce costs.

FLY ASH

RIZZO has successfully developed technology and mix designs that have enabled the use of wet fly ash in RCC production on two of the largest RCC dams in North America. RIZZO's proven performance utilizing both wet and dry fly ash in our projects helps our clients to lower the cost of production by using wet fly ash, when available, without impacting the quality, performance, or constructability of the RCC. This technology has other benefits as well: By using ponded fly ash that would otherwise need to be contained and monitored, RIZZO's RCC designs help protect the environment.

RCC FEATURED PROJECTS

TAUM SAUK UPPER RESERVOIR REBUILD

After the original rockfill dike at the Taum Sauk Pumped Storage Plant breached, RIZZO was retained by Ameren Missouri to complete a detailed forensic engineering study to determine the cause of the failure. Based on substantial investigation and design, RIZZO determined that a repair of the existing dike was not technically feasible due to flaws in the original construction. A complete re-build of the upper reservoir was required; RIZZO was hired to design and prepare construction documents for the re-build.

RIZZO evaluated several alternatives for a re-build and selected a symmetrical section, Roller Compacted Concrete (RCC) Dam. The symmetrical slopes reduced the demand on the rock foundation and allowed for the use of aggregate recycled from the existing rockfill dike material (rhyolite). A temporary rock crushing plant was erected onsite, and the existing rockfill as processed and utilized to create aggregate for the new dam.

The selected RCC mix design contained 100 pounds of Class F fly ash and 100 pounds of cement per cubic yard. RIZZO successfully investigated the use of a landfilled flyash, which was excavated from an existing facility, processed, and utilized in the RCC Mix. In addition to cost savings by not having to purchase commercial flyash, this created additional landfill space. The use of flyash is important to reduce the heat of hydration, and to improve workability of the overall RCC Mix.

The Taum Sauk Upper Reservoir Rebuild has been honored with several awards, including the USSD 2010 Award of Excellence and the ESWP 2010 Project of the Year, and was nominated as a finalist for the ASCE's prestigious OPAL award.

SALUDA DAM REMEDIATION PROJECT

In 2005 RIZZO completed an RCC Mix Design Program for the production of a $275 million seismic upgrade of the Saluda Dam located in Columbia, South Carolina. The selected remediation consisted of constructing a combination of RCC and Rock Fill Berms to form a backup berm along the downstream toe of the existing Dam. This Project was the largest active Dam Construction Project in the United States at the time, and the final project involved the placement of 1.3 million cubic yards of RCC and 3.5 million cubic yards of Rock Fill. Saluda Dam is the third largest RCC Dam in the U.S., and one of the Top 20 Largest RCC Dams in the world.

Work on the Saluda Dam Remediation Project earned RIZZO ASCE's prestigious Outstanding Civil Engineering Opal Award in 2006. Additionally, during production of the middle third of the dam, the RIZZO team set the new North American Industry RCC Placement Record, placing 18,590 cubic yards of RCC in a 24-hour period.

BEAR CREEK DAM

TVA selected RIZZO's approach for the design and construction of a backup RCC Dam addressing both ongoing seepage issues and PMF capacity at the Bear Creek Dam in Alabama. The remediation consisted of an RCC Reinforcing Structure (RCC Berm) located near the toe of the existing embankment dam, including a composite grout curtain-cutoff wall seepage barrier through the karst rock foundation.

RIZZO's Scope included the installation and maintenance of instrumentation system components and daily monitoring of the existing embankment during construction. During the construction of the RCC Berm and the cutoff wall, RIZZO provided onsite construction observation services.