GLOBAL TUNNELING EXPERTISE

At RIZZO Associates our involvement in the tunneling industry came about naturally as a result of our work providing water conveyance schemes for hydropower and cooling water schemes for nuclear power plants. In recent years our work on tunnels and shafts has expanded to include a myriad of applications on projects around the world, including: Water Conveyance, Transportation, Mine Access, and Pipeline Routing through both hard rock and soft ground. From mass transit routes below the streets of New York City to vehicle routes through the Andes Mountains, we take pride in the international breadth of our tunneling achievements.

OUR TUNNELING SERVICES PORTFOLIO INCLUDES:
- Tunnel Design
- Shaft Design
- Geotechnical Engineering
- Seismic Engineering
- Hydraulic Engineering
- Tunnel Rehabilitation Program Development
- Construction Management

WATER CONVEYANCE

RIZZO has in-depth experience in designing tunnels for water conveyance at hydropower sites and for supplying cooling water for nuclear power plants. Our extensive experience in working with regulatory agencies such as the Federal Energy Regulatory Commission (FERC) and U.S. Nuclear Regulatory Commission (USNRC) ensures our complete understanding of the nuances of designing tunnels for these applications. RIZZO professionals are skilled in the areas of geotechnical, seismic, hydraulic, and environmental engineering, ensuring that we are a valuable addition to any water conveyance tunnel project team. Our international experience includes water conveyance tunnels in Sub-Saharan Africa and the Middle East.

TRANSPORTATION

RIZZO’s reputation for excellence in providing geotechnical and seismic engineering consulting has uniquely positioned our firm to provide a breadth of services for transportation tunnels around the world. In 2007, RIZZO acquired International Civil Engineering Consultants, Inc. (ICEC), a specialty seismic engineering firm based in the San Francisco Bay Area. ICEC’s engineers and scientists brought decades of seismic and consulting experience to our firm, including years of experience with various tunnels for light rail and high speed rail projects. From developing geotechnical investigation programs to evaluating tunnels and underground structure designs against seismic loading criteria, RIZZO personnel have worked on transportation tunnel projects across the United States and in South America, Eastern Asia, and Europe.

OTHER TUNNELS

There are many applications where an underground solution is necessary or provides considerable advantages to above-ground alternatives. Tunnels and shafts can be used for pipeline routing, ore conveyance, mine access, pedestrian pathways, and even underground storage. RIZZO houses the expertise to provide tunnel engineering and geotechnical oversight for a network of tunnels and shafts. Our experience includes work performed for a large underground cavern that is integral to ore-crushing operations and material conveyance at the Gualcamayo Mine in Argentina, as well as tunnel design for routing a gas pipeline through the sub-Andes in Bolivia.
MARGARITA EXPORT LINE TUNNEL

RIZZO personnel recently completed the design and bid documents for a 1-mile long, 10-foot diameter hard-rock tunnel through the sub-Andes in Southern Bolivia. RIZZO provided a comprehensive suite of services, including: design of the tunnel, tunnel portals, bench areas, initial and final support systems, excavation system, and work camp. Additionally, RIZZO developed the Geotechnical Data Collection Plan; Project Execution Plan; Project Quality Plan; Health, Safety, and Environmental Plan; Construction Sequencing Plan; determined the availability of tunnel excavation equipment; developed commercial and technical specifications; and assisted the client, Repsol YPF, with the prequalification of tunneling contractors for construction of the tunnel.

TAUM SAUK PUMPED STORAGE FACILITY

RIZZO developed a Tunnel Rehabilitation Program for the Outlet Works system at the Taum Sauk Pumped Storage Facility in Lesterville, Missouri that was submitted to and approved by the Federal Energy Regulatory Commission (FERC). After the completion of a comprehensive inspection program, a Rehabilitation Program was executed that included the application of shotcrete in the vertical shaft, reinforcement of the rock tunnel in select areas, and repairing sections of the steel lined tunnel using specially fabricated steel plates. Ground improvement was necessary in several areas and, as such, high mobility grouting was performed using the Grout Intensity Number (GIN) Method with real-time monitoring.

Completed on-time and within budget, the Taum Sauk Upper Reservoir Rebuild Project has received the 2010 American Society of Civil Engineers (ASCE) OCEA Award of Merit, the 2010 United States Society on Dams (USSD) Construction Project of the Year, and the 2010 Engineering Society of Western Pennsylvania (ESWP) Project of the Year in Civil Engineering.

GUALCAMAYO TUNNEL

In Argentina, our engineers designed the support system for a subterranean cavern that has a ceiling height of more than 70 feet to house an ore-crushing machine at one of Yamana Gold Inc.’s most important developments. RIZZO assisted with the design and construction oversight of nearly 2.5 miles of tunnels used to access the cavern and convey the ore, and two 14-foot diameter shafts (1,410-feet long and 1,080-feet long, respectively) used as ore-passes to connect the cavern with the open pit mine above.

SOUTH AFRICAN NUCLEAR POWER PLANT TUNNEL

In conjunction with the design study for a Nuclear Power Plant, RIZZO recently completed the Conceptual Design for twin, 16-foot diameter, Cooling Water Tunnels to extend approximately 4,900 feet off the shore of South Africa’s Eastern Cape Province through hard rock strata. The Conceptual Design effort included the selection a tunnel alignment based upon geologic data, the development of a geotechnical investigation program, hydraulic sizing of the tunnel, an initial Risk Assessment, preliminary specification of construction means and methods, preliminary specification of initial and final liners, and the conceptual design of the intake shafts.

AGUA NEGRA TUNNEL

RIZZO was contracted by the San Juan Department of Transportation to provide geotechnical, geophysical, and hydrogeological studies for the Agua Negra Tunnel. When completed, the 8.5-mile long tunnel will provide an important link for vehicular traffic traveling through the Andes Mountains between Argentina and Chile. In order to adequately study the subsurface characteristics, deep borings are being advanced at high altitudes (between 14,000 and 16,000 feet above mean sea level), and under adverse weather conditions.

BART SEISMIC RETROFIT PROGRAM

RIZZO was contracted by the San Francisco Bay Area Rapid Transit (BART) for the BART Seismic Retrofit Program. RIZZO personnel developed new seismic design criteria and performed seismic vulnerability assessments and seismic retrofit studies for the Transbay Tube, the San Francisco and Oakland Ventilation Towers, and various underground structures of the BART System.

OFFICE LOCATIONS WORLDWIDE

www.rizzoassoc.com