AN EXTREME HARDROCK MISSION.

In Arrowhead/Southern California, two tunnel boring machines are underway on a difficult mission. Above San Bernardino, close to the San Andreas earthquake line, new drinking water tunnels are being built for L.A. The rock formation, which is highly stressed and has a high water content due to tectonic movements, has constituted a major challenge for the construction team. With water pressures of up to 10 bar, special pumps in the tunnel boring machines are draining up to 575 cubic meters of water per hour. Time-consuming injection measures to stabilize the tunnel face are being carried out prior to mining. People and machines are proceeding consistently with utmost patience and tenacity. The Shea Kenny Joint Venture and Herrenknecht are driving towards the goal, tunnel completion. Compliments to the Shea Kenny Joint Venture on the professional handling of such a difficult project.
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Cover Story

Jacobs Associates – Drawing on a Half Century of Tunnel Expertise 16
As an engineering company with more than 50 years of experience in the underground, Jacobs Associates prides itself on being a leading resource for design and construction management services.

By James W. Rush
(Cover Photos by Sue Bednarz)

Features

Building the Big Pipe 20
To service a six-mile-long, 26-ft diameter tunnel in Portland, Ore., seven shafts needed to be built to connect existing overflow pipes and provide above ground access.

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A closer look at what the termination for convenience clause means to you.

By Peter M. Kutil and Karl Silverberg

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Politics Block Progress of Port of Miami Tunnel

Anyone who has been around this business for any length of time knows that no tunnel plan is ever a sure thing. If a tunnel truly needs to be built, it will be, but it may take years. Maybe decades.

Here in Cleveland, the Northeast Ohio Regional Sewer District is planning its largest tunneling project to date—the Euclid Creek Tunnel, a roughly 14,000-ft, 24-ft diameter rock tunnel with an estimated price tag of more than $100 million. The project is needed as part of a long-term CSO control plan, but unfortunately negotiations with regulators have been painstakingly slow, essentially stalling the project at the expense of the environment.

In New York, work is under way again on the Second Ave. Subway, portions of which will use existing tunnels that were built 30 years ago, before the city encountered financial troubles and the project placed on hold. Around that same time in Washington, D.C., subway work was beginning in earnest. I recall reading an article several years ago that quoted a project manager saying that once he got NTP, “my goal was to build as big a hole as possible as quickly as possible so that they couldn’t stop me.” Fortunately, the work proceeded and Washington enjoys the benefits of a modern, efficient transportation system that has allowed the city to accommodate growth.

In Miami, the circumstances are different, but it was disappointing to see that the Port of Miami Tunnel is threatened because of a political impasse. With the majority of funding in place for this $1 billion transportation improvement program, it hit a snag when the Miami City Commissioners failed to approve $50 million in funding that represented its share of the project. As a result, the whole project is in jeopardy.

What is most unfortunate is that it will ultimately hurt the economic vitality of the city and negatively impact the quality of life for residents and businesses in the central business district. The project was planned to divert some 4,000 18-wheel trucks that pass through downtown Miami on a daily basis through a tunnel and provide a more direct link to the interstate highways.

The port also represents one of the region’s biggest economic engines, so investing in its infrastructure is vital to Miami’s long-term strength. The port serves both cruise and cargo ships, supporting 81,800 jobs, $5 billion in wages and provides an annual economic output in Miami-Dade County of more than $12 billion, according to the chamber of commerce.

Not investing in the project now can ultimately cost the city much more than $50 million in the long run.

Regards,

James W. Rush
Editor
Port of Miami Tunnel Update

The Port of Miami Tunnel project, one of the largest public works projects proposed in the State of Florida, may be shelved because Miami city commissioners oppose paying the city’s roughly $50 million share of the $1 billion project, according to published reports. The majority of the funding is being covered by the state and Miami-Dade County.

The Florida Department of Transportation, the project owner, has approved $457 million in funding while the Miami-Dade Commission approved its $402.5 million share. Without the city commission’s portion of the funding, the project may not go forward. “Let the state and the county build it,” city commissioner Angel Gonzalez was quoted as saying in the Miami Herald. “The county owns the port.”

“It’ll take a miracle at this point,” FDOT’s Johnny Martinez was quoted as saying. “We’re not totally dead, but it’s a very faint pulse.”

The project was awarded to a consortium headed by French construction giant Bouygues Travaux Publics as a design-build-finance-operate-maintain public-private partnership. The consortium has extended its price, pending approval, but is not likely to do so through the end of the year, according to reports.

Local business groups including the Greater Miami Chamber of Commerce have urged the city to approve its share of the project, while encouraging other business groups to apply pressure as well.

The tunnel would improve access to and from the Port of Miami, serving as a dedicated roadway connector linking the port of the MacArthur Causeway and I-95. Currently, more than 5,000 large trucks and buses travel through Miami’s Central Business District en route to the port.

Allentown Shotcrete Technology Hosts Open House

On an unusually warm October day in Pennsylvania’s Lehigh Valley, Allentown Shotcrete Technology Inc. celebrated its new alliance with Putzmeister America Inc. and introduced the company and its products to business partners from the United States and around the world.

Held Oct. 9, Allentown’s Oktoberfest-themed open house featured facility tours and seminars, a large product display and a reception dinner held at a historic local inn. Approximately 70 customers, distributors and guests attended the event and met with Allentown and Putzmeister representatives.

“This is our opportunity to thank our business partners for their past support and introduce you to the newest addition to the Putzmeister America family,” said Dave Adams, president and CEO of Putzmeister America. “Allentown was founded nearly 100 years ago and this new relationship will take the company to an even higher level, providing the world’s most comprehensive range of sprayed concrete equipment.”

Allentown is well known for its contributions to the shotcrete industry and will continue to produce pressure tank guns, rotor guns, rotary bowl guns, wet process pumps and high pressure pumps from its Allentown, Pa., location. In addition, the company will capitalize on its shotcreting expertise to drive major North American underground construction projects for the worldwide Putzmeister organization. The new alliance enhances Allentown’s product line which now includes more than 50 complementary machines.

“With over 95 years and a host of innovations behind us, we look forward to our...
future with Putzmeister,” said Allentown Shoterete Technology president Patrick Bridger. “Everyone knows the Allentown name and now we have the resources and added technologies of Putzmeister to support our efforts going forward. We will be an unbeatable team in the refractory, underground and mortar industries.”

During the open house, Bridger, sales and marketing manager Bill Allen and shoterete industry veteran George Yogg presented Mid-American Gunite Inc. owner Larry Masserant with a Customer Recognition award for his years of business, innovation and support of Allentown.

“Mid-American has worked tirelessly since the mid 1980s with Allentown,” says Bridger. “Larry was the driving force behind the development of Allentown’s MR-2200 and MR-3300. We thank both Larry and Mid-American for their years of loyalty and unwavering support.”

**Modest Construction Growth Forecast in 2008**

The construction equipment manufacturing industry expects overall U.S. and Canadian business to remain flat through the end of 2007 but rebound in 2008, while sales to worldwide markets should continue strong through 2007 and into the next year, according to the annual forecast of the Association of Equipment Manufacturers (AEM).

AEM is the North-American based international trade group representing the off-road equipment manufacturing industry. Each year it surveys its construction equipment manufacturer members about expected sales of the machines that build, repair and maintain America’s and the world’s roads, bridges, dams, houses, offices, schools and other public and private infrastructure.

In the latest AEM outlook survey, overall construction equipment demand by year-end 2007 is predicted to decline 1.9 percent in the United States and remain flat in Canada at minus 0.1 percent, while worldwide business is anticipated to increase 9.9 percent.

In 2008, growth is expected in the United States, Canada and worldwide, with the biggest gains in global markets – an increase of 2.8 percent for the United States and 2.9 percent for Canada, and growth in worldwide markets of 8.0 percent.

The AEM outlook survey asked respondents to rank the influence of several factors on future construction equipment sales. As expected, the impact of the housing slump was a key factor, as well as the state of the general economy, including interest rates and credit availability. Adequate transportation funding will also have a major impact on the business of many, according to the survey, as will rental company demand. Construction machinery manufacturing is export intensive, and the strength of the dollar against other currencies is also expected to affect business growth. Machinery makers also cited commodity shortages and prices, including steel and energy.

“Overall, we’ve seen a slowdown in the past year or so, but it comes after some very good years for the equipment manufacturing industry,” stated AEM President Dennis Slater. “The residential housing slump in the United States has sent ripples across the entire economy, not only the construction industry. However, growth in non-residential construction continues to offset losses in the housing market. For equipment manufacturers, the continued global demand for construction machinery is also balancing the slowdown in our domestic business. Economic signals are mixed, but there is guarded optimism that our economy will remain resilient and not descend into recession.”

Slater provided additional commentary about the outlook survey and factors impacting future business volume:

“The public works sector has grown steadily over the past decade and road building is an important contributor. We have guaranteed funding for the next few years under SAFETEA-LU federal transportation legislation, which will provide some stability for construction equipment manufacturing. However, it is a continuing fight to ensure that the authorized funding is actually released each year. And, a major concern is the estimated multi-billion-dollar shortfall in the Highway Trust Fund.

“Unlike highways, clean water infrastructure work doesn’t even have a trust fund to address the critical maintenance and repair needs in this sector. Looking to the future, we see tremendous business opportunity related to these projects. Clean water is, most importantly, good for the environment and people. But it is also a source of jobs where our equipment is used.

**AMEC to Perform Geotech Services on Railroad Tunnel Project**

AMEC, the international project management and services company, has been selected by STV/Ralph Whitehead Associates to provide geotechnical engineering services for the $150 million Norfolk Southern Railway tunnels enlargement project in the “Heartland Corridor” states of Virginia, West Virginia, Kentucky and Ohio.

Twenty-eight tunnels are to be enlarged vertically to enable double-stacking of containers on rail cars. The tunnels range in length from 174 ft to 3,302 ft. Currently, trains must take an alternate route that is 200 miles longer if they are double stacked. It is anticipated that double stacking on the Heartland Corridor will reduce truck traffic, thereby improving highway safety and air quality. The overall construction period is estimated to take three years.

AMEC will conduct a peer review of tunnel design and construction documents and then provide a team for tunnel inspection and construction management services. AMEC’s geotechnical unit in Nashville, Tenn., has a 20-year history of working for Norfolk Southern Railway and has performed numerous geotechnical engineering and tunnel rehabilitation projects.

In addition to the tunnel modifications, the construction management team will be responsible for other elements of the Heartland Corridor project, including modification of seven through truss bridges, lowering of tracks at three overhead bridges, modification of nine slide-detection fences, and raising of three sets of overhead wires.

Construction activities will be performed while maintaining rail traffic along this heavy-tonnage route.

**Michels Tunneling Introduced**

Michels Corp. announced that its Sewer, Water and Tunnel Division will be changing its name to Michels Tunneling. The new name will more effectively describe the services that are provided.

“Michels is one of the original U.S. micro-tunneling contractors, and when you combine this with our vast experiences with
conventional and EPB (earth pressure balance) tunneling, we felt that it was time to change the divisional name that would more represent our core business. Our focus is to take the eclectic and diversified experiences (both job and personnel) from the past and continue to grow and develop the opportunities presented that will keep Michels Tunneling as one of the top tunneling contractors in the United States,” said Ray Post, General Manager.

Pat Michels, CEO, added, “Tunneling is a highly skilled and specialized part of Michels Corp. that complements our core business as a diversified utility design and construction contractor. While the name change is a better fit for Michels Tunneling and alignment with each of our operating divisions, we want to be clear to our customers that no matter what Michels division you may be working with, we are one Michels.”

Since 1969, Michels has been the progressive leader in the construction of tunnels, water mains and storm and sanitary sewers. Michels Tunneling is licensed in all 50 states. Michels Tunneling is based out of New Berlin, Wis., with regional offices located nationwide.

Hayward Baker Opens New Minnesota Office

Hayward Baker Inc., a leading North American geotechnical contractor, announced the opening of a new sales, project management and engineering services office in Bloomington, Minn., near the Minneapolis-St. Paul International Airport.

According to Steve Scherer, senior vice president of Hayward Baker’s Midwest Region, the opening of the Twin Cities office illustrates the continuing growth of the company’s business activities in the Upper Midwest.

“We’ve been active in the Upper Midwest area for many years,” Scherer noted. “Up until now, management of our projects had been handled by our Chicago office. Opening the new office in the Twin Cities makes us more readily available to current and future clients based in the region. We’re a global geotechnical contractor offering leading construction services and technology and now we can offer them at a truly local level,” he emphasized.

The new Twin Cities office will be headed by Ryan Benson. Benson joined Hayward Baker after serving as a land development manager for Pulte Homes of Minnesota. Benson also held project engineering positions with Braun Intertec Corp., and with Ground Engineering Consultants. He holds a B.S. degree in civil engineering from North Dakota State University.

Commenting on his new responsibilities at Hayward Baker, Benson said, “This position utilizes my background and experience in geotechnical engineering and specialty contracting, while also giving me the opportunity to work in a business development and client support role. It’s a nice blend of duties that ties in perfectly with my technical and customer care interests.”

The Twin Cities office of Hayward Baker is located at International Plaza, 7900 International Drive in Bloomington, Minn. Ph: (952) 851-5500.

HMM Hosts Open House

Hatch Mott MacDonald employees hosted industry representatives from across Northeast Ohio to celebrate the opening of the relocated Cleveland office. (Photo by Don Bensman Jr., Don Bensman Photography.)

Hatch Mott MacDonald, a leading engineering consulting firm, recently relocated its Cleveland office. To celebrate the event, the firm hosted an open house attended by local industry representatives and clients.

“We opened our Cleveland office six years ago with one employee and have been fortunate enough to win over 40 projects in and around the Midwest since then,” said HMM vice president Mike Vitale, manager of the Cleveland office. “As a result, we quickly outgrew our space. Our new space will accommodate over 35, and is located in a perfect place for our business. We are within the City of Cleveland to serve our local clients, yet the office is centrally located near the airport and major interstate highways, making it convenient for staff and clients to get to.”

The new office location is 18013 Cleveland Parkway Dr., Suite 200, Cleveland, OH 44135-3233. Ph: (216) 535-3640. Fax: (216) 265-2816.

Cleveland City Councilman Martin Sweeney cuts the ribbon to officially mark the opening of the new Hatch Mott MacDonald office. (Photo by Don Bensman Jr., Don Bensman Photography.)
Keller Group Acquires Florida-based HJ Foundation

Keller Group plc, the international ground engineering specialist with extensive operations and activities in North America, announces the purchase of the business and assets of HJ Foundation, Inc.

HJ Foundation, based in Miami and the leading deep foundation contractor in the Florida market, has been acquired by Keller Group, an international ground engineering specialist with extensive operations in North America.

HJ Foundation, established in 1988 and based in Miami, Fla., is the leading deep foundation contractor in the Florida market. It reported revenues of $92 million in 2006. With more than 200 employees, the company serves a commercial and municipal client base across a broad geographic area from its facilities in Miami and Ft. Myers.

HJ Foundation specializes in continuous flight auger (CFA) piles, the most popular deep foundation system for commercial applications in Florida. The company also offers a range of other complementary foundation products such as Vibro-compaction and excavation shoring to its customers.

Commenting on the acquisition of HJ Foundation, Bob Rubright, managing director for Keller’s U.S. operations, said, “We are very pleased to welcome the people of HJ to our family of companies. HJ has proven itself as a highly effective organization, and it is an excellent strategic fit with Keller’s quality-focused U.S. foundation business.”

Rubright reported that HJ Foundation will continue to operate under current management personnel as a stand-alone business.

H.R Gray Reaches Major Milestone on BWARI/BWOAS Projects

Construction management and consulting firm H.R. Gray announced completion of the tunneling portions of the Phase I Big Walnut Augmentation/Rickenbacker Interceptor (BWARI) and the Phase 2 Big Walnut Outfall Augmentation Sewer (BWOAS). Work has now begun on the lining portion of the projects.

Designed to provide storage capacity that will be utilized during high surcharge situations, the BWARI and BWOAS projects are in response to a consent decree that the City of Columbus entered into with the Ohio Environmental Protection Agency (OEPA) to upgrade the city’s sanitary sewer system. The projects, with a combined construction budget of more than $150 million, consists of two soft ground sanitary sewer tunnels – 21,000 and 13,000 ft in length – with finished diameters of 14 and 12 ft, respectively. Further, the project includes 5,500 lf of 42-in. open-cut sewer construction as well as a large gate/drop structure.

“These projects can be extremely challenging because of the multiple elements and unforeseen conditions that may occur, but the entire design and construction team is working together to develop solutions to keep the projects moving forward,” said Todd O’Donnell, senior project manager of H.R. Gray.

For the 21,000-ft tunnel, the tunnel excavation portion of the work was completed in October 2006 and the lining portion is well underway. For the 13,000-ft tunnel, the excavation portion was completed on Aug. 1 and preparations for the installation of the liner are underway. A semi-rigid PVC sheet is used for the lining system.

In addition to the installation of the liner, several other major construction elements are also underway. First, 10 access shafts are being constructed from the surface to the tunnel. A tunnel portal access shaft will allow access for inspection vehicles to drive the length of the tunnel to inspect it. An interconnect structure is being constructed that will tie into the city’s existing 108-in. storm sewer pipe with the new tunnel system. Further, a structure is being built that will allow for the connection to the future Lockbourne Intermodal Subtrunk (LIS), which is currently in the design phase.

These improvements are designed to relieve the area’s existing 108-in. Big Walnut Outfall Sewer, provide sewerage service to new developments and accommodate approximately 37 million gallons of storage, which will reduce sewage overflows. Further, the improvements will provide the required downstream capacity for the City of Columbus’ long-term Wet Weather Management Plan. The lining phase of the project is expected to be completed in June 2008 for the 21,000-ft tunnel and in November 2008 for the 13,000-ft tunnel.

ICUEE 2007 Breaks Records

The International Construction and Utility Equipment Exposition 2007 (ICUEE) achieved all-time records for attendance, exhibitors and exhibit space, and education programming during its run Oct. 16-18, 2007 at the Kentucky Exposition Center in Louisville, Ky.

Known as The Demo Expo, ICUEE 2007 attracted 17,950 utility and construction industry professionals with electric, sewer/water, phone/cable, gas, general construction, government and landscaping jobs. Attendance tracked more than 9.5 percent over the last show.

“Every business operation wants to increase productivity and is looking for efficiencies. ICUEE 2007 provided show visitors with convenient access to the newest technologies and safety enhancements to achieve these goals,” noted ICUEE Show Manager Nicole Hallada.

More than 845 exhibitors used more than 1.155 million net sq ft of exhibit space to display and demonstrate the latest equipment, technology and product innovations.

ICUEE 2007 featured expanded working-equipment demonstration areas, and a New Product and Technology program gave exhibitors the chance to spotlight their new-to-market offerings since the last ICUEE, held in 2005.

ICUEE 2007 educational programming also set records, with more than 26 percent more tickets purchased compared to the last show. ICUEE 2007 offered a broader array of sessions than ever before, including classroom learning, tours, workshops and certification programs.

Akkerman was one of the many exhibitors at ICUEE.
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Reader Service Number 6
Manitowoc Names Global Product Manager

Manitowoc Crane Group has announced the appointment of Mike Wood as global product manager for Manitowoc crawler cranes. Wood took over Sept. 1 from Raman Joshi, who transferred to Singapore to take the position as director of marketing for the Asia-Pacific region.

In his new position, Wood reports to Bob Hund, vice president of worldwide marketing. His duties include overseeing strategy and financial performance for Manitowoc, as well as managing Manitowoc’s manufacturing alliances and analyzing market conditions. He will work closely with the brand’s sales, marketing, engineering and manufacturing locations around the globe to ensure both existing and new products meet local and global customer requirements.

“Mike has solid experience with crawler cranes, having worked with them for more than 20 years in various roles within Manitowoc Crane Group,” Hund said. “He knows our products, our customers and our markets. The global product manager role is one that has assumed greater importance in recent years as our crawler crane brand has become truly global. Mike will now be charged with taking that advance to the next level.”

Prior to this position, Wood served as a customer service manager for Manitowoc Crane CARE. He has also served as general manager of Manitowoc’s former company-owned dealership in Chicago; headed up Manitowoc’s remanufacturing division; and served as senior product support manager as Manitowoc’s liaison with key account Kiewit.

Wood will continue to be based at the Manitowoc manufacturing facility in Manitowoc, Wis.

Black & Veatch Reassigns Arnold

Black & Veatch, a leading global engineering, consulting and construction company, announced that Derek Arnold has relocated to Las Vegas to support major tunneling and conveyance projects in the Las Vegas Valley. Arnold also will continue to support global projects across the company’s water business through a tunneling and conveyance “Center of Excellence” that is being established in Las Vegas.

A “Center of Excellence” serves as a centralized knowledge base from which Black & Veatch can apply its broad project expertise and integrated global workforce to further ensure clients get global solutions to their local challenges.

Black & Veatch’s Regional Practice Leader for Tunneling in Asia Pacific, Arnold comes to the United States after 16 years in Hong Kong. He has completed design and construction supervision assignments on numerous tunneling and water conveyance projects around the world. Application of the latest technologies in underground engineering is a key element of his experience.

One of the company’s key assignments in Las Vegas is the Systems Conveyance and Operations Program, for which Black & Veatch is designing a 7.5-mile tunnel through the River Mountains Range. Arnold will assist the Lead Engineer’s team for this pipeline and tunnel project, which will convey highly treated effluent from the Clean Water Coalition member agencies wastewater treatment plants to a new discharge location in Lake Mead. Upon completion, the project will enhance water quality and sustainability of Lake Mead for valley residents, visitors and millions of downstream water users, despite increased effluent flows and decreased lake levels.

As a senior project manager, Arnold has been involved in some of the world’s largest and most complex tunneling, water supply and wastewater projects; he brings a strong understanding of all stages of project development. In 2006, Arnold worked in Sydney, Australia, as the blueprint design project manager for parts of the 135 million-gallons-per-day Sydney Water desalination project. He has also served as project manager for several Hong Kong Water Supplies Department (WSD) schemes, such as the award-winning Tai Po Water Treatment Works and Aqueducts, which included a 7.5-mile treated water tunnel. He is currently the project director for an investigation into the integration of WSD’s Sin Ho Wan and Silver Mine Bay Water Treatment Works and the Inter-Reservoirs Transfer Scheme that will connect two impounding reservoirs to increase water yield. Arnold also worked on Drainage Services Department projects in Hong Kong, including the design of the West Kowloon Drainage Improvement mega-project and the award winning Tai Hang Tung Stormwater Storage Tank.
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Reader Service Number 7
Robbins TBM Breaks Records in Iceland

A Robbins 7.2 m (23.6 ft) diameter TBM operating on the remote Kárahnjúkar Hydroelectric Project in Iceland has entered new territory. The machine, operated by contractor Impregilo SpA, beat its own world record for the second time when it bored 115.7 m (380 ft) in 24 hours on Aug. 25, 2007. It then set another record in its size class of 7 to 8 m (23 to 26 ft) by boring 428.8 m (1,400 ft) in one week. The previous record was also held by a Robbins TBM that excavated the TARP Project in Chicago.

These feats are all the more remarkable considering the machine is on its second tunnel, having bored more than 15 km (9 mi) so far in very hard rock up to 300 MPa (43,500 psi) UCS. The machine previously bored an 11.1 km (6.9 mi) long section of the main headrace tunnel at Kárahnjúkar, breaking through in September 2006.

The machine’s success highlights the longevity of all three TBMs used at Kárahnjúkar. Another machine (TBM No. 3), has successfully bored nearly 20 km on its two previous projects and will now be used on a third 15.3 km (9.5 mi) long tunnel in China. All three Kárahnjúkar machines are HP (High Performance) TBMs, employing high capacity main bearings and 19-in. back-loading cutters to increase boring efficiency in hard rock over long distances.

“The Kárahnjúkar machines are a great example of what Robbins hard rock TBMs can accomplish if they are properly maintained. The TBMs have performed extremely well despite very hard rock and heavy water inflows encountered in the early stages of the project,” said Joe Roby, Vice President of The Robbins Company.

City Tunnel Reaches Milestone

On Sept. 24, the tunnel boring machine Katrin reached Triangeln Station, marking a milestone in the construction of the City Tunnel project in Malmö, Sweden. The Herrenknecht EPB TBM covered the distance of 2.7 kilometers in slightly more than 230 days, joining its sister TBM, Anna, which holed through one month before.

The machines are being refurbished and will head toward their next destination, Malmö C. Anna is expected to reach the station next summer with Katrin arriving a couple of months later.

The City Tunnel project consists of 17 km of railway connecting Malmö Central Station with the Öresund Bridge, as well as linking up the Scania railway network and increasing rail traffic capacity for the future. Six km passes underneath central Malmö, and the other 11 km is surface railway.

Malmö Central Station is being extended with an underground section. New stations are being built at Triangeln and Hyllie, south of Malmö.

The first pit was dug on 8 March 2005. The City Tunnel is planned to be complete in 2011. The budget for the project is SEK 9.45 billion ($1.5 billion USD) at 2001 values.
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In the underground environment, there is no substitute for experience. Shallow or deep, rock or soft ground, wet or dry, Mother Nature presents myriad challenges for those who toil in her depths.

So when it comes to designing and constructing new underground facilities — highway, transit, sewer and water tunnels — finding a partner well versed in the ways of the subsurface is paramount to success.

As an engineering company with more than 50 years of experience in the underground, Jacobs Associates prides itself on being a leading resource for design and construction management services. Unlike many firms that offer services across of variety of markets, Jacobs Associates is focused on tunnels.

“We don’t claim to have broad knowledge on a lot of different subjects, we claim to know one subject — tunnel engineering,” said Bill Edgerton, who serves as a principal and president of Jacobs Associates. “Tunnel engineering involves a number of disciplines including scheduling, geotechnical engineering, civil engineering, structural engineering, rock mechanics, so when someone needs a tunnel engineer, they really need a suite of skills. And that’s what we provide.”

Incorporated in 1956 by J. Donovan “Don” Jacobs as a resource for contractors, Jacobs Associates has carved a niche as a tunneling specialist both in design and construction management. The firm has branched out from its roots as an engineer for contractors to provide services for owners as well, but the company honors its contractor heritage by delivering designs with constructability in mind.

The firm, headquartered in San Francisco, forged its reputation on the West Coast, but has spread across the country and has worked on projects in Australia, Asia, Canada and Puerto Rico. Jacobs Associates has been involved in some capacity on many of today’s high-profile tunneling projects, including the Arrowhead East and West tunnels in Los Angeles, the Portland West Side and East Side CSO projects, and the Brightwater project in Seattle.

Roots in the Underground

As a young civil engineering graduate in the heart of the Great Depression, Don Jacobs was forced to take work wherever he could find it. And in 1934, that was the Fort Peck Dam in eastern Montana. After earning his degree from the University of Minnesota in 1934, Jacobs landed a job as a truck driver on the dam site and eventually worked his up to engineering duties for the joint venture contractor of Mason and Walsh. Over the next two decades, Jacobs worked for Walsh on projects including the Queens-Midtown Tunnel and the Delaware Aqueduct, and eventually several dams and tunnels in the western United States as Walsh’s district engineer in San Francisco.

In 1954, Jacobs was appointed chief engineer of two dams and 15 miles of large tunnels on the landmark Snowy Mountains Scheme, a hydroelectric project in Australia, for the joint venture of Kaiser-Walsh-Perini-Raymond. Before accepting the position, Jacobs negotiated a contract that allowed him to return to San Francisco once the project was under way so that he could start his own consulting practice.

“Jacobs Associates has always been on the leading edge, and that goes all the way back to Don Jacobs working on the Snowy Mountains Scheme,” said Mike McRae, a principal who has been with the firm for 14 years. “It was in that project that rock bolts became recognized as a viable means of support for civil projects. Before that, the mindset was to use steel sets, so it was really a shift in thinking.”

In mid 1955, Jacobs set up shop as a consulting engineer, working with Walsh as a client, and on Dec. 7, 1956, after bringing aboard a core group of engineers, Jacobs Associates was incorporated. One of the early hires was Jim Wilton, who worked with the firm for nearly 40 years, including roles as president and chairman.

After the company’s founding, Jacobs continued to make a name for himself as an innovator by providing equipment and design solutions. One noteworthy development was the Jacobs Sliding Floor, a self-propelled trackway system that increased...
efficiency for drill-and-blast tunneling, which was the predominant form of rock tunneling. At the time, contractors used rail-mounted drill jumbos, mucking machines and muck cars, and the patented Sliding Floor offered faster mucking and improved accuracy and safety.

Through the late 1950s and 60s, the company continued to expand and pick up heavy civil projects including dams, and sewer, water and transportation tunnels in Australia, Pakistan, Nigeria, Liberia, Venezuela, the United States and Canada. In the 1960s, construction of the Bay Area Rapid Transit (BART) subway system in San Francisco formed a significant part of the history of Jacobs Associates. The firm performed several early estimating and feasibility studies for the project designers, and later was retained by contractors for excavation support design on Embarcadero Station, Powell Station, Civic Center Station, Oakland City Center/12th Street Station, Berkeley Station and Ashby Station. Value engineering studies were also performed for contractors on the line section from 24th St./Mission to Glen Park, and the Oakland 'Wye.'

The construction of the Washington (D.C.) Metropolitan Area Transportation Authority (WMATA) subway system beginning in the 1970s further added to the company’s reputation as a leader in underground technology as Jacobs Associates participated in 24 contracts and conducted a major research study on cut-and-cover construction for subways for the U.S. Department of Transportation.

The Company Today

When Don Jacobs started the company, the focus was on providing engineering services for contractors. After all, Jacobs spent his formative years as a professional engineer working for contractors. But the focus expanded beginning in the 1970s to primarily contractor design, but there was an interest in diversifying our portfolio and becoming more efficient. By having a mix of long-term and short-term jobs, we are able to diversify our portfolio and become more efficient.

However, the firm has no intention of ever losing sight of its roots as a service provider for contractors. “That’s an important part of the business because it helps our staff learn how contractors look at things,” Edgerton said.

The claims department also helps staff hone their craft. Although the firm prefers non-tunnel related claim work to avoid potential conflicts of interest, claims (the only company business that is not solely focused on the underground) can show how the

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Six Tips for Planning a Successful Tunnel Project

1. Don’t be constrained by a budgetary estimate —
   Many times owners will do a conceptual design based on limited investigation. In some cases the conceptual estimates are woefully low, which means that they have to either accept that it’s going to cost more or that the scope of the project has to be modified? Owners have to understand that preliminary estimates are preliminary for a reason.

2. Be willing to spend money on the geotechnical investigation —
   In the underground business the biggest risks are due to the unknown geologic conditions, so it is advisable for owners to spend money on that part of the job.

3. Verify the conceptual design and the proposed construction approach are suited to the project and the ground conditions —
   A well founded conceptual design and practical construction approach are two of the most important factors that will influence the success of a tunnel project.

4. Most big tunnel jobs benefit from a risk analysis —
   A quantitative risk analysis allows planners to evaluate all the risks of the projects and put a dollar value and schedule delay to those risks. It can be very useful to owners in evaluating what the potential costs are and what the delivery date is.

5. Put together a well-balanced technical review committee —
   By bringing in experienced people that have the right blend of designer and contractor backgrounds, you can have a powerful tool to economically get another review of the job.

6. Involve owner O&M and construction personnel in the design process —
   By engaging the O&M staff who will be using the end product you can customize the project design based on their requirements. Likewise, involving construction personnel in the design phase helps assure that the design is constructible and the design documents address key construction issues.

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Mike McRae

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construction process can deteriorate when things go awry.

“It’s good training because it forces you to really read the contract language and figure out what it means, what a contractor can reasonably expect it to mean when he bids the job and whether he is entitled to money if something happens on a job,” Edgerton said. “We also work on claims for both contractors and owners so that we see both sides of the issue.”

The design portion of the company comprises the largest area of business, accounting for about 65 percent of the company’s revenue. Construction management comprises about 25 percent, while claims accounts for the remaining 10 percent.

A Growing Market

Over the last 10 years, Jacobs Associates has grown five-fold while more than doubling its staff. Since 1996, the company’s revenues have increased from $5 million to nearly $25 million in 2006. Staff has gone from just less than 50 to more than 100 in that same time span.

“He water and wastewater tunnels have been and probably will always be an area of big growth, particularly in the western United States,” said John Caulfield, a principal and chief operating officer. “There is an ever-expanding population and aging existing infrastructure, and increasingly we’re finding that the tunnel solutions are coming forward as the preferred solution because of decreased environmental or community impacts.

As an example, Caulfield cites the Bay Tunnel, a new project the firm is designing for the San Francisco Public Utilities Commission. “In the case of the Bay Tunnel, the commission needed to construct a new pipeline through a wildlife refuge with endangered species, so the tunnel option was the preferred solution because it avoids impacts,” he said. As a result, the Bay Tunnel is being designed as a TBM-bored tunnel, which would mark the first bored tunnel underneath San Francisco Bay.

He added that improved technology has led to a decreased cost for tunnels. “The technology has improved so much. It’s advanced to the point where tunnels have become really cost effective in many cases so that owners are looking more toward the tunneling and underground solutions.”

The strong market has allowed most of Jacobs Associates’ growth to occur organically, but the firm recently completed its first acquisition. In spring 2007, Jacobs Associates acquired Milbor-Pita & Associates, a company that specializes in geotechnical and rail tunnel engineering.

“Growth by acquisition is not really part of our strategy, but we saw this as a good opportunity to move into a market segment that we didn’t have a large presence in,” Edgerton said. “With the acquisition, we are now better positioned to serve the railroad markets because of the contacts that Milbor-Pita has established.”

To date, the bulk of Jacobs’ Associates’ activities have been in the water/wastewater segment, which comprises about three-fourths of the company’s design revenues. Transportation tunnels constitute the other quarter.

The firm also recently announced the opening of offices in Boston and Melbourne, Australia, complementing the existing West Coast offices in Seattle, Portland, San Francisco, Las Vegas, Los Angeles and San Diego.
Edgerton cites an increase in work in Canada, as well as ongoing and planned work along the East Coast and in the Midwest, as additional drivers for growth in the company.

Forging Ahead

Jacobs Associates has been valued for its technical expertise, which can be seen on two design projects on which the company is currently involved—the Brightwater project for King Country, Wash., and a new ocean outfall for Los Angeles County.

“As time goes on we’re seeing greater and greater challenges for tunnel construction, particularly in TBM’s and the ability to handle difficult ground conditions and high ground water pressures,” said Steve Klein, a principal and chief financial officer with Jacobs Associates. “The Brightwater tunnels push the state of the art in that they have to deal with 7 bars of external ground water pressure. The Los Angeles ocean outfall project could be up to the 10 bar range, which is about the maximum that has been done. So, we need to work with the contractors and manufacturers to figure out how to build projects in areas that haven’t been done before.’’

Klein added, however, the new technologies are more readily accepted than they were in the past. “There has always been a barrier to introducing new technology, but we’re starting to see owners applying new technology when there is a need,” he said. “One of the reasons is that owners and engineers are being more open-minded about the application of a risk management philosophy, which has been a significant development in the industry. Now you can take a quantitative look at the risks as well as risk mitigation approaches in relation to economic or schedule benefits.”

Klein cited the Portland Westside CSO as an example of an owner using innovative technology after performing risk analysis. In that case, the use of a large-diameter slurry tunnel boring machine was a first in the United States, but since the technology was thought to be well-suited to the conditions, the owner opted for a qualifications-based procurement method to ensure that the contractor had experience with slurry tunneling.

“The owner recognized that they were considering an unprecedented project, so rather than go with the traditional low-bid selection for a specialized tunneling method, they went a different route to mitigate the risks. There are other owners now who are opening their eyes to other technologies and contract delivery methods.”

To keep abreast of the latest developments in the field, Jacobs Associates personnel are active in industry associations—including the Underground Construction Association of SME, American Rock Mechanics Association, the Water Environment Federation, the Transportation Research Board and others.

But despite the new technology, expanded geographic base and the burgeoning market, there are some constants you can expect at Jacobs Associates.

“We are focused on tunneling,” McRae said. “There aren’t many companies out there—certainly no companies our size—that are focused as closely on tunneling. We live and breathe the stuff. “We have every discipline, every aspect of tunneling covered in house, and the one thing that we always remember is to think about constructability in all our designs. We think about the final process and the sequence you need to go through to get there. We really try to think like contractors in how to build things.”

In a city as committed to a healthy lifestyle as Portland, Ore., a major overhaul dedicated to cleaning up the city’s main waterway (the Willamette River) is practically a given. In any other city, a 20-year, $1.4 billion program designed to reduce combined sewage and stormwater overflow by 94 percent might appear overly ambitious. But in Portland, it just seems to come with the territory.

Work on the project began in 1993 with general improvements to the sewer system. In 1999, the combined sewer overflow (CSO) program got under way, diverting streams that once flowed into the sewer system back into the Willamette River, upgrading pump stations and installing a CSO tunnel on the western side of the river from the Marquam Bridge to the Swan Island pump station. Now in its 16th year, the project has reached its final stage: the construction of an East Side CSO tunnel, which will mirror its western counterpart, running from the intersection of Southeast 17th Street and McLoughlin Boulevard to the Swan Island pump station.

To service the six-mile-long, 26-ft diameter tunnel, seven shafts will connect existing overflow pipes and provide above ground access. One shaft, the Opera Shaft (named because it sits on the property of Portland’s Hampton Opera Center), will serve as the main mining shaft. Not only will the shaft be the entry point for “Rosie,” the Herrenknecht slurry TBM that will dig the CSO tunnel, but it will also be the exit point for excavated materials, which will be loaded onto a barge and taken to the Ross Island lagoon. In order to prepare the shaft for its new role, contractor Kiewit-Bilfinger Berger poured a 3-ft-thick concrete lining in the 115-ft deep, 67-ft diameter shaft.

To accommodate multiple pours at different heights, Kiewit-Bilfinger Berger used 2,630-sq ft of segmented Doka Frami formwork to form the one-sided final concrete lining of the Opera Shaft.

Initially, Doka’s Top 50 system was proposed for this project. However, since...
there were only four lifts, it was important to have a system that could be assembled quickly. The 200-mm tolerance for the final concrete lining allowed for the segmental (or chored) approach required of the Frami system, which is one of the fastest assembling wall systems on the market. Doka also provided 52 D22 brackets, which also served as climbers for the Frami forms. Because the panels are lightweight, they could be easily hand-assembled into gangs on the ground, thereby reducing crane time. In addition, the forms’ modularity allowed different pour heights to be accommodated easily with the simple removal of upper panels.

According to Jon Colinares, Doka’s Account Manager, Frami was the ideal solution for this particular application because Kiewit-Bilfinger Berger had planned for differing pour heights (13.5, 12 and 6.5 ft), thereby requiring a modular solution. Furthermore, he said, because there were only four lifts, it was important to utilize a system that would be quick to assemble, allowing Kiewit-Bilfinger Berger to begin the sequence of lifts as soon as possible.

“Kiewit needed a solution that was quick to assemble, yet provided the required strength for one-sided cantilevered pours of varying heights,” said Colinares. “Doka provided Kiewit with Frami, the fastest assembling wall system on the market. In addition, Doka’s D22 system provided Kiewit with a lightweight system capable of withstanding the relatively high one-sided pour pressures.”

According to Mike Hanley, Kiewit’s general superintendent, the fast assembly was extremely beneficial, proving to have immeasurable timesaving benefits.

“The forming system worked very well for us,” said Hanley. “The crews could raise and set them in five shifts. Overall, this meant that it took only 90 days to form the final lining of the huge shaft.”

Another challenge was coordination of the design of the support members and loads imposed by Doka’s D22 brackets within the tunnel eye, which is composed of steel beams with spacers to account for the radius of the D22 supports. Doka’s engineering team worked together with Kiewit’s engineering team to come up with an efficient solution around the tunnel eye.

“Typically, to climb forms, we have concrete to bear on from the previous lifts. Since there was no concrete at the opening of the tunnel eye, we suggested placing horizontal beams that went across the tunnel eye so that our D22...
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brackets could have something to bear against for the second climbing lift. Doka USA provided Kiewit with the imposed point loads needed to support the D22 brackets,” stated Doka’s Project Manager, Pietro Da Sacco.

Once work was completed this spring, a tower crane loaded “Rosie” into the bottom of the shaft, where the machine was assembled and began working to clear the tunnel north toward the Port Center Shaft. There, it will be retrieved and refurbished before being lowered again through the Opera Shaft to begin moving south toward the McLoughlin Shaft.

Colinares stated that keys to success on this project were close collaboration and the effort Kiewit and Doka made from the very beginning to establish requirements. With a clear set of requirements, Doka was able to provide the most suitable and efficient system for the job without much re-engineering. With the successful renovation of the Opera Shaft completed, the project remains on schedule both for its completion date of 2011 and its ultimate goal of creating an even healthier city.
In its basic format, the typical termination for convenience clause in construction contracts and government contracts gives the project owner the right to unilaterally terminate the contract while at the same time limiting the project owner’s damages that otherwise would be incurred. Termination for convenience has nothing to do with the contractor’s performance, which is the subject of the termination for fault (or default) clause. An owner exercising the termination for convenience clause, is basically saying, “Sorry, I no longer want the item I contracted for; I will pay you your cost to date, and you go your way and I’ll go my way.”

The typical clauses usually provide that the contractor will be paid the cost of performance and profits up to the time of the termination for convenience, but the contractor usually does not receive any compensation for the remaining work the contractor did not perform, meaning no recovery of lost profits. As discussed below, the American Institute of Architects, a major source for standard form construction contracts, does provide for the recovery of lost profits for the remaining work not yet performed.

With respect to construction contracts, government procurement contracts and most other contracts, even without a termination clause, a party has the power (but not the right) to unilaterally terminate a contract. Such unilateral termination without justification, however, constitutes a breach of contract. Except with the sale of certain unique items, such as real estate or a unique watch or antique, a court will not force a party to perform a contract. Therefore, a party may breach the contract and/or walk away from a contract, but must pay the resulting damages. Normally, when one party breaches a contract by unjustifiably terminating the contract, the breaching party must pay the non-breaching party the lost profits that the non-breaching party would have otherwise earned had the contract not been terminated. The termination for convenience clause gives the owner/government the power to unilaterally terminate the contract with the benefit of not having to pay the contractor its lost profits on the work remaining at the time of the termination.

History of Termination for Convenience

One court described the history of the termination for convenience as follows: “The concept that the government may, under certain circumstances, terminate a contract and settle with the contractor for the part performed dates from the winding down of military procurement after the Civil War. It originated in the reasonable recognition that continuing with wartime contracts after the war was clearly against the public interest. Where the circumstances of the contract had changed so dramatically, the government had to have the power to halt the contractor’s performance and settle.” [Torncello v. United States, 681 F.2d 756, 764 (Ct. Cl. 1982)]

Termination for convenience clauses first appeared during World Wars I and II, as drafters of government contracts foresaw similar situations as arose after the Civil War. After World War II, termination for convenience clauses were first incorporated into peace time contracts.

When Can Termination for Convenience Be Invoked?

Can an owner or the government terminate a contractor for any reason whatsoever? What if right after a contract is award-
ed, the owner/government is approached by a new contractor that can perform the work for significantly less money? Can the owner/government terminate the contract for convenience and advertise a new bid so the less expensive contractor performs the work? What if the contracting officer is a Red Sox fan and the contractor is a Yankee fan? Can the contracting officer terminate the contract for convenience?

The answer to these questions in most jurisdictions appears to be, “no.” It is a general proposition of contract law that contracts cannot be “illusory.” A contract is illusory if there is no real enforceable obligation between the parties. If one party can breach the contract and walk away without any consequences, then courts deem that to be no contract at all. Courts often will infer reasonable conditions to make an otherwise illusory contract enforceable by implying conditions such as no termination for bad faith.

With respect to federal contracts, the federal case law has evolved in its analysis of the government/owner’s right to exercise the clause. At one point, the pendulum swung to the extreme so that the government could terminate to get a better price. [Colonial Metals Co. v. United States, 204 Ct. Cl. 320 (Ct. Cl. 1974).] The pendulum then swung back to the other extreme with the concept of “changed circumstance,” so termination was only justified when a change in the project’s circumstances arose. [Tornello v. United States, 231 Ct. Cl. 20 (Ct. Cl. 1982).] The pendulum in federal contracts cases now rests somewhere in the middle. Termination for convenience is generally allowed except when exercised in bad faith. [Krygoski Constr. Co. v. United States, 94 F.3d 1537 (Fed. Cir. 1996).] The Federal Courts recognize the public policy that favors giving contracting officers more leeway to terminate when circumstances change so that the public’s interests are best served. If, however, the project’s conditions did not “materially” change so as to justify a termination for convenience, the Courts may imply bad faith. The Courts also recognize that public interests are presumed to act “conscientiously” and not in bad faith.

**Standard Contract Provisions**

The federal government’s Federal Acquisition Regulations (FARs) provide a typical framework for contract termination provisions. The FARs standard contract, provision 52.249-2, provides: “The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government’s interest.” Under the FARs, costs a contractor is entitled to receive include:

- The contract price for completed services accepted by the Government not previously paid for
- The costs incurred in the performance of work terminated with profit, including initial costs and preparatory expenses
- The cost of settling and paying termination settlement proposals under terminated subcontracts
- Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data
- Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

Interestingly, the FARs provide that, “if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit ... and shall reduce the settlement to reflect the indicated rate of loss.”

Under the American Institute of Architecture (“AIA”), AIA 201-1997, General Conditions, Section 14.4.3, when an owner terminates a contractor for convenience, that contractor is “entitled to receive payment for work executed ... along with reasonable overhead and profit on the work not executed.” This unusual and owners using the AIA contract must be aware of the consequences of exercising the termination for convenience clause.

The pendulum then swung back again. Termination for convenience is generally allowed except when exercised in bad faith. [Krygoski Const. Co. v. United States, 94 F.3d 1537 (Fed. Cir. 1996).] The Federal Courts recognize the public policy that favors giving contracting officers more leeway to terminate when circumstances change so that the public’s interests are best served. If, however, the project’s conditions did not “materially” change so as to justify a termination for convenience, the Courts may imply bad faith. The Courts also recognize that public interests are presumed to act “conscientiously” and not in bad faith.

A contract is illusory if there is no real enforceable obligation between the parties. If one party can breach the contract and walk away without any consequences, then courts deem that to be no contract at all.

**Conclusion**

Termination for convenience is usually a standard part of construction contracts. It has nothing to do with the contractor’s performance, but is usually invoked when circumstances change so as to justify a new advertisement for bids or termination of the project. Generally, the termination for convenience clause limits recovery to profits and expenses for the work performed, with lost profits generally not allowed. Disputes may arise if the owner does not have a valid reason to trigger the clause or if the parties cannot agree on the price adjustment resulting from a termination for convenience.

Peter Kutl, Esq., and Karl Silverberg, Esq., are attorneys with the firm of King & King, LLP in New York and focus their practice on serving the construction industry. More information is available at their Web site: www.king-king-law.com.
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In it, you will find a breakdown of the products and services available in the market, broken out by state. There is also an alphabetical listing of companies with contact information and a listing of their respective offerings. The companies represented comprise contractors, engineers, manufacturers, suppliers and other professional services — anything you might need to get a project designed and constructed.

Although we focus on the North American market, the Directory is not limited to companies based in the United States, Canada and Mexico. We welcome overseas companies to participate as the tunneling community transcends national borders.

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E-mail: bcc@brookvilleequipment.com
Locomotives/Haulage Equipment, Other — SME

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E-mail: mhickman@ccidrillpipe.com
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Web Site: www.canclay.com
Pipe Jacking — ASCE

Cellular Concrete LLC
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Fax: 610-398-7050
Web Site: www.cellular-concrete.com
E-mail: info@cellular-concrete.com
Grout, Soil Stabilization — UCA of SME, SME

Central Mine Equipment Co.
George Burnhart, Manager Business Development
Central Mine Equipment Co.
E-mail: info@cmeco.com
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Drilling Consumables, Drills & Rigs, Grout

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San Francisco
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<td>VMT GmbH</td>
<td>Andre Bregler, Marketing</td>
<td>Stegweisstr. 24, Bruchsal, 76646 Germany</td>
<td>Web Site: <a href="http://www.vmt-gmbh.de">www.vmt-gmbh.de</a></td>
<td>E-mail: <a href="mailto:info@vmt-gmbh.de">info@vmt-gmbh.de</a></td>
<td>Survey/Guidance Instrumentation, Engineering/Design, Consultant, Tunnel Livings, Tunnel Support, Pipe Jacking, Tunnel Boring Machines, Communications, Roadheaders</td>
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<td>W. L. Hailey &amp; Co. Inc.</td>
<td>Randy Houston VP</td>
<td>800 S. Main, Pleasant Grove, UT 84062</td>
<td>Web Site: <a href="http://www.westcon.net">www.westcon.net</a></td>
<td>E-mail: <a href="mailto:mellis@westcon.com">mellis@westcon.com</a></td>
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<td>Westcon Microtunneling Inc.</td>
<td>Mike Ellis, President</td>
<td>84062 Nashville, TN 37204</td>
<td>PO Box 40646</td>
<td>E-mail: <a href="mailto:rhouston@wlhailey.com">rhouston@wlhailey.com</a></td>
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<tr>
<td>Wholesale Mine Supply LP</td>
<td>Joe Dilibridge, Sales Manager</td>
<td>338 Main St., North Huntington, PA 15642</td>
<td>Ph: 724-515-4993</td>
<td>Fax: 724-866-7582</td>
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<tr>
<td>Willco Far West</td>
<td>Frank Wilden, CEO</td>
<td>3435 W. 500 S., Salt Lake City, UT 84104</td>
<td>PO Box 1208</td>
<td>E-mail: <a href="mailto:contact@willcofarwest.com">contact@willcofarwest.com</a></td>
<td>Tunneling/Large Diameter, Pipe Jacking, Drilling, Microtunneling, Auger Boring — NUCA</td>
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- Concrete/Grout Pumps
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- Pipe-HDPE
- Pipe-Polymer Concrete
- Pipe-PVC
- Pipes
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- Large Diameter Shaft Drilling
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- Microtunneling
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Upcoming Projects

CALIFORNIA

Alameda County, Calif.
New Irvington Tunnel
San Francisco Public Utilities Commission

Constructing a tunnel parallel to the existing Irvington Tunnel, in Alameda County, Calif., will allow the San Francisco Public Utilities Commission to decommission the Irvington Tunnel for inspection and rehabilitation to improve the water delivery reliability. Located between the Calaveras and Hayward Fault Zones, the mixed-face tunnel is made up of interbedded layers of sandstone and shale, with several smaller fault zones. Adding more complications, the tunnel offers 700 ft of cover and high hydrostatic head with potential water inflows up to 1,000 gpm.

An 18,200-ft long excavation is proposed with the installation of a 10-ft inside diameter concrete liner. There will also be construction of a new access road to the Irvington Portal and a new Portal within the piping manifold. Additional isolation valves and connections to the Bay Division Pipelines, originating from the Irvington Tunnel site, will also be installed.

The total construction cost for the project is estimated at $154 million. The bid date has been proposed for March 2009, with an estimated construction start around August 2009.

Berkeley-Orinda, Calif.
The Caldecott Tunnel Project
California Department of Transportation

The Caldecott Tunnel connects Alameda and Contra Costa Counties via State Route 24, and The Caldecott Improvement Project proposes to alleviate traffic congestion along Route 24 by constructing a fourth bore of the Caldecott Tunnel. The goals of the project are to improve mobility for motorists and emergency crews along State Route 24 via the Caldecott tunnels, reduce delays and improve travel times, eliminate the need for daily tunnel lane reversals and merges, enhance safety for the traveling public and Caltrans maintenance workers and respond to Regional Measure 2 and Contra Costa County Measure J.

The project is fully funded with a total production cost estimated at $420 million. The design phase will be completed in summer 2008. Construction is planned to begin in the summer of 2009, with a completion in 2013 or 2014. It’s proposed that excavation will be completed primarily by roadheader with around-the-clock activity from both sides. If the construction is limited to one side, the project’s duration will be increased by 14 months, the cost will be increased by $45 million and risks for serious delays will increase. A sound-isolating and sound-absorbing temporary wall will need to be built — 1,000 ft long and 35 to 40 ft high.

San Francisco, Calif.
Bay Tunnel
San Francisco Public Utilities Commission

Down by the Bay, the Bay Tunnel Segment of the new Bay Division Pipeline (BDPL) No. 5 will extend 5 miles from Newark. From there, it will cross under the San Francisco Bay and adjacent marshlands, ending in Menlo Park, Calif. Under the San Francisco Bay, it’s a mix of sandy and silty clays of the San Antonio Formation, with one 500-ft section through the Franciscan Formation bedrock.

Using a pressurized-face tunnel boring machine, the construction of the 26,200-ft long tunnel will utilize bolted and gasket, pre-cast concrete segmental lining and the installation of a 9-ft inside diameter welded steel pipe final liner. Two permanent shafts will also be constructed — one 58-ft in diameter and 129 ft deep and one 28-ft in diameter with a depth of 83 ft. It’s proposed that these will be constructed using either slurry wall or caisson methods.

The total construction cost is estimated at $280 million. The bid date is proposed for August 2008, with an estimated construction start in January 2009.

San Mateo County, Calif.
New Crystal Springs Bypass Tunnel
San Francisco Public Utilities Commission

Beginning from the south and mostly through bedrock contained within the Franciscan Complex, classified as Melange and sandstones, the New Crystal Springs Bypass Tunnel will provide system redundancy for the vulnerable Crystal Springs Bypass Pipeline and improve delivery reliability. The tunnel passes under San Mateo Creek near the north, where potential pre-grouting may be needed to strengthen the creek bed.

The excavation will measure 13-ft in diameter and 4,200-ft long. Installation of initial pre-cast concrete segmental lining will be needed to support the tunnel excavation, in addition to the installation of additional isolation valves, vaults and connections to the existing pipelines and/or tunnel ends. The tunnel will sport an 8-ft inside diameter welded steel pipe (WSP) final liner.

The total construction cost is estimated at $57 million. The bid date will be set in April 2008, with an estimated construction start in October 2008.

FLORIDA

Miami, Fla.
Port of Miami Tunnel Project
State of Florida Department of Transportation

As Miami-Dade County’s second leading economic generator, providing 81,800 jobs, $5 billion in wages and $12 billion in economic output, according to Washington Economic Group Study, the Port of Miami needs a strong infrastructure. So, the proposed Port of Miami Tunnel (POMT) will play an integral role in improving SR-836 and I-95.

The project includes a tunnel under Government Cut, roadway work on Dodge and Winston Islands, MacArthur Causeway Bridge widening and a 42-ft tunnel boring machine, with an estimated year of excavation — six months in each direction. The Port of Miami Tunnel is being procured as a public-private partnership.

Under the POMT Concession contract, the concessionaire will finance the project based on the expectation of earning annual “availability payments” once the project opens for service. Essentially these will be payments from FDOT, contingent upon actual lane availability and service quality. Local partners in Miami-Dade
County are committed to share 50 percent of the capital cost of the project.

The estimated construction cost of the tunnel is $1 billion.

MARYLAND

Prince George's/Montgomery County
WSSC Bi-County Tunnel
Washington Suburban Sanitary Commission

The study phase of the Bi-County Water Main project was completed in January 2006, and the design phase is continuing through 2007 with the construction phase planned to begin in mid 2008 and last three to four years, into late 2011. The tunnel itself will be approximately 100 to 260 ft below the finished grade, and requires a tunnel boring machine to cut through the bedrock.

Black and Veatch is the prime design engineer, while Jacobs Associates and EA Engineering, Jacobs Engineering, and Hatch Mott MacDonald are on the short list of primary construction management firms. The design engineer will be providing technical review and performing miscellaneous services during construction. The WSSC is in the process of selecting an engineer to provide inspection, quality control and other services during construction. The estimated construction cost is between $115 million and $135 million.

NEW YORK

New York
No. 7 Line Extension
Metropolitan Transportation Authority

To redevelop the Hudson Yards area of Midtown West, the Metropolitan Transportation Authority proposed construction and operation of an extension of the No. 7 line. The MTA agreed on a $2.1 billion expansion for the No. 7 train as part of the development of the MTAs rail yards on the West Side of Manhattan. Taking the subway further west from its current finishing point at Times Square, continuing along 41st Street and 11th Ave and then south to a new terminal at 34th Street and 11th Ave.

Construction of the No. 7 Subway Extension would be accomplished by a variety of mining methods, including the use of a tunnel boring machine, conventional excavation, cut-and-cover, and drill-and-blast.

The contract to dig the tunnels for the expansion is estimated at $1.14 billion. The contracts will be bid and awarded in 2009.

LOOKING AHEAD

- **Muni Tunnel** (San Francisco, Calif.)
- **Las Vegas Outfall** (Las Vegas, Nev.)
- **Las Vegas Intake** (Las Vegas, Nev.)
- **University Link** (Seattle, Wash.)

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12-14  International Symposium on Tunnel Safety and Security, Stockholm
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20-22  International Symposium on Underground Freight Transportation (ISUFT), Arlington, Texas
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22-24  International Symposium on Sprayed Concrete - Modern Use of Wet Mix Sprayed Concrete for Underground Support, Lilleshammer, Norway
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7-11  2008 North American Tunneling, San Francisco
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23-28  ITA-AITES World Tunnel Congress, Budapest, Hungary
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14-17  2009 RETC, Las Vegas
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June 2010

12-16  North American Tunneling, Portland, Ore.
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Dispute Review Boards: More Than Just Dispute Resolution

Available Alternative Dispute Resolution (ADR) methods such as mediation, arbitration and Dispute Review Boards (DRBs) provide a welcome alternative to litigation for the resolution of disputes. DRBs, however, can provide a unique opportunity for “dispute avoidance” that is not possible with the other ADR methodologies. Owners and contractors alike have stated that, in their opinion, the greatest value of DRBs is in their ability to prevent “issues” from ever becoming “disputes.” Unfortunately, the benefits of such dispute avoidance are impossible to quantify in either dollars or time as the savings are in “avoided costs.”

A traditional DRB is composed of an unbiased panel of three experienced and recognized experts in the type of work being undertaken that is familiar with the contract documents, that regularly visit the site and meets with the parties throughout construction, and that monitors progress through weekly or monthly reports. As such, a DRB is in a unique position to consider “issues” before they become full-blown “disputes.” Through discussion of these issues and proactive questioning from the board before the parties become entrenched in their positions, the issues are often resolved without having to resort to dispute hearings. Consequently, a truly successful DRB may never need to conduct a hearing.

In January 2007, the Dispute Resolution Board Foundation (DRBF) published its revised manual, “DRBF Practices and Procedures,” for DRBs and DABs (Dispute Adjudication Boards) that incorporated “lessons learned” over the past 10 years, since publication of the original “Construction Dispute Review Board Manual” by McGraw-Hill. (This revised manual is available in hard-copy through the DRBF or on the Web site at www.drb.org.) One revision was the elimination of the term “fair” throughout the revised manual because some DRB members had interpreted the use of this term to mean the board was obligated to ensure “fairness” in their recommendations or decisions, even if it meant ignoring some terms of the contract. In actuality, many contracts contain seemingly unfair terms, however, the successful contractor has accepted these terms in signing the contract, perhaps with the added risk reflected in the bid price. The revised manual emphasizes that the DRB does not have the authority to alter the terms of the contract.

Owners and contractors alike have stated that, in their opinion, the greatest value of DRBs is in their ability to prevent “issues” from ever becoming “disputes.”

A further revision is the addition of “advisory opinions” to the repertoire of available approaches to dispute avoidance and resolution through DRBs. Unlike the more formal dispute hearing process, mutual agreement by both parties to the contract is required in order to request an advisory opinion from the board. The parties are encouraged to seek advisory opinions before they become entrenched in their respective positions. The advisory opinion process is quick and easy and is intended to get the board’s initial opinion on the entitlement issues of the dispute, based on fairly cursory information presented by each party. Based on my experience, the process involves brief oral presentations (less than an hour) by each party, followed by questions from the board, a brief caucus by the board to discuss and prepare its opinions, and an oral reporting of the board’s opinion on the same day.

If the advisory opinion process does not lead to resolution of the dispute, either party may request a regular dispute board hearing on the matter. The subsequent hearing process provides the board with more complete information on the dispute and more thorough presentations of the parties’ respective positions. The board then considers only the more comprehensive information provided in its evaluation of the dispute (disregarding any prior advisory opinions) and prepares a written report containing its findings and recommendations, with supporting rationale.

Advisory opinions have been used on many projects to date with outstanding success; I am aware of only one dispute that went on to a subsequent DRB hearing following an advisory opinion. This remarkable success may reflect any or all of the following:

- A better understanding of respective positions based on open and honest communication and board questioning;
- Less complex issues that can be conveyed in short briefs to the board;
- A mutual desire to end the dispute at this early stage; or
- A reconsideration of the merits of the respective positions by the parties based on the board’s initial opinions.

In any event, the results of advisory opinions to date are extremely impressive and, in my opinion, should always be considered in the early stages of a dispute that is or may be developing between the parties.

Peter M. Douglass is an independent consulting engineer on underground construction, has served on numerous DRBs, and is immediate past president of the DRBF. He can be reached at pmdouglass@aol.com.
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