

FRONTIER-KEMPER CONSTRUCTORS, INC.

CROSSCUT

Chinatown Station

FKCI's Heavy Civil Division Prepares for
NATM/SEM Excavation and Initial Support
of the Underground Cavern



Frontier-Kemper Safety



The Courage to Change

I recently completed the statistical portion of our monthly report and was somewhat surprised. As a Company, Frontier-Kemper currently has incident rates which are equal to or better than the national average for our industry. This is an accomplishment that we all share in and take responsibility for.

It's also not near good enough.

The effectiveness of our safety systems and the measure of our safety culture is dependent upon each of us as individuals and our commitment to working safely. Simply put, safety lives in behavior we display and decisions we make when we know that we're not being watched. This is often the area that possesses a threshold moment for us—take a short cut, or have the courage to say no.

The One You feed

Nothing causes damage to a safety culture more quickly and completely than a poor attitude. Avoid pitfalls such as bad mouthing, constant complaining, and other anti-positive activities. All of us are exposed to negative and positive influences in our work and home lives. The influence you feed is the influence that will grow. Be the champion of the positive.

Begin With the End in Mind

Take complete advantage of all safety programs at your project. Stretch and Flex, Job Hazard Analysis, and Work Area/Mobile Equipment Inspections are all programs designed to assist you to begin your daily tasks with the end in mind—safe completion of your job.

Commitment

All Frontier-Kemper Projects currently have a "Why I Work Safe" bulletin board. Stocked with photographs provided by project personnel, these boards are positioned at the work zone entrance to remind us of our individual commitment to work safe. Please insert your favorite photo of your reason to return home safely. Let that image serve as a reminder when you are faced with a threshold moment. Have the Courage to Change.

"Safety First, Last, and Always"

George W. Zugel, CMSP
Corporate Safety Director

Letter from the President



Dave Rogstad – President & CEO

Two years ago Frontier Kemper became a Tutor Perini Company and with that ownership change the decision was made to establish our executive headquarters in Sylmar, California. In 2012 we broke ground on a new office building and just a couple of months ago we moved in. The facility in Evansville, Indiana will continue to service our Mine Development and FKC-Lake Shore Divisions. The Civil Division is headquartered in Sylmar. I am sure that Bruce Kemper will crack a smile to see that headquarters are now in Los Angeles, his home and the home of Kemper Construction.



Frontier-Kemper Constructors' new Headquarters Office located in Sylmar, CA.

In addition to moving our headquarters to California we have picked up some California work. We had last worked in Los Angeles in 2007 when the Eastside Light Rail Transit project with MTA was completed. Our newest project involves the construction of an underground light rail station in the Chinatown neighborhood of San Francisco and is our feature story in this issue. We will be a subcontractor for our parent company, Tutor Perini Corporation, and we will be responsible for the SEM excavation and support of the underground excavations.

In this issue we are also introducing our newest raise drill which will go to work immediately this fall. I last wrote about the uncertainty in the mining market that we witnessed in 2012. We have seen that stabilize quite a bit in 2013, especially in the coal mining market. Higher prices in natural gas led to increased production for coal powered generation of electricity and the growth (albeit slow and fitful) in the world economy led to a continued increase in exported coal. As a result, we continue to do our part to meet the demand of mine operators around North America for our development and equipment services. One area that continues to grow for us is our Field Services group and the increasing requests for preventive maintenance - this is another of our stories in this issue.

Dave Rogstad
President & CEO

People, Projects, & Ingenuity

Mining Division

Herrenknecht RBR-600



FKCI's new Raise Drill—the Herrenknecht RBR-600. The first project is set to begin in October in Waverly, KY.

In an effort to upgrade and expand our fleet of raise drills, Frontier-Kemper (FKCI) recently purchased a new raise boring machine from Herrenknecht AG of Germany. With a great deal of research performed, and meeting with nearly every manufacturer of raise drills, the Herrenknecht RBR-600 was deemed the best fit to advance FKCI's service offerings to our Mining and Heavy Civil clients.

Built to FKCI's specifications, the RBR-600 offers the latest technologies in raise boring. Advanced rod handling and wrenching systems are two examples of advancements that will help lead to greater productivity and increased safety factors in these areas. State of the art data logging on operational systems can be transmitted to remote offices for daily analysis of production and drilling statistics. This will provide improved information for remote troubleshooting and timely repair.

Capable of 2,248,000-lbs of thrust and 406,000-ft. lbs. of torque, the RBR-600 packs quite a punch; boasting nearly twice the power of any machine

in FKCI's existing fleet. The forward thinking design of the RBR-600 allows for easy upgrades of mechanical and electrical components to expand the machine's capability to provide up to 541,000-ft. lbs. of torque. Due to the large diameter reams that the new machine is capable of pulling, the RBR-600's base had to be designed to support the machine and its 2.3 million lbs. of thrust over a 30-ft. span. Designed by FKCI's engineers, the base not only achieves this requirement, but it was also designed with ease of mobilization, demobilization, and transport in mind.

The RBR-600 enlarges FKCI's ability to ream larger diameter and deeper shafts. It is this type of cutting edge technology, combined with the expertise of the professionals at FKCI, that allow us to maintain our position as the leader in pulling deep, large diameter raises.

Civil Division

Sitka Blue Lake Expansion Project

Blue Lake Tunnelers [a JV of J.S. Redpath Corp. (Redpath) and FKCI] has been making steady progress at the Blue Lake Expansion Project throughout the early part of 2013.

In January 2013, our crews began mobilizing in the small fishing town of Sitka in southeastern Alaska to build a Surge Shaft and Access Adit, Intake Tunnel, and Drainage Tunnel at the Blue Lake Dam Expansion project (as previously mentioned in the Winter 2012 Crosscut).



FIGURE 1: Surge Shaft Access Tunnel

In early February 2013, excavation at the 400-ft. long Surge Shaft Access Adit began (shown in **Figure 1**). The JV had originally planned on excavating the Surge Shaft Access Adit near the powerhouse and the new Intake Tunnel at

the dam concurrently. Due to a delay from the general contractor in building the access roads to the Intake Tunnel, only the Surge Shaft Access Adit could begin as scheduled. While the JV waited for access to the Intake Tunnel site to be completed, we performed some additional surface blasting at the general contractor's request.

After the Surge Shaft Access was completed, the JV constructed the 350-vf Surge Shaft via raise climb with 8-ft. rounds.

At the top of the Surge Shaft (shown in **Figure 2**), our crews faced a unique challenge in getting a substantial volume of grout to the top of the shaft in such a remote area. Due to a lack of power, JV crews had to mix, by hand, 15 yd² of grout to fill the top 20 vf of annulus between the steel liner and shaft. That was 9 pallets of 94-lb cement—all mixed by paddle mixer!

In early spring of 2013, as part of raising the existing dam 80 ft., the JV constructed a 140-ft. long exploratory and drainage tunnel in the abutment of the dam. Drill & Blast excavation of this tunnel was completed in just over one and a half weeks.

In early June 2013, after access to the Intake Tunnel at the dam was complete, excavation started on the 950-ft. long Intake Tunnel and is projected to be complete in early July 2013. The Intake Tunnel has a 17% downslope, and the JV is using rubber-tired scoops to bring the rock out of the tunnel after blasting. The JV has been able to complete between 2 and 3 rounds of blasting/day, with each round excavating 12 ft. of tunnel. Upon completion of the Intake Tunnel, a 100-vf Gate Shaft will be raised from the Intake Tunnel.

The JV expects to complete the first phase of this project by the end of July 2013 (ahead of schedule). Excellent communication, coordination, and favorable ground conditions have assisted in the speedy completion of this project. No shotcrete needed to be installed in the tunnels and very little rock bolting was required (3 to 4 rock bolts every 5 ft.).

Crews are scheduled to come back to the project in August 2014 for the Phase 2 tie-in works during a scheduled outage of the dam at that time.

There have been no workplace injuries or incidents on this project.



FIGURE 2: Top of Surge Shaft



FIGURE 3: Transporting the Shaft Liner to the Top of the Surge Shaft



FKC-Lake Shore Division

Preventive Maintenance Program

We have all heard the old saying. “If it ain’t broke, don’t fix it.” This mentality can be dangerous when we’re talking about critical systems that are required to produce revenues – like a mine operator’s Production and Service Hoists. The cost of downtime for a mine operator is tremendous. It’s for this reason that FKC-Lake Shore is taking the opportunity to educate and partner with our clients to change the way hoist maintenance is perceived. Our goal is to help them see that regular maintenance on hoists will increase the life of the system, reduce repairs costs, and significantly drive down the costs associated with downtime. In short, FKC-Lake Shore wants to help our customers recognize the cost savings of “keeping the ore running” through preventive maintenance.

Mine operators count on FKC-Lake Shore equipment to function safely and reliably, yet many companies neglect to perform required preventive maintenance tasks at the scheduled interval. Seeing the need to educate and partner with our customers to improve their preventive maintenance plans (PMP), John Isaacs, FKC-Lake Shore Field Services Manager, created a new PMP service offering designed to extend the life of systems and minimize unexpected downtime.

The program is based on MSHA regulations and industry best practices to give owners confidence that the equipment is operating efficiently, safely, and within regulations. The goal of the PMP service is to create a partnership with the client’s maintenance staff, by training them to perform comprehensive and consistent daily/weekly inspections and maintenance tasks. A PMP guide book is provided to all customers that have

existing PMP contracts with FKC-Lake Shore. All inspections and maintenance tasks performed by the client’s maintenance staff are recorded in this book, and are then audited by our experienced in-house field technicians as part of a monthly visit.

The FKC-Lake Shore Preventive Maintenance Program offers the following:

30 Day Inspections

- General inspection of system to include: Gearing, Brakes, Drums, Ropes, Switches, Motors, Cage, Pits, and Landings
- Operational checks of entire system
- Adjustments to: Brakes, Limits, and Positioning
- Lubrication of: Door Rollers, Guide Rollers, and Lilly
- Critical Spares Inventory

60 Day Inspections

- Comprehensive inspection of: Controls, Motors, Drives, Gears, Couplings, Pinions, Headframes, Sheaves, and Counterweights
- Insulation resistance (Megger) readings of motors
- Brake Load test (MSHA requirement)
- Safety-Dog test (MSHA requirement)

90 Day Inspections

- Thermal Imaging of: Electrical Systems, Motors, Gears, and Bearings
- Lubrication and Oil Analysis Sampling
- Laser alignment of: Gear, Shaft, and Sheave(s)

180 Day Inspections

- NDT: Non-Destructive Wire Rope Test and Evaluation (MSHA requirement)
- Vibration Analysis of major components
- Filter changes

Many thanks to John Isaacs and the Field Services team for developing this innovative new service offering. This is but another example of our core value of Innovation that allows us to keep ahead of the curve and provide value-added services to our customers that reduce downtime and increase efficiencies in their operations.

SAN FRANCISCO'S CENTRAL SUBWAY CHINATOWN STATION

NATM/SEM Excavation and Initial Support of the Underground Cavern

Contributed By:
ROHIT SHETTY & DARYL COFFLAND

PROJECT DESCRIPTION

The Central Subway Project is the second phase of the San Francisco Municipal Transportation Agency's (SFMTA) 3rd Street Light Rail Transit Project. Phase 1 of the project constructed a 5.1-mile light-rail line along the densely populated 3rd Street corridor. The first segment of the T Third Line opened to customers in April 2007, restoring light-rail service to the high transit-ridership area of San Francisco for the first time in 50 years.



FIGURE 1: Planned alignment for San Francisco's Central Subway extension

Phase 2: the Central Subway, will extend the T Third Line from the 4th Street Caltrain Station to Chinatown—providing a direct, rapid transit link from the Bayshore and Mission Bay areas to SoMa, Union Square, and Downtown. Four new stations will be built along the 1.7 mile Central Subway Project alignment (Figure 1).

In April 2012, Tutor Perini (TPC) was the lowest of four bidders to build only the underground Chinatown Station, but after reviewing elements of the station design and procurement methodology, SFMTA decided to rebid the project in April 2013 with all four stations and trackwork bundled together as one package. In April 2013, TPC was again the low bidder on the bundled package and was recently awarded the \$840M contract (SFMTA Contract #1300), which is the largest and final major construction contract for the Central Subway Project.

Under Contract #1300, TPC will construct the following elements of the Central Subway:

- The **Chinatown Station**, a subway station with an entrance at Stockton and Washington streets;
- The **Union Square/Market Street Station**, a subway station with entrances at Stockton and Geary streets and Stockton and Ellis streets;
- A **Concourse** connecting the Union Square/Market Street Station to the existing Powell Street Muni/BART Station;
- The **Yerba Buena/Moscone Station**, a subway station with an entrance at 4th and Clementina streets;
- The **4th and Brannan Station**, a surface-level station on 4th Street between Brannan and Bryant streets;
- **Surface Tracks** on 4th Street between 4th and King Streets and the subway tunnel portal on 4th Street between Bryant and Harrison Streets;
- **Trackbed, Tracks, Switches and Train Control Systems** within the Central Subway tunnel.



With approximately 25% of the contract amount going to certified Small Business Enterprise (SBE) firms, TPC exceeded the SBE participation goal of 20%. Additionally, TPC will set aside approximately 50% of the contract's trucking and hauling work for certified SBE firms, invest approximately \$1.5 million in hiring socially and economically disadvantaged individuals for entry-level jobs, and provide socially and economically disadvantaged individuals with at least 40,000 hours of on-the-job training for construction management positions.

In June 2013, TPC received Notice to Proceed. Construction will continue through 2018, with the Central Subway scheduled to open in 2019.

FKCI SCOPE OF WORK

Frontier-Kemper's participation on this project, as a subcontractor to TPC, will include the excavation and initial support of the Chinatown Station (shown in Figures 2, 3, and 4); the northernmost of the three underground stations on the alignment. Our scope of work will involve the excavation and initial support of the underground station cavern. This includes approx. 45,000 bcy of excavation and about 27,000 cy of shotcrete placement. The method of excavation that has been specified for this station cavern is the NATM/Sequential Excavation Method (SEM).

PLANNED SEQUENCE OF CONSTRUCTION

As shown in Figure 5, the Chinatown Station has been divided into sections, with each section representing a separate stage of excavation. Each station will be sequenced in order starting with 1) the Station Headhouse, then 2) the Cross-Cut Cavern, then 3) South Platform Cavern, and then 4) concurrently, the Crossover Cavern and the North Platform Cavern.

In the first stage, the Station Headhouse excavation, TPC will install slurry walls and then excavate & support the roughly 176-ft. long x 64-ft. wide x 112-ft. deep Headhouse Shaft for the Chinatown Station. An especially challenging issue is the constraint of physical space available to contractors. The entire surface area of the project is within a small parcel of land in one San Francisco's busiest neighborhoods. Special emphasis throughout this project's construction, and especially in the excavation stages, will be given to access coordination and efficient use of the site layout.

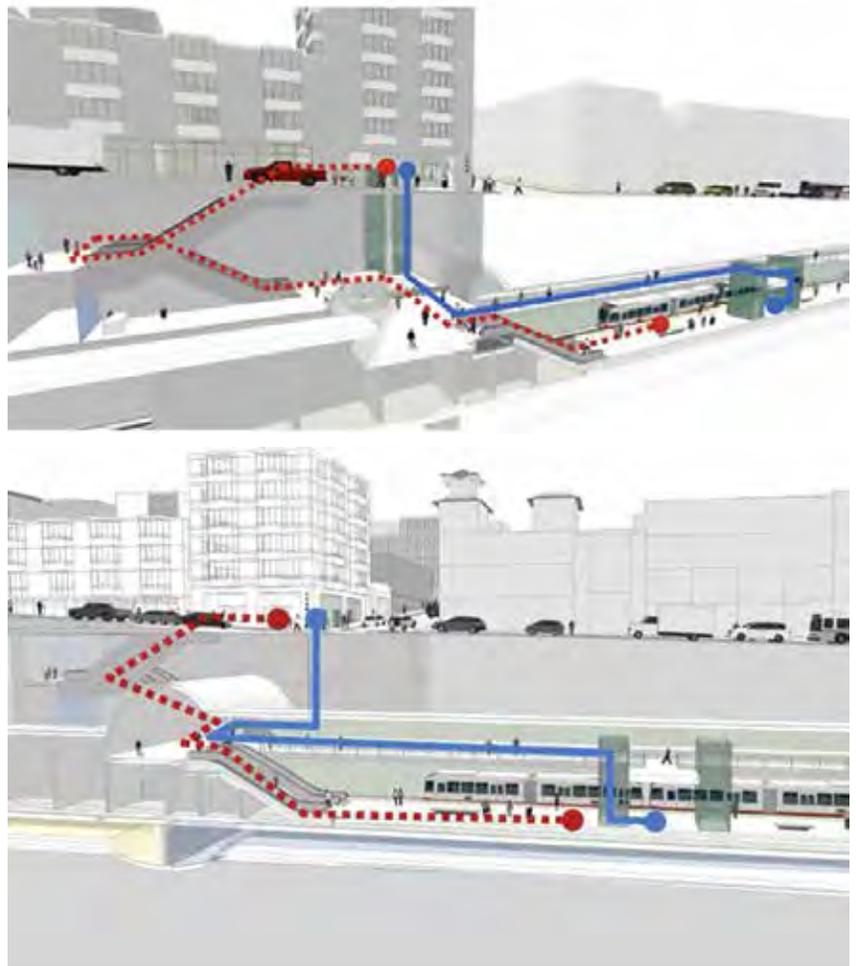


FIGURE 2: Artist renderings of the completed Chinatown Station

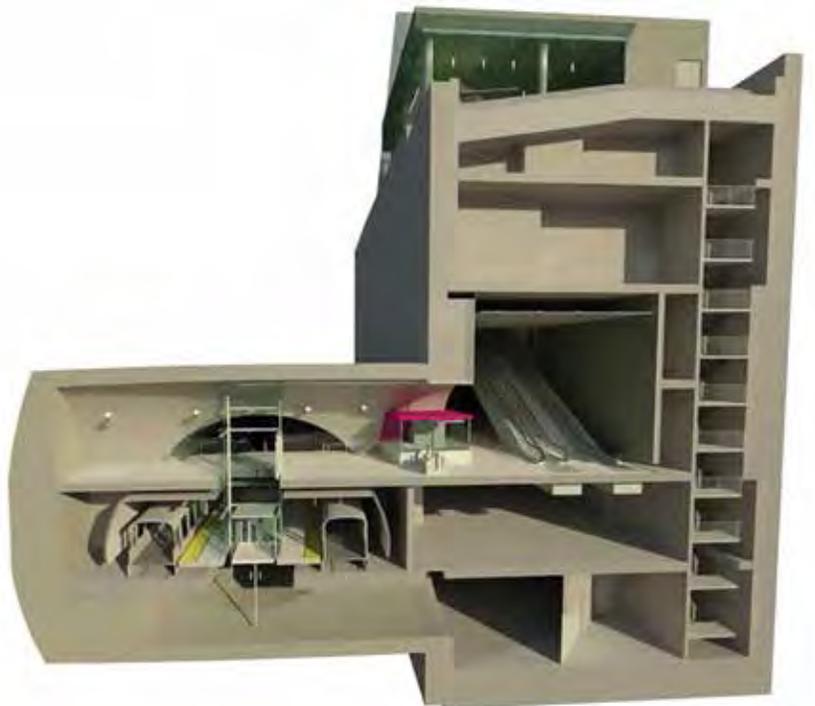


FIGURE 3: Cut-Away through the Headhouse & Cross-Cut Cavern of the Completed Chinatown Station

After the Station Headhouse excavation is complete, Frontier-Kemper will begin on-site work by breaking into the slurry wall to excavate the Cross-Cut Cavern. The Cross-Cut Cavern will have an extremely large excavated cross-section area of approx. 2,255 ft² and will be roughly 58 ft. tall, 48 ft. wide and 70 ft. long (cross-section shown in Figure 6). The excavation will be carried out in segments with a maximum of 3'-6" advance lengths using SEM methods. Lattice girders, steel arches, fiber-reinforced flashcrete, and fiber-reinforced shotcrete will be used as standard SEM support measures. Additional SEM support measures throughout this project may include pocket excavation, face bolts, in-tunnel dewatering, spiling, grouted pipe spiling, metal sheeting, and grouting. SEM crews are planned to be excavating the left and right sides (drifts) of the tunnel concurrently and then excavate the top and bottom center drifts after the sides are complete. The same general SEM sequence will



FIGURE 4: Longitudinal Cut-Away along completed Chinatown Station

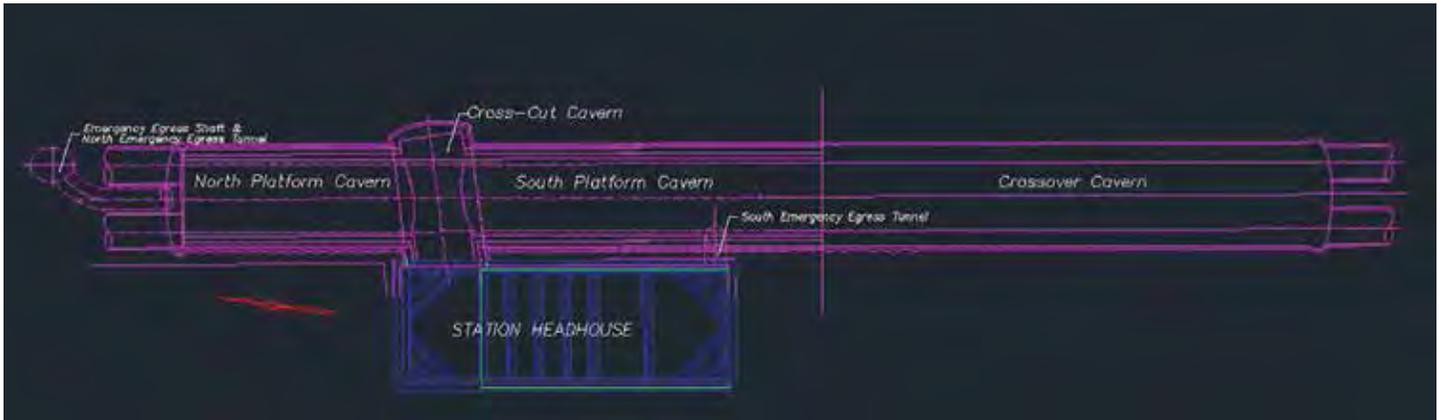


FIGURE 5: Chinatown Station Layout (Plan View)

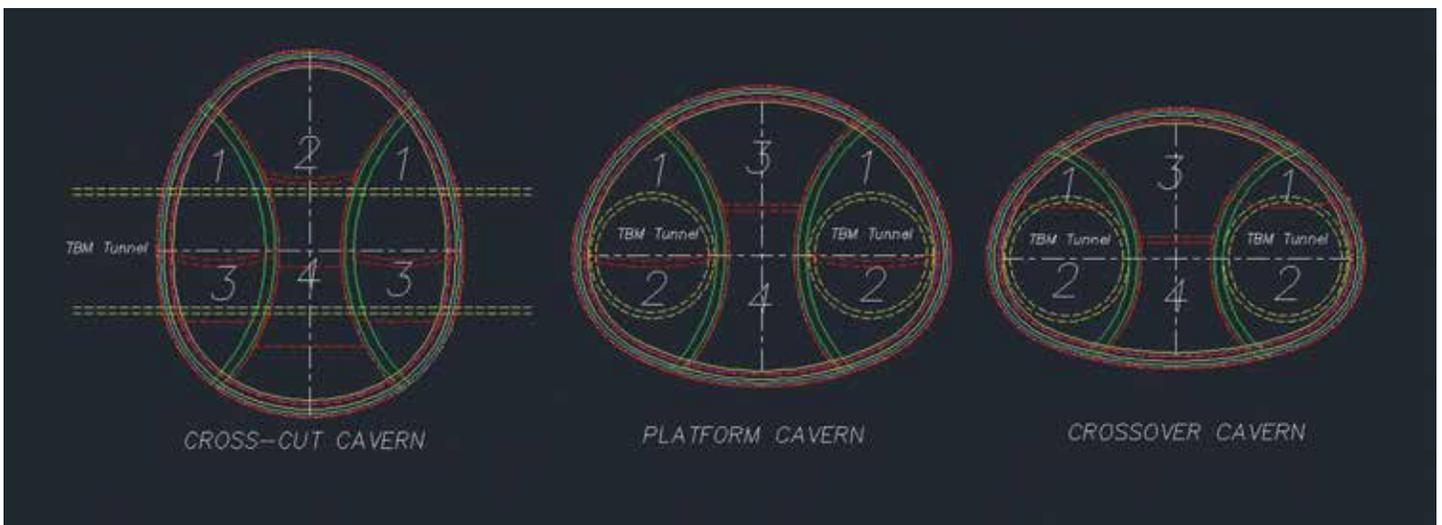


FIGURE 6: Typical Excavation & Initial Lining Cross-Sections with Excavation Sequence

occur in the Platform Tunnels and Crossover Cavern as well.

The Cross-Cut Cavern excavation will intersect twin TBM-driven running tunnels (constructed under a different contract by another contractor). The TBM tunnel segments will be removed during the excavation process.

Once the Cross-Cut Cavern excavation has been completed and the headwall at the end of the Cross-Cut Cavern has been constructed, the North and South Platform Caverns will be constructed, beginning with the South Platform Cavern. The Platform Caverns are roughly 47 ft. tall and 60 ft. wide with an excavated cross-section face area of roughly 2,228 ft². In the Platform Caverns, maximum SEM advance length is 4 ft. with the same standard SEM support measures used in the Cross-Cut Cavern.

There is also a Crossover Cavern (roughly 41 ft. tall, 60 ft. wide with an excavated cross-section face area of 2,076 ft²) which begins at the southern end of the South Platform

Cavern and runs for a length of approx. 268 LF. Maximum SEM advance length in the Crossover Cavern will also be limited to 4 ft. The Platform Caverns and the Crossover Cavern will run along the alignment of the twin TBM running tunnels with the TBM segments being removed during the SEM excavation process.

In addition to the Cross-Cut Cavern, the North and South Platform Caverns, and the Crossover Cavern, FKCI's work will also include the construction of an Emergency Egress Shaft and two, short Emergency Egress Tunnels. After the SEM excavation is complete, TPC will install the final concrete lining and finishes.

Frontier-Kemper's work on the project is currently anticipated to begin in mid 2015 and will last about 18 months.

Years of Service

30 YEARS



Curt Wolfe, Raise Drill Operator A, in the EVV Shop celebrated 30 years of service with FKCI on 7/14/2013. Thanks for your many years of dedicated service, Curt!

20 YEARS

Tim Wargel	EVV Shop	7/26/13
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15 YEARS

Ron Joyce	FKC-Lake Shore	5/11/13
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10 YEARS

Buddy Harrison	EVV Shop	2/12/13
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5 YEARS

Lisa Wagner	EVV Office	1/28/13
Kyle Peek	Seymour-Capilano	2/6/13
Matt Bauer	Fredonia Facility	2/23/13
David Brickey	EVV Office	2/25/13
Joseph Gawec	Seymour-Capilano	3/9/13
Steve Lodwick	EVV Shop	3/10/13
Chad Parker	Seymour-Capilano	3/18/13
Erin Strader	EVV Office	4/21/13
Jevon Miller	Fredonia Facility	4/21/13
Matt Shelton	EVV Office	5/5/13
Roger Cherry	FKC-Lake Shore	5/12/13
Steve Redmond	NWDO	5/15/13
Christa Rucker	EVV Office	5/20/13
Hughen Holte	Seymour-Capilano	5/21/13
Caleb Daugherty	EVV Office	5/27/13
Aaron Ramage	Seymour-Capilano	6/16/13
Anastacio Oling	Seymour-Capilano	7/16/13
Russell Calkin	New Croton	7/28/13

News and Events

Frank Miluso Retires



After almost 18 years of continued employment in Frontier-Kemper's Northeast Division Office (NEDO), Frank Miluso has decided to hang up his tools and retire. Frank began his career with Frontier-Kemper on September 11, 1995 at the rehabilitation and widening of a highway bridge (HB-1) spanning the Van Wyck Expressway at J.F.K. International Airport. From there, he worked on just about every NEDO sponsored project. Whether it was for a short time to lend his helping hand and expertise, or a long-term assignment, Frank was always an integral member of the project team; very conscientious, and a consistent team player.

Frank was always willing to share his field experience and knowledge in a very respectful manner. He was an informal mentor to many of the young supervisors that have aged and grown with him. After almost 18 years of working day-in and day-out, (some days stretching long into the night), Frank's presence, knowledge, expertise, and camaraderie will be missed. We wish him a long, healthy, and enjoyable retirement. It is well deserved.

Roger Blankenship Retires



Roger Blankenship has been known throughout his career as a guy that can get things done. He's a no nonsense, dyed-in-the-wool miner with experience dating back to the early 80's when he first started with FKCI on the Turriss Coal project in Elkhart, IL. Since then, Roger has made significant contributions on both Mine Development and Heavy Civil Projects. As versatile as the Dremel tool, Roger could serve as the Walking Boss on a small shaft sinking project one day and step in as the Project Superintendent on a large civil tunneling project the next. As a mentor to junior minors, Roger held the capacity to teach important lessons about the work, as well as share life experiences that allowed less experienced personnel to flourish professionally and personally.

Roger officially retired on July 1, 2013. His friendship and leadership will be missed. Whether he's mending fences or testing his skills on the links, we know that Roger will continue to be known as a guy that can get things done. We wish Roger the best for a fulfilling retirement, with many years of health and happiness.

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Crosscut is FKCI's semi-annual newsletter. Just as a crosscut in a mine or tunnel provides a connection between one area and another, this newsletter serves to connect the various parts of our organization. The Crosscut's aim is to celebrate accomplishments, provide explanations and information, and promote communication. To help maintain the standard of our publication, your comments and suggestions are appreciated and welcome. Write to FKCI Crosscut, P.O. Box 6690, Evansville, IN 47719-0690.