



A rocksaw trencher leads the way to excavate a fiber optic cable duct on Utah Service Unit's Caliente Subdivision.



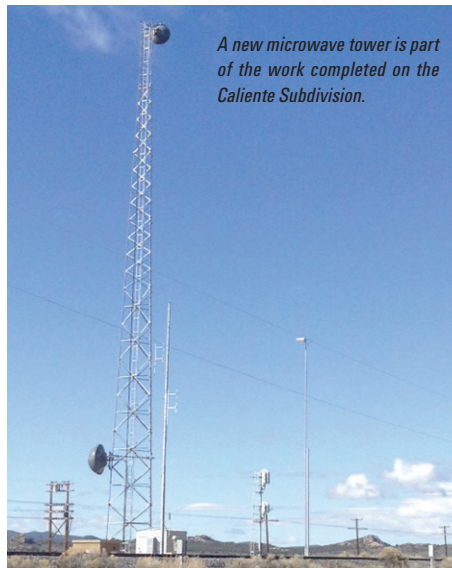
Fiber Optic Construction Continues

As Union Pacific continues to grow, the need for enhanced, reliable communications grows with it. UP recently completed construction of another segment of fiber optic cable along one of its western corridors.

Similar to other rural and remote areas where the company operates, UP designed and built approximately 40 miles of new fiber optic and power construction on the Caliente Subdivision between Caliente and Uvada, Nevada, near the Utah border. For a portion of the project, curving through the desert terrain along the rail corridor, Clover Creek appears and disappears. The stream is a designated "delicate waterway," sometimes running underground and other times making surface pools replete with fish. UP employees and contractors worked closely with appropriate local and regional agencies to ensure construction did not adversely impact the surrounding areas.

Several tunnels and bridges carry trains between curves and hilltops, prohibiting the use of microwave through the canyon-like route. Prior to the fiber optic service for this area, communications relied on older pole lines with code wires to facilitate radio and signal systems. Commercial power was not readily available to every action requiring power, so in addition to the fiber cable, UP included an additional duct to accommodate a new power line for the length of the project.

Michael Heald, senior systems engineer, and Paul Pino, senior project engineer for UP's Safety, Asset Utilization and Fiber Optic Technology (SAFT) group, developed the project design for UP's Telecom and Signal departments. These departments were responsible for the construction



A new microwave tower is part of the work completed on the Caliente Subdivision.

and requirements to provide telecommunications service to railroad facilities.

One significant outcome was the collaborative relationship forged between Lincoln County Telephone Systems (LCTS) and UP.

"We were able to provide a couple fiber optic strands to LCTS so they could provide enhanced telecommunications services to a small segment of their rural and remote customers along the route," said Craig Johnston, director-Fiber Optics and Asset Utilization. "Such service was not practical to provide due to the cost involved to serve a limited number of rural customers. However, by collaborating with UP to use LCTS expertise by maintaining the new fiber system and providing other services, such as locating capabilities, both UP and LCTS have a win-win outcome."

Paul Donohue, LCTS outside plant supervisor, said UP has been a tremendous blessing to the company.

"We partnered with UP to maintain the fiber optic strands in the canyon while allowing us to provide phone and Internet to people 45 miles down the canyon," Donohue said. "It allows us to provide better service to other customers in the area as well. If anything happens to the fiber, we will be able to respond and repair it."

LCTS will also serve as locators for anyone needing to dig in the area, ensuring the protection of fiber optic cable for both the railroad and LCTS.

This effort is a good example of building relationships and credibility within the communities we serve and "living our credo" of the "how matters," which simply means doing the right thing.

The Evolution of Fiber Optic Group Engineering

By Michael Heald, senior systems engineer

A lot can change in 34 years, especially given the speed at which technology evolves. As a result of the 1982 merger of Western Pacific, Missouri Pacific and Union Pacific, telecommunications consumption increased due to the additional capacity required by railroad operations. At the same time, the U.S. Justice Department was pressing for the breakup of the Bell System. A federal judge issued an order mandating a breakup.

To streamline rail operations at the lowest obtainable cost, UP in 1984 decided to utilize its right of way to enhance its telecommunications. Rather than enter a new, capital-intensive and competitive line of business, UP negotiated with fiber optic customers to install fiber along the railroad right of way to provide additional telecommunication capacity.

During the summer of 1985, fiber optic cable installation began along the Dallas Subdivision between Fort Worth and Dallas. Today, approximately 34,000 miles of fiber optic telecommunication systems occupy UP's right of way. The installation, operation and maintenance of these fiber optic systems ensure the continued growth, change and operational flexibility necessary to secure our rail transportation business opportunities now and in the future.

At the time of the 1985 installation, commercial telecommunication proposals were reviewed by UP's Engineering Department. Construction oversight activities were relegated to regional engineering inspectors-Fiber Optics, which soon evolved to the regional construction coordinators known today.

These inspectors coordinated with local roadmasters — now known as managers-track maintenance — to make certain that fiber optic cables were installed as approved, and would not interfere with the maintenance and safe operations of the track, including the rail, ties, ballast and other railroad facilities. This coordination effort continues with both new and existing fiber optic construction activity along

the right of way. Coordination activities involve coordinating with regional railroad operating personnel to provide flaggers to ensure track is cleared for approaching trains. Flaggers are key to safe operations and were instrumental during the telecommunication boom.

In Omaha, the Engineering Department was responsible for plan design approval and coordination with capital improvement plans. Several Engineering representatives determined how to design and construct fiber optic cable systems along railroad right of way without interfering with operations. Others soon joined Engineering as customer demand increased and additional fiber construction began. An important component to this process was incorporating actual field trips via hy-rail to evaluate opportunities for fiber placement. UP has continued the functional aspect of Engineering and added integral components to its Safety, Asset Utilization and Fiber Optic Technology (SAFT) Group responsibilities and processes.

Work continues to ensure expansion and enhancement of fiber optic telecommunication within UP's right of way is completed safely, correctly and without undue interference to operations, facilities and property.

Gary Voogd, information technology systems consultant, and I joined the group more than 17 years ago, handling the engineering process and functions for the fiber group. Generally, when new people are brought into any organization, they bring with them new ideas to enhance the process.

Among the processes we looked to enhance, Voogd and I created a new record-keeping system to track and monitor projects we worked on. Later, we assisted Tom McGovern, project engineer, who created a new master software program that expanded our initial program. This new database expanded capabilities of our original database and enhanced the process for storing and retrieving records, including



Michael Heald, senior systems engineer, retires March 31.

our notifications, plan approvals and various other projects. It also enabled the entire group access to the same database.

Recently, a new software system was developed and placed online to replace our original Call Before You Dig database. This new database, Fiber Optics and Asset Utilization Agreement Management System (FAMS), is used by our "Call Desk" to initiate CBUD tickets when someone calls for authorization to dig. The system was developed to combine the other databases in use by the SAFT Group, including CBUD, agreements and the engineering projects into one database. Paul Pino, senior project engineer, and I worked with McGovern to incorporate our original project database into the new FAMS System.

There were other enhancements I was able to be a part of during my tenure with the SAFT Group, including implementation of email for notifications, plan approvals and more. I believe we built upon the processes of our predecessors.

My March 31 retirement will allow others with fresh ideas to continue the tradition of refining the processes and enhancing the group. I have enjoyed working with our customers, Engineering, Real Estate and other departments, as well as members of the SAFT Group. To everyone, thank you for the memories.

This newsletter appears under direction of the IT Department. For news coverage, contact Grace by phone at 402-475-6397, fax 402-475-6398, mail information to 2201 Winthrop Rd, Lincoln, NE 68502-4158, or email grace@newslink.com. This material is intended to be an overview of the news of the department. If there are any discrepancies between this newsletter and any collective bargaining process, insurance contracts or other official documents, those documents will govern. UP continues to maintain and reserves the right, at any time, to alter, suspend, discontinue or terminate all plans and programs described in this newsletter. This newsletter is not an employment contract or any type of employment guarantee. Any photo submitted may be used. Anyone who submits a photo retains all rights to the image. However, by submission you give the newsletter permission to use your photo(s) in all related media. Thanks to everyone who contributed to this newsletter, including, but not limited to, Craig Johnston and Gary Voogd.

'Call Before You Dig' e-learning Module Available

For the past 20 years, Call Before You Dig (CBUD) training has been an annual experience for more than 8,000 Engineering employees. However, since 1996, technology, rules and procedures have changed.

"The existing Call Before You Dig training is a 12-minute video," said Ericka Juno, program manager, training content. "We have streamlined the content, still delivering the same important message."

The result? An e-learning module that will take about five minutes to complete.

The update was completed by Craig Johnston, director-Fiber Optics and Asset Utilization; Marti Carrington, Management Development manager; Ericka Juno, program manager, training content; Tom McGovern, primary subject matter expert (SME); and Joe McIntyre, SME.

Goals of the updated e-learning module include:

- A decrease in the number of cables damaged as a result of unapproved digs.
- A decrease in the number of incidents in which an employee digs without calling for authorization.
- An increase in the number of employees calling for authorization to dig.

The training is assigned to learning plans for Engineering and Telecom employees.

"It is important for employees to recognize Union Pacific's commitment to protect our facilities on our right of way," McGovern said. "The new module facilitates a common message to employees in the company."

He said training would be part of the learning plan for some employees and live training for others.

"Our construction coordinators will conduct start-up meetings with Engineering and present the training," McGovern said.

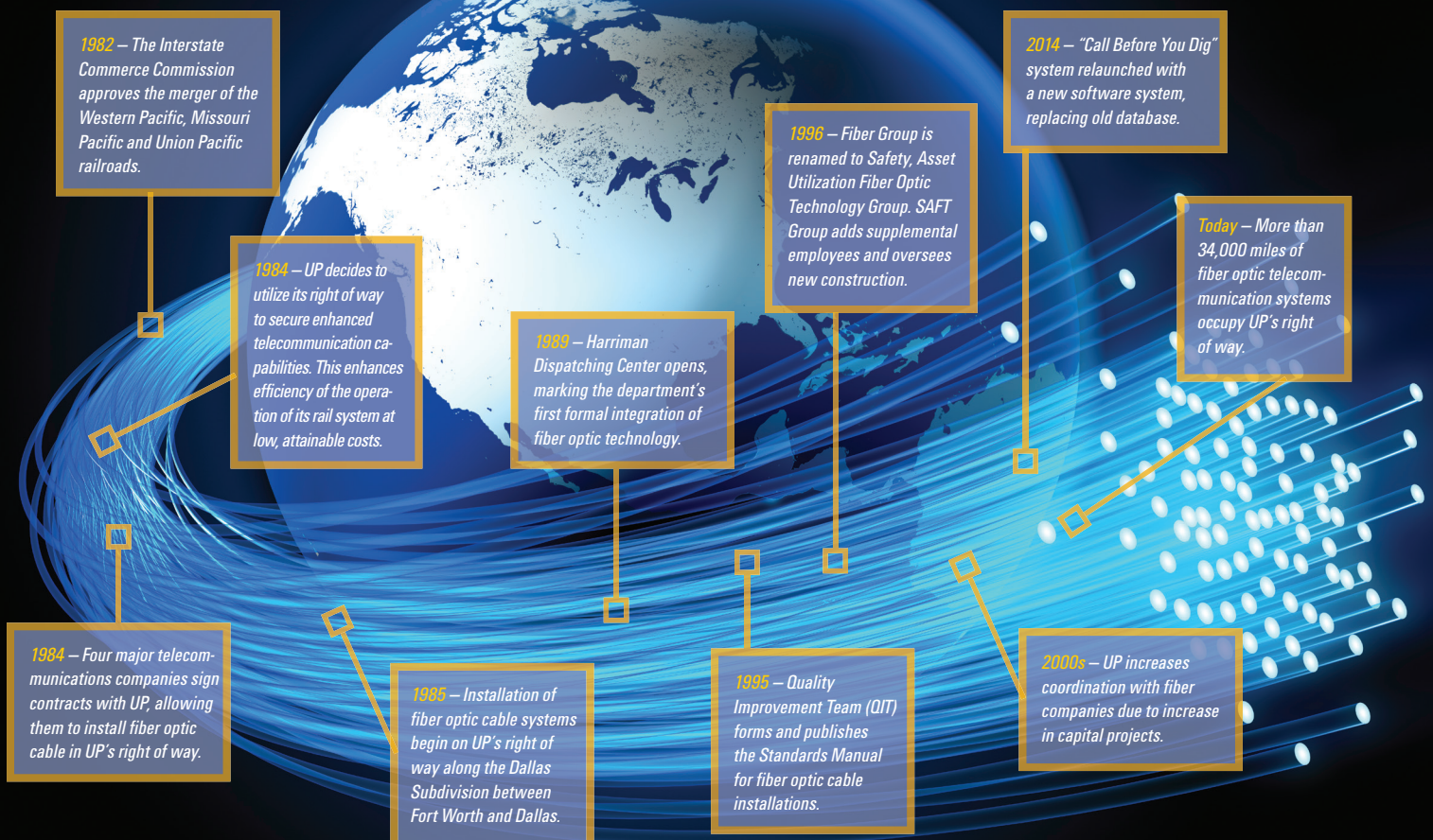


"Everyone in the live training will get credit for it as well."

The training module was completed by the team in the first quarter of 2016. Employees performing any digging along our right of way are encouraged to complete the new training module as soon as practicable.

UP is committed to protecting the fiber systems on its right of way. These systems carry railroad communications as well as every type of voice, data and video transmission imaginable. The new training module is an example of UP's efforts to continue being a leader in underground cable protection.

The Evolution of Fiber Optic Group Engineering





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Plum, Ruhnke Recognized with 'Buckle Down' Awards



Thanks to the observations and mindful actions of Tim Ruhnke, facilities management, and Ben Plum, senior electronic technician, a potential interruption to operations at the Harriman Dispatching Center was prevented Dec. 4, 2015.

Ruhnke was leaving HDC when he noticed workers near the facility digging without appropriate locators visible near a fiber optic facility. Ruhnke alerted Plum, who also was leaving. They contacted the Response Management Communication Center to rectify the situation. Plum and Ruhnke stayed with the contractors until the Sprint locator arrived to ensure everything was protected.

“Through their diligent actions, a major interruption to Union Pacific’s network, as well as Sprint and other fiber optic systems, was avoided,” said Craig Johnston, director-Fiber Optics and Asset Utilization.

Even though UP’s Telecommunications network is designed for redundancy, a third-party contractor digging in front of HDC without a proper Call Before You Dig notification and subsequent utility locator potentially could have damaged multiple facilities.

Plum and Ruhnke were recognized with “Buckle Down” awards as a tokens of appreciation from UP’s Safety, Asset Utilization and Fiber Optic Technology (SAFT) program.

“In taking this extra effort, you lived up to two key phrases used in the fiber optics program: to work ‘closely and cooperatively,’ and ‘protect as if it were you own,’” Johnston said. “The continuing success of damage prevention initiatives and the protection of UP fiber optic communications network depend on similar actions from employees and individuals like you.”

From left, Tim Ruhnke and Ben Plum receive "Buckle Down" awards for preventing potential interruption of operations.