



MINING & CONSTRUCTION

MECHANIZED ROCK EXCAVATION WITH ATLAS COPCO - NO. 1/ 2013

Atlas Copco Celebrates



Flexible drill for 'hardest' rock

Atlas Copco is 140—with 63 years in U.S.

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Bridge demo with heavy breaker line

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Excove solves problem in exploring graphite

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EDITORIAL



Training is an important part of Atlas Copco Mining and Rock Excavation Service Division (MRS). Effective training is a key ingredient in the recipe for growth and efficiency for our employees and our customers. I'm proud to be a part of a team that helps educate others on how to best operate and care for their valuable assets. The first and most important aspect of any training at MRS is relaying our message of safety. It is foremost on our minds and we want our teams and customers to take every step to ensure it is first on their minds.

MRS training strategy is built on several factors:

- » Delivering training that supports customers
- » Developing state-of-the-art training solutions
- » Building regional training organizations to facilitate, support and coordinate training efforts
- » Supporting all of our products with effective training

We want to ensure that all lines of Atlas Copco are fully supported. We provide technical and mechanical material to increase the skills of our customers, who get top-of-the-line instruction and use of the latest innovations. Our locations for this service are strategically placed to offer ideal access for our customers.

Another part of showing how much we value our customers is making sure our own employees are well trained across all our product lines to better assist them.

Whether it's assisting our employees to further their certification goals or helping more operators in the field get certified in Master Driller training, our programs are a recipe for success I hope everyone will follow.

Versie Wallace
US Training Manager

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SAFETY FIRST

Atlas Copco is committed to comply with or exceed all global and local safety rules and regulations for personal safety. Some photographs in this magazine may, however, show circumstances that are beyond our control. All users of Atlas Copco equipment are urged to think safety first and always use proper ear, eye, head and other protection as required to minimize the risk of personal injury.

Atlas Copco



The hardest rock we drill

DTH rig meets Tier 4 emission standards and increases production in Sioux quartzite in Rock County, Minn. Meanwhile its operators call the FlexiROC D60 the “professional” driller’s rig. »

The quartzite found in southwest Minnesota is favored for road aggregate because of its hard nature. It is also used on the pads of wind turbines constructed in the area.

» Frank Featherston said he started Midwest Drilling & Blasting with his mind on the bottom line, frugally buying four top hammers that weren't made by Atlas Copco. The company has done well with them, doubling in size in just the last five years, but with the company's growth Featherston believes it is time to look at upgrading his operation to down-the-hole drilling.

Featherston likes the results from the Atlas Copco FlexiROC D60 down-the-hole surface drills with Tier 4 engines he acquired on rent-to-buy arrangements with the Atlas Copco-Milwaukee Store. He already had two rigs in northern Wisconsin working sand quarries for hydraulic fracturing customers when a third FlexiROC was sent to its first job at the Hoogland Quarry in Rock County in southwest Minnesota to drill Sioux quartzite for the aggregate market.

"It's the hardest rock we ever drill," said Drilling Operations Manager Phil Hoppa, who was drilling at the Hoogland site.

Hoogland Quarry

Although the Hoogland Quarry has only been crushing rock since September 2011, it is steadily providing product for its growing client base. Mike Haugen, who is general manager and one of the four owners of BreMik Materials Inc., the company which operates the quarry, said the future is looking good here. Much of his customer demand has to do with the highly valued durability

of the stone he is quarrying.

The rose-colored Sioux quartzite is so hard and so resistant to deterioration that BreMik's cone crusher goes through a liner every 10 to 12 days. Haugen said normally the liners last anywhere from five to 30 years, that in the softer rock of a limestone quarry, "a guy might retire before ever having to change one." He quickly added, "We're sure getting good at it, though."

It's this hardness that makes the rock superior for gravel road surfaces, highway road mixes and other construction projects, as well as the pads for the area windmill farms. Historic buildings in the area are made of cut quartzite stone.

Top to bottom

At the start, Featherston said, DTH is more expensive than top hammer drilling, from the rig down to the bits. The payoff comes from the increased production speed: "It's not just about penetration rate; you have to figure in man hours and machine hours. That's what determines how we get paid at the end of the day."

The DTH bits cost almost twice what top hammer bits do, but since Midwest Drilling & Blasting gets nearly twice the drill-feet from them, it's a wash. Increases in production value come from improvements in shift time dedicated to drilling. For instance, DTH here requires only half as many drilling interruptions to change bits as top ham-

mer drilling did.

Featherston added, "The guys really like the auto-greasing feature, which saves them 15 minutes running around greasing the rig. These little things add up. We're getting 20 to 40 feet more drilled an hour. By the end of a 12-hour shift that's quite a bit. And if we're more productive, if we get in there and out, we serve our customer sooner and we get on to another job faster. That's what 'increased production' means to us."

The FlexiROC D60 at this Minnesota quarry was outfitted with 16-foot lengths of 3.5-inch pipe, a COP 44 Gold Secoroc hammer and a 4.5-inch carbide button bit to drill a 12-by-14-foot blasthole pattern to depths that ranged from 31 to 34 feet deep. Hoppa said he was getting 3.5 feet a minute in the fractured quartzite.

Operator

Like the other five drillers in the company, Hoppa is often operating away from the home office for two or three days at a project as a one-man crew. He appreciates the attention Atlas Copco paid to the operator's general well-being. "For one, it's quiet inside the cab. And it's so comfortable. Compared to what I was used to, this is like sitting in back of a limousine."

The interior of the FlexiROC D60 cab does not treat the driller as just a laborer, said Featherston: "The driller feels like a professional. It's a very classy machine."

(on cover) Driller Phil Hoppa serves as drilling operations manager and has been with Midwest Drilling & Blasting for 10 years.



Both Featherston and Hoppa said the computerized information on the monitor is another good feature. It comes in handy, for instance, if at some point during the monotony of a 12-hour shift he should doubt which pipe he is on. A glance at the monitor instantly tells the driller how deep he is in the hole. Hoppa rolled through a list of information it makes available to him, including circuit and function data, oil pressures, and fuel consumption.

Customer relations

Featherston's relationship with members of the Atlas Copco-Milwaukee staff goes back many years, even before the acquisition of the Ingersoll Rand line of blasthole drill rigs and long before his company became a consumer of Atlas Copco products.

"We're in the Wisconsin drilling industry, so naturally we would run into each other here and there." But Featherston said his decisions for Midwest Drilling & Blasting are solely made on what's best for his business. He said he would continue to rent the rigs until the model had earned his complete confidence. Atlas Copco technician Cohlyn Dupes is on hand to ensure they do. He was at Hoogland Quarry for the third FlexiROC D60 rig's startup, and he's always ready should they need to call.


Hoppa said that although he prefers Atlas Copco equipment because it

is easy to use and is dependable, he is impressed by the service he's seen from the Atlas Copco-Milwaukee Store.

"If I ever have a question or need to do some troubleshooting, we go over it on the phone or they email me a manual and I can handle it right away. Cohlyn was just here yesterday for set-up and he called today to make sure everything was going okay. When we need to purchase something—no matter where we are at—they always get it to us right away. That always amazes me, how we can call from anywhere and they come through," Hoppa said.

Midwest Drilling & Blasting understands this level of service firsthand. Featherston said, "We'll stay on the job for them even at our own cost if we have to. We'll never let a customer down."

The company does not currently have a website and may not need one. Demand for its services comes through word-of-mouth.

In fact, Haugen himself hired Midwest for his quarry's drilling work because another quarry had recommended them. That's how Midwest Drilling & Blasting came to be so far from their Westfield, Wis., base, drilling in the hardest rock they've ever drilled. 

UNIQUE ROCK

Aptly named, Rock County lies in the southwest corner of Minnesota, sharing with its neighboring counties a 60-mile-long elevation known as Buffalo Ridge, which is Minnesota's most prominent portion of the Coteau des Prairies, a 200-mile-long range of rolling hills in the otherwise flat upland prairies.

When the last glacier split to flow along the sides of this geologic phenomenon, the glacier scoured the coteau's sides, increasing Buffalo Ridge's prominence on the landscape. Its current elevation is nearly 2,000 feet, which is hundreds of feet higher than much of the prairie around it.

In many places, especially along Buffalo Ridge, the glacier removed layers of shale and sandstone bedrock, exposing thick layers of Sioux Quartzite, which had metamorphosized from the sandstones of river sediment left millions of years ago. Where glacial till and wind-blown loess have not filled it over, the body of Sioux quartzite lies exposed at the surface.

Mike Haugen, general manager of BreMik Materials Inc. said this is why they chose the Hoogland Quarry site: easy accessibility to the Sioux quartzite with very little waste.

Sioux quartzite of this area also bears "pipestone," the catlinite bands woven within its matrix that Native Americans quarried for hundreds of years to craft their ceremonial pipes. The nearby city of Pipestone, Minn., the neighboring county of Pipestone, and Pipestone National Monument are all named for this metamorphic companion of Sioux quartzite.



Quarry Manager Mike Haugen

The FlexiROC D60 drills Sioux quartzite to about 34 feet for blasting as a breaker works below, prepping rock for the crusher. Visible at the bottom rear of the rig is the leveling jack.



Atlas Copco turns

▶ **1950** Atlas Diesel opens its first U.S. sales office in San Francisco (Copco Pacific Limited) and New York (Atlas Diesel Eastern).



▲ **1951** Atlas Copco Pacific is organized in San Francisco, but by 1956 moves to 930 Brittan Ave, San Carlos, CA. Additional district offices are located in Spokane, Seattle, Salt Lake City, Phoenix and Denver.



1955 The parent company Atlas Diesel renames itself Atlas Copco AB. "Copco" is based on the initial letters of a Belgian acquisition, Compagnie Pneumatique Commerciale, to better reflect its focus on pneumatic technology and products.



◀ **1952** Atlas Copco Eastern is established in Paramus, N.J., with district offices soon opening in Duluth, St. Louis, Picher and Knoxville. In July, the headquarters move to a new office space at 163 Linwood Ave., near Union Ave., in Paterson, N.J.

1956 Atlas Copco Eastern announces that two completely new air-powered hoists with maximum load limits ranging from 1,100 to 2,200 pounds are now available for sale.



February 21, 2013, Atlas Copco celebrated its 140th anniversary. The milestone is an opportunity for the company to celebrate the accumulated experience and expertise it's developed over these many years.

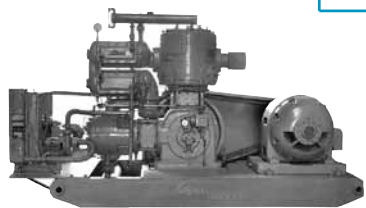
Today Atlas Copco is a world-leading, multi-division manufacturing icon whose equipment and compressors are familiar to customers throughout the automotive, mining, construction, aerospace, food and pharmaceutical industries. Its customer base spans 178 countries with operating bases in 90 of them. So it may surprise people to know the company first laid its tracks in Sweden in 1873 as a locomotive and railroad manufacturer, which at the time was called "Atlas."

Reliable, productive tooling for manufacturing railroad equipment was neither convenient nor cost-effective to keep importing. So Atlas first made pneumatic tools and machines for itself, so that it could complete its share of orders for the rapidly developing Swedish railway. It means that long before they were ever coined, Atlas Copco's brand promise of "Sustainable productivity" and its visionary slogan "There's always a better way" have been working principles for Atlas Copco.

By 1876 rail car orders for the established rail network were slowing down, and Atlas was getting its first lessons in diversity

◀ **1980** Copco Pacific Limited and Atlas Copco Eastern, which had previously merged, are established as the holding company for all U.S. operations. The company becomes known as Atlas Copco North America, and separate operating subsidiaries are established for the different business lines.

1984 The Atlas Copco 1984 Annual Report acknowledges that the United States "is by far the Group's largest single market," noting 25 percent increase in sales.



◀ **1974** Atlas Copco sells its 1,000th compressor in the U.S. and in 1976 creates a new department for the rental of portable oil-free air compressors.

1980 Atlas Copco buys Turbonetics Inc. of Voorheesville, N.Y., and also buys the McGraw-Edison Company's U.S. air power operation of its Worthington compressors unit in Holyoke, Mass.

1987 Atlas Copco acquires Chicago Pneumatic Tool Company. Chicago Pneumatic was founded in 1901 and had developed a strong global brand, supplying air tools and compressors to customers across a wide variety of sectors.

140

In the U.S. for 63 years

Atlas Copco has grown U.S. operations to more than 1.7 million square feet of manufacturing, production, distribution and office space. Sales, service and customer support associates span the country, and together work to serve each customer in a better way, every day. While much has changed since 1950, what remains is commitment to developing cutting edge technology and taking care of Atlas Copco customers. Today, the U.S. market is served by 4,800 dedicated employees from 109 locations, including 13 manufacturing facilities.

as a component of sustainable productivity. Atlas strategically shifted toward production of steam engines, tools and machines. As Atlas modernized its own manufacturing plant, adding planers, mills and grinding equipment, it imported a compressor and a yoke riveter.

The exorbitant cost of having to import them prompted the company's engineers to reverse engineer this equipment, as it had other machines, to make their own. But Atlas also improved upon those designs, further developing them through an openly collaborative effort among the engineers, production staff and end-users.

By 1901, pneumatic tools were coming off Atlas's assembly line. And in 1905 the first Atlas rock drill was in production. The tools were better than others on the market. By 1915, pneumatics accounted for more than 50 percent of Atlas's revenues.

Then in 1917 Atlas merged with Diesels Motorer, headquartered outside Stockholm. Atlas ran the diesel engine side of its

operations separately from its compressed air division. The compressed air side of the company accounted for much more of its profit. During the 1920s and '30s, Atlas made crucial advances in compressed-air technology under the leadership and vision of Erik Ryd, the son of Atlas Diesel's former chief designer.

Ryd had a combination of expert technical knowledge and the intense desire to improve his customer productivity. In collaboration with the legendary John Munck, for whom Atlas Copco's Munck award is named, Ryd designed a strong, lightweight and highly efficient pneumatic rock drill in 1936. Capable of one-man operation, it could be equipped with a pneumatic pusher leg enabling one-man drilling in various directions.

When Atlas noted that customers were reluctant to invest in new portable drills, it accommodated them by adding rental services to local customer centers. The popularity of compressed air machinery imme-

diately increased throughout the industry. At this time Atlas Copco developed its selling technique of taking the equipment to the customer's jobsite and demonstrating their productivity to operators and engineers on site, rather than relying on designated company representatives alone.

The Swedish Method

At about that time another Swedish company, which manufactured drill steel and bits, was experimenting with tungsten carbide as a bit material. When Atlas's portable drill was combined with carbide bits, nothing in the industry could compare with its performance. Other countries such as France, Germany, the United States and Canada, were using much heavier, more burdensome equipment.

Atlas Diesel acquired the rights to the carbide bits and paired it with their lightweight pneumatic drills as a new technique for drilling. The technique and its equipment were nicknamed "The Swedish Method."

1990 Atlas Copco acquires Wagner, a manufacturer of underground mine trucks and scoops, from PACCAR and also acquires T-H Industries, a manufacturer of down-the-hole bits.

1995 Atlas Copco acquires Milwaukee Electric Tools Corporation. Milwaukee Tools manufactures high quality, heavy-duty portable electric tools and accessories for industrial and professional use.

2004 Atlas Copco strengthens its portfolio of mining products. Acquires both the Drilling Solutions Division of Ingersoll Rand Co. and the Baker Hughes Mining Tools Division of Baker Hughes.

2005 Atlas Copco-owned Chicago Pneumatic Tool Company purchased the assets of GSE tech-motive tool from SPX Corporation. GSE manufactures and distributes specialized tightening solutions for customers with safety critical assembly applications, primarily in the motor vehicle industry.



2007 Atlas Copco acquires Dynapac AB., including Dynapac USA. Dynapac is a leading supplier of compaction and paving equipment for the road construction market.

2007 Atlas Copco purchased the manufacturing assets of GreenField Compression. GreenField designs, manufactures and markets a range of CNG compressors aimed at the natural gas vehicles market.



1999 Atlas Copco acquires Rental Service Corporation—more than doubling the number of equipment rental outlets affiliated with Atlas Copco.

2005 Atlas Copco acquires Pneumatech Inc. Pneumatech is a manufacturer of compressed air, gas drying, filtration and nitrogen generation equipment.



2006 Atlas Copco acquires BeaconMedaes, a world-leading supplier of medical gas equipment.

2007 Atlas Copco acquires Mafi-Trench Corp of California. Mafi-Trench is a leading U.S. based supplier of turbo expanders for the oil and gas industry.

Throughout World War II the drill and bit combination were used to make Sweden's defense bunkers, but exportation was hampered by a crippled trade network, disrupted by the international crisis. In the latter half of the 1940s, however, as Atlas Diesel's motor sales declined, its pneumatic equipment sales increased tenfold.

The company terminated diesel engine production in 1948, dedicating all resources solely to compressed air machines and equipment. In 1956, the company changed its name to Atlas Copco, trading Diesel for an abbreviation of the French words Compagnie Pneumatique Commerciale.

Having already established dozens of international offices Atlas now offered its Swedish Method to North America, dispatching George Blomdal, a Norwegian engineer, and drill master Olle Hedwall to Canada. Blomdal chose Northern Ontario's gold mining industry as a likely starting point. The Swedish Method caught on almost immediately.

In 1950, Blomdal helped introduce Atlas pneumatic products to the U.S. market, having been invited to a drilling contest in San Francisco. Success there led to establishment of two new offices in San Francisco and New York.

By the mid-1950s, Atlas Copco compressors were experiencing success after success. Then in 1958, Atlas Copco introduced the first oil-injected screw compressor, later launching a portable screw compressor that produced oil-free compressed air without chamber oil injection in 1967. With oil-free compressed air, Atlas Copco broadened its presence in the textile, food,

and pharmaceutical industries.

Sales of handheld tools also increased, especially in the automotive industry, where pneumatic assembly tools and systems prevailed. In the 1960s, Atlas Copco designers worked with medical experts to enhance the ergonomics of handheld tools.

Atlas Copco itself had realized the importance of having a close source for reliable, productive tools and equipment during its humble beginnings as a locomotive and rail car manufacturer. A series of acquisitions have made it possible to provide the same for Atlas Copco's customers.

Some have powerful brand names that assured customers they were getting the highest quality available, such as the Craelius mineral exploration lines, which Atlas Copco acquired in 1960. In 1987, Atlas Copco acquired Chicago Pneumatic Tool Co. The purchase instantly made Atlas Copco the world's largest manufacturer of pneumatic tools and assembly systems. Secoroc down-hole tools joined the Group in 1988, and Wagner loaders and mine-trucks in 1989.

Atlas Copco acquired U.S.-based Ingersoll Rand Drilling Solutions, as well as Baker Hughes Mining Tools, in 2004. The drill rig division manufacturers open pit, quarry, oil and gas and water well rigs.

In 2007 Atlas Copco acquired the Swedish road construction equipment manufacturer Dynapac.

In 2012 Perfora came to Atlas Copco with its high quality drill rigs and cutting tools specifically designed for the dimension stone industry. That same year GIA increased the selection of electric mine trucks,

In 1984, a new type of dinosaur was found at the Dinosaur Cove East site at the coast of Victoria, Australia. It was named **Atlascopcosaurus loadsi** after Atlas Copco, who had provided equipment for the dig, and William Loads, the state manager for Atlas Copco at the time, who assisted during the dig. Atlascopcosaurus means Atlas Copco lizard.

It has been estimated that an Atlascopcosaurus, a vegetarian, was about two to three meters long and weighed roughly 125 kg.

utility vehicles, continuous loaders and ventilation systems.

As Atlas Copco has grown, it has not neglected its responsibility as a global citizen, knowing full well sustainability means operating in accordance with established environmental standards, promoting ethical business practices, and providing for the safety and wellness of its people and their communities. One of its best-known initiatives is Water for All, born of the belief that all people have a right to clean water. Since 1984 the program has been funded by employee donations and today is met with matching funds from the corporation.

With solid plans in place to increase its diversity, mobility and competence development even further, Atlas Copco is committed to your sustainable productivity for another 140 years. ☺

2008 Atlas Copco acquires the Hurricane booster and portable compressor business of Grimmer Industries Inc.



2011 Atlas Copco acquires the Cryogenic Pump Business from JC Carter Co Inc. JC Carter's products are primarily used in liquid natural gas regasification and liquefaction plants along with natural gas liquid processing.



2012 Atlas Copco acquires Houston Services Industries Inc., a U.S. manufacturer of low-pressure blowers and vacuum pumps with a strong domestic position in wastewater treatment equipment and industrial processes.



2010 Atlas Copco acquires Quincy Compressor Inc. from EnPro Industries Inc. Quincy Compressor designs, manufactures and markets reciprocating compressors, rotary screw compressors and vacuum pumps to industries across the U.S.

2011 Atlas Copco acquires SCA Shucker and its U.S. operations become part of Atlas Copco. SCA Schucker manufactures adhesive and sealant equipment for use in the automotive industry, as well as many others.

2011 U.S. Dept. of Energy awards Atlas Copco Secoroc \$3.4 million for a three-year research and development project working with Sandia National Laboratories.

2012 Atlas Copco Secoroc agrees to acquire U.S.-based NewTech Drilling Products LLC. NewTech develops and manufactures drilling products with a focus on rotary PDC (polycrystalline diamond compact) drill bits as well as Klaw bits for rotary soft rock mining.



BREAKING NEWS

Demolition crew wins race to remove Golden Gate's south ramp »
by Monday morning rush hour



» **S**an Francisco's Doyle Drive no longer exists. It had been around as long as the Golden Gate Bridge itself, opening to traffic in 1937. The 75-year-old elevated highway that had lain between Marina Boulevard / Richardson Avenue and Highway 1 was outdated by today's construction standards and was an earthquake concern. It is being replaced by the Presidio Parkway project.

The transition from what is also known as Route 101 to the temporary bypass took place in just a single weekend.

Demolition was orchestrated by Ferma Corporation, an engineering and demolition services company working this job for R&L Brosamer Inc. the general contractor for the renovation.

The contract's stipulations for this part of demolition meant Ferma's crews would only have 24 hours to demolish and remove three critical sections of Doyle Drive that interfered with the Presidio bypass. Ferma president Marc Ferrari said even for Ferma, which owns and operates over 1,000 pieces of its own machinery, this project's logistical requirements and time constraints were considerable. It meant freeing up or locating a large number of machines and tools and having them at the ready for the signal "Go!" with no room for equipment failure or downtime.

For his additional equipment needs Ferrari worked with a number of rental agencies. When he looked for breakers, he trusted RGW Equipment Sales, the authorized Atlas Copco distributor in that territory. He said, "These guys have a can-do attitude. It's the kind of relationship I like to have with dealers." The construction side of Ferma, he said, works with RGW frequently.

RGW supplied the additional five heavy-duty breakers Ferma needed: an Atlas Copco HB3000, HB3600, HB4700, HB7000, and the giant HB10000. RGW also reserved Atlas Copco's CC 6000 Combi Cutter, its largest model.

There was not a single equipment failure on the Atlas Copco breakers or Combi Cut-

“These guys have a can-do attitude. It's the kind of relationship I like to have with dealers.”

Marc Ferrari
Ferma President



ter during the project. And not only did Ferma clear out the three conflict points, the company decided to make a 35-hour push and take down the entire superstructure consisting of 65,000 tons of concrete. With on- and off-ramps, it measured nearly a full mile of roadway.

RGW Equipment Sales LLC is the division of RGW Construction Inc. that takes care of its own construction company's needs and those of other construction customers. RGW Equipment Sales is one of the largest equipment service organizations in Northern California with its state-of-the-art service and repair facility and 13 fully equipped service trucks. Its 20 mechanics are all schooled on a wide assortment of demolition equipment from leading manufacturers. All of them have model-specific training from Atlas Copco on its equipment, from air compressors to the breakers themselves. This meant that not only could RGW meet Ferma's request, but it could contribute 24/7 technical support for the equipment, teaming up with Ferma's own technicians.

Ferrari was already familiar with Atlas Copco as a compressor customer. And he knew Atlas Copco Construction Equipment Regional Channel Manager Dana Creek-

more already, having met him at a national demolition show. In early 2011 they began discussing equipment needs for the Doyle Drive project. RGW submitted its bid in June and was already beginning to bring in equipment by July for what was originally to have been a September start on the project.

Hurry up and wait

Ferrari said, "We were given a September start date that slid into October. By November 15 we knew we would hold off because of the holidays until at least the end of the 1st quarter. Then it was to be March. But Dana and the RGW team came in here and said, 'We'll do what you need us to do.' It's just what I needed to hear on this kind of job. Notice I was received was very, very limited. I felt like I had them playing hurry up and wait for me, because I kept starting and stopping them, but never once did they get upset."

Warren Hanson, a sales representative from RGW, did admit that at times he wondered a little about equipment availability as the time stretched out. "We actually brought in the equipment, all except for the big hammers, in June 2011, holding it for this job."

Nevertheless, when Ferma got the green light about six weeks before the final start date, RGW got them the equipment on time and was on hand 24/7 to make sure hoses and brackets fit and flows and pressures were set precisely.

RGW and Ferma both had mechanics on the site. Both took notice of one of the



Atlas Copco specialists who was there. Said Hanson: “Keith Becker from Atlas Copco was absolutely amazing. He did a marvelous job,” adding that Becker lent a hand in diagnosing a number of issues as they came up, ensuring hydraulics were performing optimally, capable of full power to the breakers. Becker is a product development specialist who travels to sites to ensure the products perform exactly as promised. No one knows the hammers better than he does.

Ferrari said, “I noticed him there and he was there throughout the night. When we started it was already dark. He could have slipped off to a motel, but instead he stayed to support the product. I wasn’t charged extra for that. Service was phenomenal. They were out there in force for us.”

Ferrari laughed as he added one more example. “At one point they became a little pit crew for my superintendent when he pulled in with a flat tire. They just said, ‘Hey, we’ll take care of that for you.’ When he came back it was fixed.”

The care taken on this job wasn’t just demonstrated by equipment performance and service on the site. Both Creekmore and Hanson said this was about the smoothest orchestration of a project they had ever witnessed. Ferrari attributed it to good team-

work over all led by Ferma’s General Superintendent Don Ferrari and Superintendent Travis Thompson, who coordinated the steps of the demolition.

Said Ferrari: “We had perfect safety. Not a single cut. That’s most important to us. This was done with seven crews and over 100 workers running at the same time all while starting and running at night. We had crews working from the ground and on top of the deck at the same time. We had to make sure we cleared certain areas before we started others to make sure we could get all four crews off the deck. Then we had to keep all that material from above cleared in certain areas to restore access across the site. I’m very happy with what our crew was able to do.”

Ferrari said he felt some stress relief finally when he awoke early Monday morning in time to hear the 5:30 a.m. news announce the bypass was opening 15 minutes early. Two weeks afterward, of the hundreds of machines on-site, only about a dozen pieces of equipment were still there working. Three of the hammers, the HB10000, the HB7000 and an HB3000, were left to assist in reducing the remaining piles of con-

GET 30% MORE LIFE OUT OF YOUR BREAKER

No matter what kind of breaker you have, it spends its working days busting up rock and debris. It’s no wonder that good maintenance is so important in protecting the substantial investment you made when you purchased it.

30% more uptime

Those industry professionals who own, manage or operate a fleet of equipment are well aware of the importance of proper maintenance. A breaker that receives scheduled maintenance as recommended by the manufacturer is able to deliver 30 percent more uptime than a unit that is run to component failure before being serviced.

In general, regular breaker maintenance consists of the following tasks:

- Checking carrier flow rates and operating pressure
- Checking nitrogen charge where appropriate
- Regular lubrication
- Proper storage
- Timely replacement of bushings, tool steel and wear components

Machine setup

Before your new breaker fires a shot, your carrier’s hydraulic system should be set up to match the attachment’s specific flow and pressure requirements. Although machine specifications may indicate a good match, a carrier should be tested at least once a year—more often in heavy-duty applications.

It’s important to know that flow problems can pose just as much risk of damage to an excavator or other carrier as they would to the breaker. Also, too little or too much oil will reduce breaker performance and could damage parts of the breaker and carrier. There is really no way to compensate for improper machine setup.

Uptime is just part of the equation

A regularly maintained breaker will also give you optimal performance and top production. And based on our own experience in the field, we have discovered that following the factory’s maintenance schedule (parts and service) for a mid-range breaker typically only costs about 9 percent of the total cost to operate. As a specific example of the value of following the maintenance schedule, a piston replacement can usually be avoided by simply replacing bushings and tool steel at the proper time.

crete to Class 2 base rock.

The rest of the rental equipment has moved off to other jobs, and Ferma is engaged on other projects. But both Ferrari and Hanson said the Doyle Drive demolition was going to count among their most memorable projects. For Hanson part of that memory will be getting to work closely with the caliber of institution that Ferma is, which he termed a “crown jewel” in his 41-year career. In turn he believes RGW and Atlas Copco also made a good impression on Ferma. Would Ferrari work with them again? “Of course—well, I already am!” ☺

Exploration focus at **PDAC** show

United States representatives of Atlas Copco were among the exhibitors for the Prospectors & Developers Association of Canada Convention, which drew an international crowd of more than 30,000.

Exploration products took center stage, including Excore, Excore EXII Safety Overshot and an Atlas Copco Christensen CS14 crawler core drilling rig.

A new product was featured at the show—the Atlas Copco Securoc RC40 hammer for reverse circulation drilling. Its modular system features a one-piece sample tube that can easily be changed without opening the hammer. Matching the RC 40 to Atlas Copco pipes, which are 23 percent lighter, allows exploration to depths greater than 1,970

feet. The RC 40 hammer is ideal for hole sizes 5 to 5.5 inches in a variety of conditions. The hammer's unique new design is 34 percent shorter than other 4-inch hammers and 20 percent lighter than its competitors. It can also be serviced more quickly. Ⓞ



Ken Breen of Atlas Copco Canada exploration products talks to a customer about the CS14



MARK PRUEHER



Premium bit payoff

Change in diamond core bit increased ROP 40%, tripled bit-life

When Major Drilling sent project supervisor Brad Kiser to a graphite exploration job in Alabama, Kiser said he pretty much knew what bit series they would start with and what to expect from it. However, Kiser said he wasn't happy with his initial results in this site's conditions.

Graphite at first doesn't seem like a mineral that should cause much of a drilling problem. However, the same soft, lustrous gray stuff used for pencil lead (as well as high-temperature lubricants, battery cells and motor components) is most often found in complex layers of abrasive metamorphic rock. Here the rock was highly fractured, Kiser said. Choosing just the right diamond coring bit for this job would take a bit of trial and error.

Kiser said drilling had been going okay in general, but he thought he should have been getting longer bit life. He had seen 700 feet on one bit, but on average bits lasted between just 300 and 500 feet here. Having worked previously for a company that used Atlas Copco wireline coring bits, he recommended the manufacturer to Mark Prueher, who is Major Drilling's Central Area Manager based out of its Little Falls, Minn., location.

Prueher contacted marketing specialist Katherine Rogers of Atlas Copco Geotechnical Drilling and Exploration division.

Founded in 1980 in Bathurst, New Brunswick, the multipurpose drilling company Major Drilling Group International is today one of the world's largest metals and minerals contract drilling companies with more than 760 drills operating in 22 countries on six continents.

"We'd tried a variety of bits of other manufacturers here," Prueher said, "in series four, six and seven. But we always came up with the same bit life, the gauge row wearing out." Rogers recommended Excore.

Excore is Atlas Copco's premium bit line. Its longer wear life and faster penetration rate in conditions like these are made possible by fine-tuning its matrices and crown profiles. Though each Excore bit covers a wider range of conditions than non-premium diamond coring bits, these slight matrix and crown changes can represent huge differences in performance. So when customers are looking to improve bit performance in conditions such as Kiser had been encountering in Alabama, Rogers dials in corrections to find a perfect match.

Prueher detailed the conditions the bits were struggling in. The terrain at the site was a bit hilly. The driller was encountering bedrock anywhere from 20 to 50 feet. The bedrock consisted of multiple layers of quartz, pyrite, graphite, schist and densely grained metamorphic rock with fine sandstone blends. Of the 66 holes drilled, depths ranged from 250 to 500 feet, vertical and angled.

Hearing the results Rogers chose two bits she believed would solve the problem. Prueher said, "The results were immediate. With the Excore 6-8s Katherine sent us we saw our penetration rate increase 30 to 40 percent. Average bit life went to 850 feet. The cost per foot went down to just 27 percent of what it was, a substantial savings."

Kiser explained, "The inside matrix on these 6-8s was strengthened, so the gauge row won't wear as fast, yet the bit doesn't polish off, it still self-sharpens."

Prueher said, "We weren't just saving on per-foot cost but also on tripping out less often. Originally we were using a new bit each hole when we were drilling 300 to 325 feet. But for deeper holes you're looking at

EXCORE SYSTEM

The Excore premium wireline product family consists of much more than coring bits. It's an entire system. The line includes a head assembly configured for use in both surface and underground drilling orientations, an improved overshot assembly for increased safety, a MO-EX pipe thread design that increases productivity and reduces downtime, and two types of rod, MO and CMO, for both straight and deviated hole drilling applications.

But Excore bits will also work with almost any existing wire-line setup, as they did for Brad Kiser's crew on the Alabama graphite exploration job: "We put the Excore bit on the core barrel we have. Nothing special is needed for it."

The extra attention to matrix and crown design mean greater penetration rates can be achieved with less pressure, which in turn yields several advantages. Lower weight on bit results in less deviation, which makes core extraction more exact. Lower weight-on-bit drilling means less wear and tear on the entire string, including the rig itself. Yet when hard competent rock conditions allow a driller to push for greatest penetration rate, Excore bits excel.



up to 60 minutes of nonproduction and associated costs."

Doug Podraza, product manager with Atlas Copco, said that isn't unusual for Excore. "Time and again the Excore diamond tools have proven their value by increasing bit life and the rate of penetration driving down the total cost of drilling for our customers."

Kiser said, "We finished the job while we were on the second bit, an Excore 6-8 in HQ. This one had 1,200 feet on it when we stopped and the driller believed he could still get maybe 400 feet more from it.

"Our customer was happy with the job. They even wrote up a press release in which they say how pleased they were with Major Drilling." ◉

Atlas Copco has a large presence at **SME**

The 2013 Society for Mining, Metallurgy & Exploration (SME) annual meeting in Denver was its largest so far with 7,202 in attendance and nearly 823 exhibitors and booths.

New to the show this year was a special honor sponsored by Atlas Copco, the Miner of the Year Award, given to Cherie Tilley. The award was established to recognize mine site leaders who are able to manage production, people, community, safety and be good stewards of the environment.

To say that Tilley was born to be a miner is no exaggeration—he was born at Anaconda’s Rio Tinto mining camp in Nevada and raised at Anaconda’s Darwin mining camp in California. When Tilley was 11 years old his father put him to work underground on a Scheelite discovery. They used hand steel and a single jack to excavate a 40-foot shaft where they had a hand windlass for hoisting.

Atlas Copco Geotechnical Drilling and Exploration Division Business Development Manager Bill Warfield steered the creation of this new award. He said, “This award isn’t about Atlas Copco or what equipment he uses, but about someone who has contributed so much to our field.”

Tilley said, “If I wasn’t in mining, I don’t know what I would have done. It’s all I know. Receiving this award is a great honor.”

Warfield said, “We felt that we as a group were good at giving honors to top level management, the CEOs. But we were lacking in recognizing the person who gets in and does the work in the mines.”



Pictured are (from left) Jess Kindler, General Manager of Atlas Copco Nusantara and SME division secretary, Bill Warfield, Miner of the Year Cherie Tilley and M&E Chair Steven Holmes.

Cherie Tilley has spent 54 years in the underground mining industry, working in mine management the last 37 years. Some of the positions he held during his distinguished career include:

- General Mine Superintendent at the Mariano Lake Mine
- Development Superintendent at the Mount Taylor Mine for Gulf Mineral Resources
- Development Manager at the Nose Rock Project in Crown Point, N.M., for Phillips Uranium
- Mine Development Director for Phillips Petroleum in Denver
- Vice President-Mining for American Mine Services
- Mine Manager at the Stillwater Mine for Chevron Mineral Resources
- Project Manager, Safety Director and Area Manager for Dynatec Mining Corporation



1988 in Chevron Stillwater Mine

Tilley retired from Dynatec Mining Corporation but is active as a mining consultant as Tilley Exploration and Development Company LLC, and serves on the board of directors for Copper King and Mohave Gold.



MINING: IT'S ABOUT THE PEOPLE
2013 SME Annual Meeting & Exhibit
and CMA 115th National Western Mining Conference
 February 24-27, 2013 • Denver, Colorado, USA

More honors

- » Atlas Copco's Bill Warfield received the Distinguished Service Award, which honors members of SME who have made outstanding contributions to the Mining & Exploration Division in its programs or other activities. Warfield has been an actively involved member of SME since he was the President of the Student Chapter at Colorado School of Mines. He has served on numerous SME and M&E committees. As M&E Division Chair in 2011, Bill oversaw the creation of the Miner of the Year award and the Stewart Wallace Memorial Scholarship—both of which were awarded for the first time at SME.
- » M&E Outstanding Young Professional Award was given to Elaina Ware, mine operations manager for Rio Tinto's Kennecott Utah Copper and also is responsible for the management of employees at Bingham Canyon Mine in Salt Lake City.
- » The SME Rock Mechanics Award recognizes distinguished contributions to the advancement of the field of rock mechanics. This year's recipient of the Rock Mechanics Award was Dr. Mark Board, geotechnical engineer with Hecla Mining Company.
- » Ben F. Dickerson, III Award recognizes professionalism and contributions to the mining industry and went to Tom Patton. Patton has worked in the exploration industry for over 40 years. He cur-

rently serves as the President and CEO of Quaterra Resources Inc., a junior exploration company with headquarters in Vancouver, B.C.

- » Robert Peele Memorial Award is given for the most outstanding paper published on behalf of the Mining & Exploration Division by an SME member under the age of 35. The 2012 Peele Award recipient was Ananta Yennamani, mine engineer with AMEC, for her paper titled "Blast-Induced Rock Movement Measurement for Grade Control" published in the February 2011 issue of Mining Engineering magazine.
- » The William Lawrence Saunders Gold Medal, funded by AIME, recognizes distinguished achievement in mining other than coal. The Saunders Medal was given to Ronald Thiesen, Chief Executive Officer of Hunter Dickinson Inc.
- » The Mining & Exploration Division provides scholarship opportunities to deserving undergraduate students majoring in mining, geology, or other field of specialization covered by the Division's unit com-

mittees. Recipients were Ashleigh Mitchell from New Mexico Institute of Mining and Technology, Tyler Morgan from University of Arizona, Simon Ortega from University of Alaska Fairbanks, Chelsea Pomeroy from Colorado School of Mines, and Justine Sorensen from South Dakota School of Mines and Technology.

- » The Henry DeWitt Smith Graduate Scholarship was awarded to Caelen Anderson from Colorado School of Mines.
- » Eugene F. Pfeider Memorial Scholarship was awarded to Andrew Crook from the University of British Columbia.
- » Erica Key, a graduate student at the University of Nevada-Reno, received both the Steven C. Potter Memorial Scholarship and the Stewart R. Wallace Memorial Scholarship.

» The Daniel C. Jackling Award and Lecture was given to Edward C. Dowling. The award is funded by AIME and is presented for significant contributions to technical progress in mining, geology, and geophysics. In Dowling's lecture, he painted a picture of the industry showing its recent successes from higher commodity prices and the need to streamline costs. He said mining has a promising future despite socio-political challenges and world economic conditions. ☉



EDWARD C. DOWLING

LARGE and in CHARGE

*Colorado company demonstrates
power of grout plant designed
especially for U.S. market*



Chris Todd established HTM Construction nine years ago with co-owner Aaron Holderith when he was just 25 years old. He already had an engineering degree by then and also several years' experience installing ground support systems. In addition to being an avid designer, he was also a successful, multitasking project manager who was bidding, launching and overseeing several projects simultaneously, generating up to 40 percent of his former employer's revenue.

This dual capability—designing and building—distinguished HTM from the start and remains a company hallmark. “We design about 90 percent of what we build,” said Todd.

HTM's reputation for on-time quality work and low-cost logistical efficiency means the Lakewood, Colo., company has been awarded jobs as far away as Georgia. The jobs have also grown in size, from residential retaining walls to securing long stretches of roadway. Though not their largest project to date, a recent job called for 820 active anchors to secure the concrete basin of a new reservoir designed to protect a water treatment facility's operations from storm-water run-off. This job required over 3.3 million pounds of grout for two different grouting stages, filling tiebacks first at low pressure, then post-grouting at high pressure. So HTM turned to Atlas Copco, who hooked the company up with its Unigrout Flex-D Large grout plant.

“I'm very happy with it,” Todd said of the plant, tipping his hat to Atlas Copco's chief grout plant expert in the U.S., Ken McClanahan. McClanahan has more than 40 years' experience in grouting and was influential in fine-tuning the design of the Unigrout plant for the U.S. market.

As a ground support specialist Todd has consulted a number of grouting authorities for various projects in the past decade. Of them, he said, “I'd rate Ken number one in the country for his grouting knowledge. If he's not number one, he's among the top five. Easy.”

McClanahan had come to the site to personally train Todd on the system, who in turn trained his own operators. Todd said training wasn't difficult. “We had a silo custom built to feed the mixer. Turn on the mixer, then transfer to the agitator, ready to pump.”

Since the Cemag agitank has double



The 820 anchors of this reservoir project won't actually connect to the reservoir's concrete basin. They don't need to. They serve to keep the soil beneath the basin in place. After they are covered with fill, the basin will float freely over them without stress points.

Each of the project's anchors comprises four 7-strand cable tendons. After passing a 10-minute creep-test, the tension of each tieback was set at 145,300 pounds.

the capacity of the Cemix mixer, there can be three batches of cement ready at any given time, up to 318 gallons.

Reaching bedrock

Todd described ground conditions at this site in plain terms: “Dirt. Basically just dirt down to bedrock, or what we call bedrock. We didn't need a hammer at all here, that's for sure. Rotary drilling.”

He explained the bedrock was shale in groundwater. The site was continuously pumped during construction. Once exposed to air the shale slaked, deteriorat- ➤



“We could drill a 70-foot 8-inch hole in about 12 minutes.”

Chris Todd

Owner, HTM Construction



ing rapidly into a gray mud. Beneath a work boot the drying shale was something like the damp wood charcoal of a campfire freshly doused. Below the exposed surface, however, it remained solid and firm. The rock below was the anchoring target.

The anchor system design for the reservoir consisted of several concentric lines of tiebacks drilled perpendicular to the sloping sides of the reservoir by an Atlas Copco CM 785 down-the-hole crawler drill rig and a Casagrande C6 piling rig. “The 785 was the perfect drill for this job,” Todd said, commenting on the rig’s accuracy and speed drilling the 8-inch bores, hole after hole. “For example, we could drill a 70-foot 8-inch hole in about 12 minutes.”

At the top level the longest hole was drilled at an angle to 112 feet. At the lowest level, 45 vertical feet below the reservoir’s rim, the shortest tieback hole was drilled to 67 feet. Holes were temporarily cased with PVC up to 32 feet for anchor installation using another manufacturer’s casing system.

Grout from the plants reached the tiebacks through lines up to 700 feet long. Operators learned quickly to count strokes. Knowing the strokes enabled them to flush the line without having to waste 700 feet of grout. They also knew how many strokes it would take to fill the lines before starting to grout again.

Active anchoring system

At peak production HTM was running both drills, the Unigrout Flex-D Large, a Unigrout Flex-D Regular, and an older grout plant the company had used prior to working with Atlas Copco. “What’s so nice about a Unigrout,” Todd said, “is that we can fill the holes at, say, 35 gallons-per-minute and 100 psi. You’re basically just filling the corrugated tube with that

and you don’t want high pressure. Then come back later, flip the switch to high pressure with a six-bag mix, and post-grout up to 500 psi. We couldn’t switch to high pressure with our old plant.”

The post-grouting technique sent a high-pressure, six-bag grout mix to break the earlier grouting at designated intervals, where it expanded through hose-covered holes spaced at intervals along the bottom length of two PVC fill tubes. The pressure required to break the first grouting depended on how long it had set. Several days sometimes passed before post-grouting.

Along these points near the end of the tieback column, the post-grouting expansion maximized bonding with the sides of the hole. It’s this technique that allowed the tiebacks, each consisting of four seven-strand cable tendons, to pass a creep test with less than .01 inches of movement during a 10-minute creep-test. After creep-testing, the tension of each tieback was set at 145,300 pounds.

Todd himself designed the reaction blocks for the system. Todd’s design utilizes reinforced concrete panels to support the bearing plates. The panels’ purpose is much like that of a wide washer on a bolt. Without the panels the anchors would have required much larger bearing plates in these soil conditions. He calculated the top rim of tiebacks in clayish soil to require 8-by-7-foot reinforced concrete panels. Against the bedrock near the bottom of the reservoir, however, the panels needed only to be 4 by 4 feet.

Chris Todd of HTM Construction designed the reinforced concrete panels that support the bearing plates. Acting like a washer on a bolt, Todd calculated the top rim of tiebacks in this clayish soil to require 8-by-7-foot reinforced concrete panels. These panels against the bedrock near the bottom of the reservoir, however, needed to be just 4 by 4 feet.

As HTM completed the tiers of tiebacks, other crews covered them with gravel fill before laying a 6- to 8-inch layer of concrete. This prevented tiebacks from attaching to the reservoir itself.

“Flex”-ibility

Initially HTM was renting the Flex-D Large for its high-pressure capability. Not all of their projects require this capability. In fact, Todd said the Flex-D had more capabilities than they required on this project. He mentioned features such as an alternate pump cylinder capable of pressures greater than 1,400 psi, as well as an optional multifunction Logac data recorder. Yet, he so was pleased with the unit that he opted to purchase it rather than return it when the job was completed.

It will come in handy on future tieback jobs. Todd said transportation and logistics have not presented too big a problem for them in their bids so far, so his company can bid on jobs just about anywhere. ☉



Hard water

Municipal water project calls for revised horizontal directional drilling technique and better reamer, the Atlas Copco DR54C Hole Opener

Water from the municipal wells of Franklin, N.H., has always been safe to drink, but in 2008 city leaders decided to treat the water to eliminate the odor, taste and staining problems of its high manganese and iron content. The project required installation of two 12-inch mains (raw intake and treated supply) connecting two groundwater wells on one side of the Pemigewasset River to the

new treatment facility and a third well almost directly north on the other side. Nearly everyone involved with the water treatment project agreed horizontal directional drilling (HDD) was the best technique for installation, having the least impact on the river's ecology.

The project team chose to drill through the river's alluvial bed, which was once part of the area's low-lying wetlands. All signs

were that it would be faster, easier and as a result much less expensive than drilling through the underlying bedrock, which was expected to be schist and sandstone. However, one significant bit of information was missing: the southwest channel's bed had been almost completely replaced with armor stone.

For Henniker's founder Jeff Martin, who has 26 years in the industry, it sim- »



Jeff Martin's expertise in HDD equipment and techniques, his crew's commitment to finishing the job, and his faith in Atlas Copco got the job done. A paper presented to the North American Society for Trenchless Technology (NASTT) at the 2012 "No-Dig Show" in Nashville, credited "the contractor's perseverance and the project team's patience" for getting Franklin's water project completed in spite of the obstacles.

» ply meant the job was going to take longer than planned. Once a geotechnical consultant determined what he was up against, he knew a variety of techniques and tools to get the crew through the HDD job. This project ultimately called for a change of path and depth, his biggest HDD machine, an Atlas Copco 6.75-inch tricone rotary bit and an Atlas Copco 12.25-by-5.5-inch DR54C Hole Opener before final reaming and swabbing of four 18-inch bores, two per channel.

Surprise obstacle

The river is actually divided into two channels at the Franklin Falls Dam, one of a network of large earthen dams the Army Corps of Engineers built for regional flood control in the 1940s. The channels are separated by a 560-foot wide strip of wooded land called Piney Point and continue southeast a short distance to where they join again at

the north end of the city, turning south as one body to flow through it.

Preliminary land-based test hole analysis along the riversides, combined with supply well test borings and ground penetrating radar samples from the channels themselves showed nothing more than some random cobble and small stones to work past. In the southwest channel, this layer was expected to be 20 to 30 feet thick. The northeast channel was judged to be 85 to 100 feet thick. Henniker Directional Drilling went right to work at the southwest channel (the discharge channel), but the crew soon encountered an extensive barrier of large boulders.

The Henniker crew had tried for a month with claw-type soil bits to get a bore completed on the southwest channel, repeatedly running into boulders. Sending bit after bit in several strategic attempts, Martin's crew was finally convinced that conditions were too harsh for controlled directional drilling.

While the project team sorted things out on the southwest channel, Martin's crew moved to complete the northeast channel. They encountered no problems there, making the two bores from the channel's eastern shore that exited in the middle of Piney Point. It took only one week per bore. Once the two bores met companion bores from the southwest channel on the island, the crew could pull the 12-inch SDR-9 HDPE plastic pipe through them to complete the mains.

Meanwhile the project team discovered historic documents in the Army Corps of Engineers' files whose photographs revealed the problem. The southwest channel at this site had been dug as a discharge channel. After excavating its course 19 to 27 feet deeper than its original grade, with most of the excavated alluvium removed to Piney Point, the newly discovered photographs revealed how the Army Corps of



Engineers had closely layered the remaining thin river bottom with 10- to 20-foot-high boulders. Neither the land-based test holes nor the dam's design plans had clued project engineers to this hidden armoring against erosion from the discharge. The river's northeast channel had not received this treatment.

What Martin's crew was supposed to drill through had essentially been replaced with this armor stone. "You can drill through [natural formations of] rock even with cracks and fissures, but you can't control drilling through that kind of manmade formation," Martin said, explaining the havoc wreaked on bits and drill rigs by the frequent, large voids and changing surfaces of the boulder array.

Switching to a quality reamer

When the city changed plans to go lower, avoiding obstacles by drilling within the bedrock, Martin said he initially made a choice he regrets: he didn't start with an Atlas Copco Secoroc Hole Opener reamer.

The new strategy had begun okay. He brought in his Vermeer D100X120 HDD machine and a mud motor to steer the 6.75-

inch Atlas Copco tricore through the bedrock on a path 20 to 40 feet deeper than the original plans called for. It was relatively straightforward rotary rock drilling in conditions that varied from weathered and unweathered bedrock to cobbles in sand.

Reaming did not start off well, though. The crew burned through two off-brand 12.25-inch reamers, which they used only because they were close at hand and seemed inexpensive. However, the reamers could not be advanced more than just a few dozen feet of entry. "That cost us unnecessary time and also the investment in those bits," Martin said. He said there was a greater risk, too, in pushing a cheap bit too hard as it wore down: "Break off a carbide from one of those cheaper bits in the hole, you'll lose time, maybe several days, fishing that out, or you might even have to abandon the hole, start over."

Martin said it didn't take long to get a quality bit when he called the Atlas Copco store in Ludlow. The 12.25-by-5.5-inch DR54C Hole Opener was picked from the shelf of their Nashville affiliate and sent to Martin by overnight delivery. What sets Atlas Copco Secoroc Hole Openers apart

are the company's proprietary bit-thirds, giving HDD drillers a reamer designed by a dedicated rotary rock bit manufacturer. The random cutting structure of these bit thirds evenly distribute the load and contain more cutters for more efficient cutting and longer tool life. They stand up in hard applications such as those Martin's crew faced at Franklin.

After completing over 400 feet in the southwest channel bores the reamer was judged to still have about 70 percent tool-life remaining for future projects. "I'll definitely use it again. And from now on, I'm just sticking to Atlas Copco. There's no sense in wasting time and money buying other bits."

Atlas Copco Product and Business Development Manager for HDD Bruce Betty said, "The DR54C Hole Opener is designed for conditions that other tooling can't touch. Our tooling has consistently provided drilling contractors with a lower total cost of operation while completing bores ahead of schedule. We are happy to have been able to provide a solution for this project and wish Jeff continued success." ☺



Dynapac launches new interim Tier 4 compliant paver range

To meet the new emission regulations, the upgraded paver series has been equipped with the Cummins QSB 6.7 liter interim Tier 4 engine. The engine delivers 220 hp at 2000 rpm or 230 hp at 1800 rpm. The Cummins interim Tier 4 engine also provides a direct flow air cleaner and new technology in the form of Exhaust Gas Recirculation, Diesel Oxidation Catalyst, and Diesel Particulate Filter systems.

Dynapac adjusted the paver duty cycle

so that regeneration of the DPF system occurs without disturbing the paving operation in most conditions. A high pressure fuel injection system reduces fuel consumption up to 5 percent over earlier engines. The interim Tier 4 engine reduces exhaust emission of particulate matter by 90 percent and NOx by 45 percent.

To learn more about the interim Tier 4 F1000 pavers, watch the video at www.dynapac.us

Dynapac introduces high density paver models

Dynapac has introduced a new model, SD2500CS to its high density asphalt paver family. Several innovations enhance machine and screed performance and operator effectiveness even while making operation quieter and more fuel efficient.

The SD2500CS is powered by an interim Tier 4 certified Cummins QSB 6.7 water-cooled turbo-diesel engine rated for 200 horsepower (149 kW) at 2,200 rpm.

For even finer performance the paver can be outfitted with Dynapac's patented Vari-oSpeed drive option with automated load sensing.

The Dynapac SD2500CS also offers the industry's first hydraulic push rollers. The



hydraulic push rollers minimize impact from the truck during asphalt delivery to the paver. Acting as a shock absorber for the paver, they guard against bumps in the asphalt surface.

The SD2500CS operator's platform can slide hydraulically from one side to the other with a safe-impact system to provide safe docking for the operator. An optional "weather house" offers better visibility and protection during harsh weather conditions.

Dynapac offers a new remote control and color screed display with easy and intuitive handling. Energy-saving LED working lights and an adjustable camera system has been added so that an operator can easily monitor the application.

Atlas Copco honored for business practices

Atlas Copco has once again fared well in several prestigious rankings of the world's largest manufacturers. The company earned its highest marks in the areas of innovation, sustainability and environmental responsibility.

Atlas Copco has been included by Forbes in its list of the world's most innovative companies. Dow Jones selected Atlas Copco for its 2012/2013 sustainability index, and Newsweek chose the group for its Green Ranking of global companies. Atlas Copco had also placed in these lists before.

Forbes selects companies for the list by an "innovation premium" based on a company's market capitalization compared to anticipated cash flows from the company.

The Dow Jones Sustainability Index lists the world's leading sustainability-driven companies. Membership in this index is based on an annual assessment and comparison between industry peers.

Newsweek's Green Rankings evaluates the 500 largest publicly traded companies in the world. Leading environmental research providers, Trucost and Sustainalytics, collaborated with Newsweek to assess companies.

Sustainability

Atlas Copco also ranks 18th among the 2013 Global 100 Most Sustainable Companies—a list presented on Jan. 23 at the World Economic Forum in Davos, Switzerland. This is the seventh time that Atlas Copco has appeared in the Global 100 rankings.

"Sustainability lies at the heart of Atlas Copco's innovative products and employee mindset," said Jim Levitt, president, Atlas Copco North America LLC. "As a company with a long and cherished history, we know that being socially and environmentally responsible is not only the right thing to do, but is critical for developing and growing our business in a profitable way."

The Global 100 list is based on a selection of 4,000 developed and emerging market companies, which are measured against key performance indicators. For more information, visit <http://global100.org>.



Award-winning rig

Atlas Copco's Pit Viper 311 rotary blasthole drill rig has been voted innovation of the year by the readers of the international journal Mining Magazine.

Atlas Copco received the Surface Mining Award 2012 (hard rock category) presented by the magazine to Jon Torpy, vice president of marketing at Atlas Copco Drilling Solutions, and Brian Fox, vice president of technology for RockTec. (Fox left, Torpy right)

Atlas Copco distributes Minova FiReP rockbolts

Atlas Copco is working with Minova MAI GmbH to distribute their fiber reinforced polymer (FiReP) line of ground support products. The FiReP Group is one of the world's leading manufacturers of Fibre Reinforced Polymer products for mining, tunneling and civil engineering.

Atlas Copco will be working closely with Klug & Associates, manufacturers' representatives and experts in the North American tunneling market.

FiReP products are produced with high-quality fibers embedded in a polyester, vinyl ester or epoxy resin mix which fixes and protects the fibers. This process results in a high tensile strength longitudinally that resists stretching.

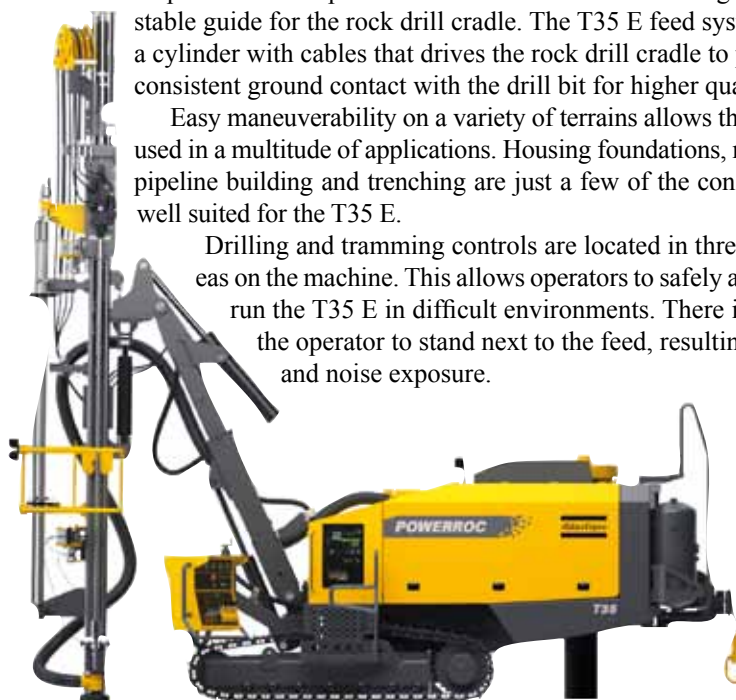
PowerROC T35 E surface drill rig

Atlas Copco introduced the T35 E surface drill rig, the latest addition to the PowerROC product family. The PowerROC T35 E is the non-cab version of the T35 drilling rig.

The new PowerROC was designed with an aluminum feed system to drill straighter holes. Aluminum is highly resistant to bending, and the prism shape of the feed profile allows two directional sliding surfaces as a stable guide for the rock drill cradle. The T35 E feed system also uses a cylinder with cables that drives the rock drill cradle to provide more consistent ground contact with the drill bit for higher quality holes.

Easy maneuverability on a variety of terrains allows the T35 E to be used in a multitude of applications. Housing foundations, road building, pipeline building and trenching are just a few of the construction jobs well suited for the T35 E.

Drilling and tramming controls are located in three separate areas on the machine. This allows operators to safely and efficiently run the T35 E in difficult environments. There is no need for the operator to stand next to the feed, resulting in less dust and noise exposure.



WHERE TO FIND US

Please contact your nearest Atlas Copco Customer Center. Visit the store website to see regional news and product information focused to its location.

State	City	Phone	Website
GA	Atlanta	888-762-3745	www.atlascopco.us/atlanta
MD	Baltimore	877-797-0987	www.atlascopco.us/baltimore
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