Rembco
Geotechnical Contractors, Inc.

The Stabilizing Force
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Taming the Black Wolf

Rembco® plugs a leaky mine

For a mine owner, groundwater is a constant concern – even after the mine is closed. That was the case for the owners of Black Wolf coal mine near Bluefield, West Virginia. As their federal lease neared its end, groundwater seepage from the mine was likely to interfere with the land reverting back to federal control. While the mine was still in operation, a temporary water removal system had kept the inflow under control. But now, the water was collecting in the tunnels…the removal system was overwhelmed…and the water was sheeting-out onto adjoining property. It was also seeping into the soil, moving underground, and re-emerging on adjacent property. Black Wolf called Rembco to stop the flow.

"The job was two-fold," explains Rembco Project Manager, James Grubbs. "Black Wolf wanted us to stop the water migration. They also wanted us to seal the surface openings to stop water from escaping." The two operations called for two different solutions.

Acrylamide underground

First, to stop the below ground migration, Rembco used permeation grouting - performing a series of acrylamide injections to form an underground grout curtain. "This approach is ideal for containing underground water," says Rembco General Superintendent, Tim Adkins. "Acrylamide solidifies into a gel in a very predictable manner. Once its gel time is reached, it forms a matrix of gel and soil that is impermeable to water. When mixed to achieve very short gel times, it will even perform in moving water", adds Adkins. The grout curtain stopped the underground water migration, but sealing the surface openings required a different approach.

Shotcrete at the surface

Next, to cap the mine shaft openings, Rembco elected to seal the five surface openings with concrete. "If possible, we would have brought in ready mix " says Grubbs, "but due to the remote location of the mine, that wasn't a good option." Fortunately, Rembco had just the right piece of equipment: a "dry shotcrete pot" that could easily be brought to the site. "The shotcrete pot uses a dry mix of sand and cement" Grubbs explains, "that allows us to stockpile materials on location and dry-mix them in a hopper. Water is then added at just the right ratio as the mixture is sprayed thru a nozzle onto the receiving surface." This method worked just as planned and prevented further runoff from the mine shaft.

Signed, sealed, delivered

With the underground seepage stopped and the surface openings sealed, the project objectives were achieved. Black Wolf tamed. If you experience similar problems, we can help you tame those, too! Please give us a call. You can reach Mike Bivens at 865-671-2925, or email mike.bivens@rembco.com.

Visit www.rembco.com for more information about geotechnical services. Or Call Rembco today at (865) 671-2925.

Rembco® Extends Its Capabilities

Custom built mast allows driving 35' casing in a single pass

Drilling with an excavator that's located 30 feet away from the hole may seem like quite a stretch, but thanks to a Komatsu excavator with a 42-foot mast attachment, Rembco can pull it off with ease. "There were times when we simply couldn't get other drill rigs close enough to the drill site," says Rembco owner, Clay Griffin. "now, with this mast attachment, we have the reach to do lots of jobs."

Custom designed to Rembco's Specs

"We knew we needed a large excavator arm," says Rembco Operations Manager, Bill King, "but nobody was making a mast that had all the features we needed without including a lot of those we didn't. We decided the best course was to have the piece custom-made. That's when we called Glenn Patterson, VP of Engineering at TEI Rockdrills."

"Rembco asked me to build a mount for a Gardner Denver feed to attach to their Komatsu PC400 excavator," recalls Patterson. "Their immediate need was to drive in a 35' casing with a single pass, but, of course, there are a lot of other uses for the mast. Going with a custom-built mount is a resourceful way for Rembco to utilize existing equipment to greatly increase their capabilities."

More Reach To Do More Projects

The immediate need Patterson refers to is a job Rembco was doing at a radioactive landfill. "We needed to drive down to the radioactive material and then seal it off with grout," says Project Manager Ken Bowman.

But that was just Project Number One for the new mast. "Now we can reach up 23 feet to drill holes for rock anchors," says King. "Changing drill rods at that height is labor intensive and time consuming, but with a 35' single pass, changing drill rod is unnecessary…it makes the job a lot easier and less expensive." "And it's great for landslide remediation," adds Griffin. "A single operator can install soil nails with just one stroke per hole. That's a cost savings we're happy to pass on to our clients."

Got a job that requires a little extra reach? Reach for the phone and call Mike Bivens at Rembco, the Stabilizing Force: 865-671-2925, or email mike.bivens@rembco.com.

Neither Snow, Nor Rain Nor Gloom of Night

Rembco® completes JMU bleachers with no delay of game

James Madison University was faced with the challenge of adding 10,000 seats to their football stadium. The tough part was doing the job after the season's last game and before the home opener next year. So JMU issued a challenge of their own: bidders should plan to hit the schedule goals or step aside and let somebody else do the job. Delays were not an option. Rembco owner, Clay Griffin, accepted the challenge knowing full well it would mean an all-out effort to complete the job right and on-time.

Immediately after the last game of the 2009 seasons, the old bleachers at Bridgeforth Stadium were demolished and removed. As demolition was being completed, Rembco was mobilizing and preparing to stage the site. "We had only six weeks to put in 300 piles," says Rembco Project Manager Ken Bowman. "That would leave just enough time to construct the new bleachers before the Dukes kicked-off a new season. The schedule was very compressed. There was NO room for unwanted surprises. So of course, we immediately had some."

Happy Holidays

Rembco's pile installation began in late November - as did the onset of winter. While Harrisonburg, Virginia, isn't known for its nasty winters, the winter of 2009-10 was an exception. "We had a ton of snow, sleet and freezing temperatures," recalls Bowman. "Working round the clock after a 23" snow, and in sub-freezing temperatures really tested our guys. It sure wasn't a picturesque scene like comes to mind when you think of the Christmas holidays."

Aside from its toll on the crew, cold temperatures can seriously slow down progress. "We were drilling in clay with four different rigs going constantly," says Bowman. "We had to continually flush the holes with water to get the drill cuttings out. That along with the freezing temperatures meant we had ice around the rigs and icing in the lines. Still, we kept drilling. As soon as we'd put on a pile cap, another contractor's crew was right behind to excavate for the footings, then another to frame it up to pour, and then another to pour the concrete. That's the way it went for six weeks."

They Score!

In spite of the harsh and demanding conditions, the Rembco team managed to put in 300 piles in the allotted time. "We were even called on to provide some water stop grouting along the southern edge of the football field before going home," says Griffin. "and the bleachers were ready for the home opener on September 4th."

Many of JMU's loyal fans were able to watch the first kickoff that fall from their new seats. In fact, 16,612 were rewarded with a great home performance as the Dukes pulverized Moorhead State, 48-7. (Probably only a few of those in attendance realized that they were sitting on another great performance…300 Rembco micropiles and a water-stop grout curtain.)

When you need expert geotechnical services for your time-sensitive project, we'd like to help. Just call Mike Bivens at 865-363-4708, or email mike.bivens@rembco.com.

Permeation Grouting 101

Any type of grouting can be complicated. Variables like the scope of the problem, desired outcomes, physical properties of the material to be grouted, structural issues, access restrictions, budget and time constraints, etc… mean that dozens of different mix designs and injection plans should be considered before settling on a "best" solution.

But that's OK. In fact, having lots of options is a very good thing - a long as you have the help of a qualified contractor.

You should never have to worry about exactly how your contractor arrived at that best solution. After all, developing a comprehensive approach – including a suitable mix design - is a large part of how we grouting contractors earn our keep. You should, however, have a good foundation of understanding. At Rembco, we believe that helping you to develop that foundation of understanding is another part of how we earn our keep. Please read on…

Pressure Grouting

"Pressure grouting" is a term that is frequently misused to describe permeation of a formation, but since all grouting is done under pressure, "pressure grouting" is confusing. "We prefer the term permeation grouting" says Rembco General Superintendent, Tim Adkins. "That's a specific term that means we're using a thin, fluid grout to fill the spaces between particles. With permeation grouting, we improve the properties in a variety of formations like granular soil, sand, gravel, weathered rock, or even fractured concrete. We're not filling large voids or displacing loose soils like we do with compaction grouting. Permeation grout soaks-in without altering the structural makeup of the formation being grouted."

There's a Grout for That

For permeation grouting, there is a remarkable assortment of grouts available to choose from – from cementitious, to resinous, to chemical. A chemical grout, such as polyacrylamide renders a soil impermeable to water, so it is ideal for containing groundwater. Epoxy grouts and polyurethane grouts are excellent for repairing damaged or cracked concrete. Both bond tightly to the material being treated, but each serves a different purpose. Polyurethane is used to seal leaks in joints or cracks – even very fine cracks. Combining the best properties of rubber and plastic, polyurethane grouts are effective even when movement or vibration is present. Similarly, epoxy based grouts begin as a thin liquid that readily penetrates cracks and joints. As epoxy cures, however, it takes on very different properties. Within hours, epoxies become extremely strong and rigid, returning structural strength to the material being treated.

Considering the variety of additives that can be prescribed, either alone or in combination, the number of options in designing a grout mix is almost limitless. To apply the best solution, your geotechnical contractor must be well versed in the properties of grouts and additives as well as the strengths, limitations and costs of each.

Special Delivery

Geotechnical contractors must also know how to select the best injection methods for a particular job. One project might require a heavy drill rig and high-rate batch plants, while a more subtle job calls for hand drills and small metering pumps. Sleeve-port pipes (tubes with holes at regular intervals) allow for a predictable and controlled dispersion of grout. And downhole packers are used to isolate particular zones in a formation when two or more zones require distinct treatments. (See an animated demonstration of a downhole packer at **www.rembco.com/***)

All this may seem a bit baffling, but don't worry. Rembco has been designing and performing permeation grouting for more than 25 years. Whether you want to prevent water flow, stabilize granular material, encapsulate contaminated material, improve the physical properties of rock, or simply increase the bearing capacity of a soil, Rembco has a grout for that. And we know how to deliver it in an efficient, effective and economical way.

Whether you're facing a geotechnical problem at your construction site or need help with a structural failure at an existing facility, the skillful advancement of just the right grout may be the answer. For a complete evaluation, call Mike Bivens at 865-671-2925 or email him at **mike.bivens@rembco.com**.