

Outstanding Underground Project Award Recipient— The Heartland Corridor Clearance Improvement

With sky-rocketing fuel costs for truck and air transport, moving freight over national railroads has become increasingly attractive to suppliers and manufacturers. With this increasing traffic demand, many railways have been challenged to find solutions to accommodate the increased volume. The solution that has been under review and planning for a number of years is clearance improvements to the railway system. This will allow for double-stacked containers to be moved seamlessly from state-to-state or coast-to-coast when all work has been completed. The design team worked tirelessly to design and implement an efficient and cost-effective clearance repair method.

Norfolk Southern Railway has, since design completion, embarked on the Heartland Corridor Clearance Improvement Project, which will allow for this seamless movement throughout its system. Tunnels with low clearance and other overhead obstructions will be altered or removed over the next 3 years to allow for double-stack train traffic.

Our firm was the successful low bidder on the first of 28 tunnels on the Heartland Corridor Clearance Improvement Project across the stretch between Virginia and Kentucky. The Cowan Tunnel Project involved the removal of approximately 3304 linear ft (1007 m) of existing concrete crown tunnel liner. This involved grinding the liner to meet required clearance, installing about 7800 rock bolts, as well as applying approximately 2300 yd³ (1758 m³) of steel fiber-reinforced shotcrete. The necessity to complete the repair areas and return the railroad to service at the end of each 10-hour shift was a profound challenge. Working in a confined tunnel 3304 ft (1007 m) long on a single track where 2300 yd³ (1758 m³) of shotcrete was required was daunting. Working in conjunction with our subcontractors, our firm was up to the challenge.

Road headers were used to remove the tunnel liner, which later was removed to stockpile using railway supplied air dumps and company-owned hy-rail car movers. Areas were thoroughly scaled of loose debris, rock bolts were installed in predrilled holes, and drain fabric was installed prior to the application of shotcrete. A typical work train was outfitted with a volumetric batching machine, a gantry hoist system, and a custom shotcrete pump.

Crews were able to apply an average of 30 to 40 yd³ (23 to 31 m³) of shotcrete on a daily basis with minimal rebound and fall out. This was made possible using a prebagged, silica fume, fibrous shotcrete mixture as well as the application of the product by AC Certified Nozzleman. Shotcrete operations were overseen by our tunnel superintendent and ACI Certified Nozzleman. The tunnel nozzleman applied the shotcrete in multiple layers under the site inspectors' direction with very minimal rebound. The finished product far exceeded expectations of the owner. The lead project inspector remarked, "The nozzleman was one of the best I had worked with during my career and appreciated my demand for perfection." The nozzleman was not only able to apply the shotcrete during this project but was also able to provide assistance and training for other nozzlemen within the company looking to achieve their ACI Certification.

The project is nearing completion with an anticipated final turnover in late September 2008. Crews will then mobilize to another four-tunnel project currently under contract to our firm in West Virginia. Similar means and methods are planned for these tunnels with a completion date of mid 2009.

The Heartland Corridor Clearance Improvement Project proved to be a challenging but very rewarding experience. With meticulous schedule planning, labor coordination, and equipment allocation, our firm was able to achieve high shotcrete productivity without forgoing the efficiency of other tunnel work tasks. As the first of the 28 tunnels, our firm developed a standard of means and methods of future tunnel improvements for the project.