



Route 7 Climbing Lanes *Pedestrian Trail Relocated for Safety*

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Location: Leesburg, VA

The Virginia Department of Transportation (VDOT) recently widened Route 7 from Leesburg's West Market Street to Route 9, a major commuter corridor to and from the Washington, DC suburbs. The most impactful improvements were the addition of a climbing lane to relieve westbound congestion due to heavy and slow-moving trucks ascending the steep grade, as well as expansion of the diamond interchange at Route 9 by adding a pair of roundabouts at the tops of the ramps. Both improvements significantly upgraded safety and eased traffic flow in this corridor.

Another significant necessity was the relocation of the W&OD bike and pedestrian trail through the Route 9 interchange, and the addition of a tunnel to reduce conflicts between trail users and vehicles. This portion of the trail on the former right of way of the Washington and Old Dominion Railroad, passes through Clarke's Gap, which was cut in the mid-1800's to accommodate a road, and later, the railroad. The new trail relocation required a precast arch structure (TechSpan®) with mechanically stabilized earth (MSE) head and wing walls to retain the soil at the ends of the arch.



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The geometry of the arch envelopes the required clearance area from the path, 12 feet high by 22 feet wide.

The precast panels have a custom rock pattern, making the overall arch and wing wall structure a near-match for the geometry and appearance of the clearly visible W&OD stone arch bridge, built in the late 1800's. Another Reinforced Earth MSE wall, approximately 200 feet long and having the same panel shape and appearance, supports the trail as it climbs to the Route 9 bridge over Route 7.

The general contractor, Shirley Contracting (Lorton, VA) selected The Reinforced Earth Company (RECo) to design and supply the new structures. Overall project design was completed by Dewberry (Fairfax, VA), with support from geotechnical engineer, GeoConcepts Engineering, Inc. (Ashburn, VA). The MSE walls and arch were precast by K.J. Williams Concrete Company (Cresaptown, MD).

UPCOMING EVENTS

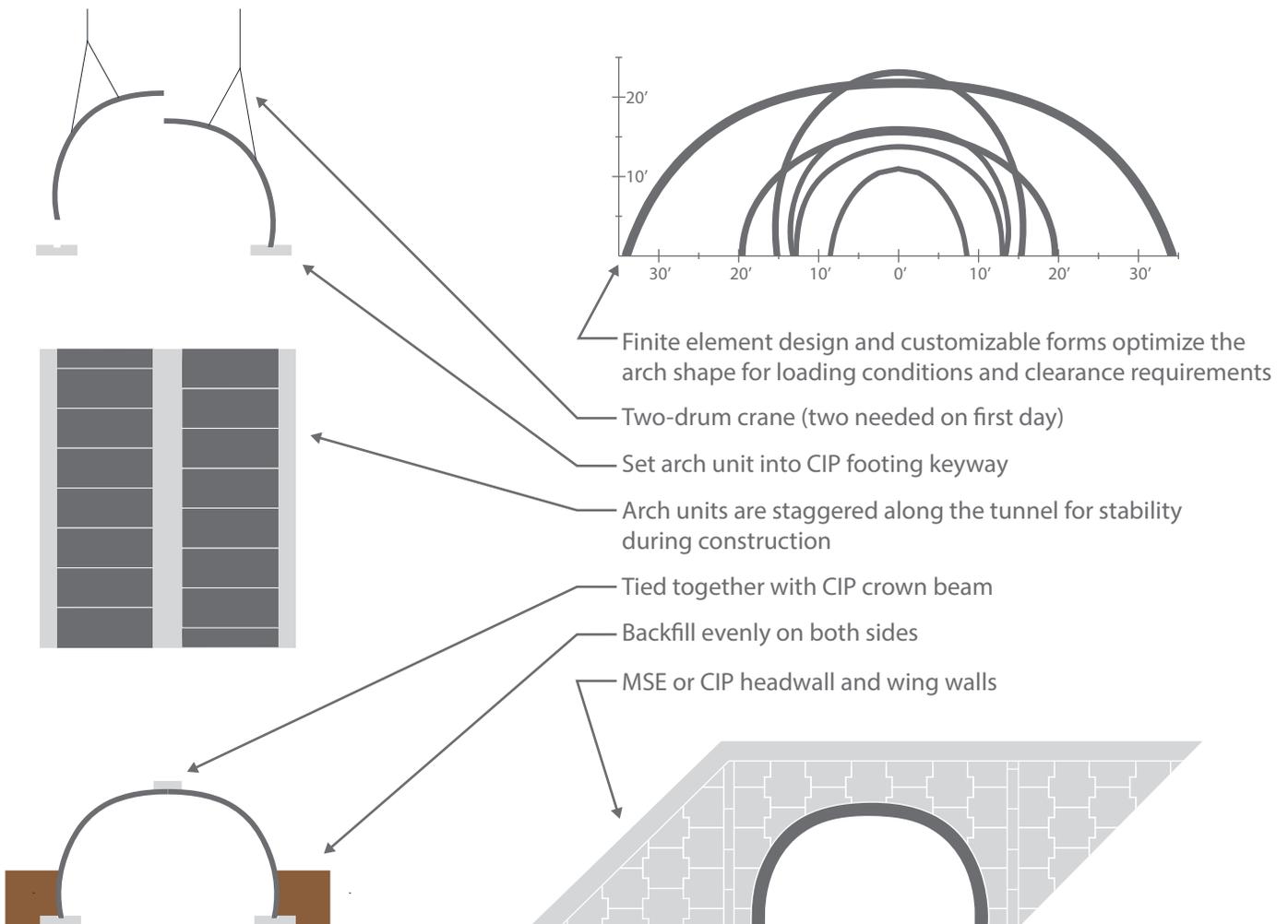
FEB 2 FTBA Construction Conference

FEB 20 SME Annual Conference

MAR 2 Virginia Concrete Conference

MAR 13 Geotechnical Frontiers

What You Need to Know About TechSpan®



Raw Material Storage Reclaim Tunnel

The Challenge

Buzzi Unicem USA is a major cement producer, operating eight manufacturing plants as well as distribution terminals and aggregate quarries across the southern US, and extending north and east to Wisconsin and Pennsylvania. At its Maryneal, TX, facility, increasing the plant's bulk aggregate handling capability required a more efficient way to fill trucks from the stockpile. A simple concept was chosen, which was to elongate the stockpile and run a conveyor beneath the pile. Three questions arose, how to (1) support the 50-foot deep stockpile, (2) support and protect the conveyor and (3) control aggregate flow onto the conveyor? A TechSpan® reclaim tunnel was the answer, but how could they build one economically while addressing their functional requirements?

The Solution

The inherently high compressive strength of an arch structure addressed the "support the stockpile" requirement and also allowed the conveyor to be hung from the underside of the arch segments. The precast fabrication method facilitated creation of openings in the tunnel roof for the 12 hoppers, which were mounted directly to the arch using bolts field-drilled through the 8-inch thickness of the precast segments. Storing aggregate material in and above the hoppers, which control the flow of aggregate onto the conveyor will allow the trucks to be rapidly loaded directly from the conveyor, eliminating the previous and much slower method of using one bucket load at a time with a front end loader.



The Details

The Maryneal TechSpan reclaim tunnel is 480 feet long, 16 feet, 4 inches wide and provides a 12 foot clearance height. The total number of arch units is 191 at 5 feet wide and 2 at 2.5 feet wide. The hoppers are spaced 35 feet on center and the openings through the arch are the width of two arch segments. Arch design was performed by RECo, in conjunction with the project geotechnical engineer Kleinfelder Central, Inc. (Killeen, TX) and structural engineer (for the arch foundation structure) Lehigh Valley Technical Associates, Inc. (Northampton, PA). The contractor, CCC Group (San Antonio, TX), chose to modify and adapt the recommended arch erection procedures when building the Maryneal reclaim tunnel. Rather than using a second crane, an alternative bracing system was developed to temporarily support the upper ends of the arch segments at the beginning of construction.



Live Munitions Storage, Fresno, CA

The California Air National Guard (ANG) needed to construct a new earth covered magazine (munitions storage facility) at their Fresno Yosemite International ANG base to accommodate their fleet conversion from the F-16 Fighting Falcon to the F-15 Eagle aircraft. But live munitions storage requires protecting against outside forces that could detonate those munitions, requiring specially engineered structures. Design of such structures is regulated by the US Department of Defense Explosives Safety Board (DDESB).

The ANG required a single stand-alone magazine, also known as a storage "igloo" (due to its shape as viewed from either end). Such structures must meet DDESB criteria for structural capacity, lightning protection, soil cover depth and side slope parameters. The TechSpan® precast concrete arch system from The Reinforced Earth Company is approved by the DDESB for this purpose and was selected by the ANG igloo designer. Drawings and specifications for this igloo system are designated as "Magazine, Precast Concrete

Earth-Covered TechSpan System, Std. 421-80-05," and are maintained by the Corps of Engineers, Huntsville, Alabama Division. A TechSpan magazine is rated a "7-bar" design, meaning it provides the highest level of resistance to blast loading and requires the least restrictive siting separation distances.



Lightning protection is a critical part of shielding munitions from accidental detonation. The TechSpan system lightning safety net begins with welding or tying all rebar within each precast segment. Segments are then interconnected using jumper cables across segment joints on the backfill

side. Stirrups protruding from the bases of the arch segments are electrically tied to stirrups rising from the interconnected rebar of the floor slab creating full wrap-around lightning protection through a grounding rod.

Under a subcontract with general contractor Cooper Chase Construction (Fresno, CA), this was the fourth TechSpan munitions storage igloo erected by J & P Construction (Santa Maria, CA).

CONTACT US to discuss making your next project a success



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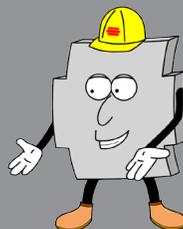


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