



Liberty Tunnel Rehabilitation Project Pennsylvania Department of Transportation

Location: Pittsburgh, Pennsylvania USA

Date: 2012 – 2013

Structure: Two twin tunnels

Length: 5,888 feet (1,795 meters) each

Cross-Section: 27 feet (8.2 meters) at springline

Geology: Conemaugh Group, including Glenshaw and Casselman formations (cyclic sequences of sandstone, shale, red beds, limestone and coal); Monogahela Group (cyclic sequences of shale, limestones, sandstone and coal; Pittsburgh Coal

Cost: --

Client: Swank Construction Company

Owner: Pennsylvania Department of Transportation (PennDOT)



Figure 1. Liberty Tunnel.

Liberty Tunnel Rehabilitation Design Services: ITA (International Tunneling Award) 2014 Award Winner for “Rehabilitation Project of the Year”

The Liberty Tunnel consists of two 5,888-foot (1,795-meter) long tubes, which run through Mount Washington in Pittsburgh, Pennsylvania. The tunnels provide a direct route to downtown Pittsburgh from the South Hills suburbs, easing traffic flow between the two locations. The Liberty Tunnel was opened to traffic in January 1924 and has gone through a series of upgrades and repairs. Gall Zeidler Consultants (GZ) provided the rehabilitation design for the tunnels’ aging ventilation arch walls.

The ventilation arch walls act as tunnel-shaped jet structures for fresh air supply to the inside of the tunnel. GZ provided an alternative design for the replacement of the arch walls in-lieu of the original contract design that proposed the use of self-consolidating concrete for the ventilation arch walls and support the arch walls with radial hangers that were tied to the structural tunnel arch above. The proposed alternative concept used a self-bearing shotcrete arch wall and embedded lattice girders, which avoided the utilization of the radial hangers as well as the cast-in-place, self-consolidating concrete.

The alternative shotcrete concept provided the Contractor with a schedule and cost saving solution under the given tight construction window allowed during a complete shutdown of the tunnels.



Figure 2. Preparation of a Center Arch section.