Economical solution for tunnel ground support - DSI prepared to adapt roof bolt system to changing ground conditions

Nancy Creek Tunnel, Atlanta, Georgia, USA

Atlanta and its surrounding counties have been growing at an incredible rate for many years. The infrastructure that carries sewage to the treatment facilities does not have enough capacity to carry both the raw sewage and the additional storm water. The City of Atlanta, DeKalb County and Fulton County have agreed to work together to construct the Nancy Creek Tunnel to increase the sewer capacity and help an area that experiences recurring problems with sewage overflows.

The Nancy Creek Tunnel is a 43,000 foot long sewer tunnel, just north of the Central Business District of Atlanta, Georgia. The tunnel diameter will be 16 foot. The sewer tunnel is being constructed by Nancy Creek Constructors,a joint venture of Obayashi Corporation and CJB Contracting Inc.

Reference Details:

Owner City of Atlanta, Georgia, USA +++
Design Engineer Jordan Jones & Goulding, Atlanta, Georgia, USA +++
General Contractor Nancy Creek Constructors, Atlanta, Georgia, USA

DSI Units DSI Ground Support, Salt Lake City, UT, USA
DSI Services Preparing of technical specifications for general contractor; Supply of expansion shell bolts; Pull testing and on-site technical assistance

The original design called for a fully encapsulated cement grouted double corrosion protect bolt and for the tunnel being non-concrete lined.Economical analysis demonstrated that this design was very expensive so it was changed to a much simpler installation method using a mechanical bolt (plus the tunnel is to be lined with concrete after development to provide the "permanent" support).

The rock strength permits the use of expansion shell bolts -7/8 inch,grade 75 steel installed in a 1-3/4 inch diameter hole. The expansion shell anchor has been initially tested, in the tunnel, via pull tests to exceed the designed working load for the ground support. Ongoing tests occur during mining of the tunnel to ensure optimal anchorage is maintained.

The advantage of using the expansion shell bolt is the quick installation. The holes are drilled using the drills on the TBM (Tunnel Boring Machine), and the bolt installed using a hand held impact gun. There is no need to change out drill steels to place the bolt driver. The impact gun is sized to ensure sufficient pretension to set the expansion shell.

The tunnel will be fully functional by the end of October 2005 and completed in January 2006 after restoration of the construction sites.

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