Keys to Success in Managing a Complicated Tunnel Project

Big Walnut Sanitary Trunk Sewer Extension, Part 6F1
City Of Columbus, OH

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Presentation Overview

- Project Overview
- Construction Management Team (CMT)
- Project Challenges
- Benefits of the CMT
- Owner and Contractor Contributions
- “Partnering”
Project Overview

- **Project Budget:** $25 Million
  - Combination of lump sum and unit cost pay items
- **Contractor:** KMM&J Joint Venture
- **Timeline**
  - Notice to Proceed – January 2007
  - Final Completion – November 2009
- **Unique Aspect** – Encountered multiple Ground Conditions utilizing same TBM
Project Overview

Construction Management Team (CMT)
- H.R. Gray
- DLZ, Inc.
- Jenny Engineering

Owner
- City of Columbus, Division of Sewerage and Drainage
Project Overview: Location
Purpose:

- Provide Sanitary Service to three counties currently without service – Franklin, Licking and Delaware
- Delaware County is one of the fastest growing counties in US (census bureau)
Installation of 10,000± lineal feet of 72” sanitary sewer tunnel using Reinforced Concrete Pipe (RCP) with PVC T-lock liner for tunnel lining
Installation of five (5) access shafts/manhole structures and tangential inlet drop structure with associated deaeration chamber and appurtenances

**Outfall Shaft** – Tied into Existing 84-inch Sanitary Sewer

**Shaft 4 Tangential Inlet** – Tied into Existing 36-inch Sanitary Sewer
Utilized 105-inch diameter tunnel boring machine (TBM)

- 9500± linear feet of Ohio Shale
- 600± linear feet of soft ground/mixed-face conditions

TBM was a LOVAT Model RM 99/105

- Consisted of cutters, center cutters, shale rockers, front-loading “ripper” teeth and flood doors. TBM modified to perform both soft ground and rock excavation.
Project Overview

Tunnel Boring Machine

Rock

Soft Ground
Project Overview

Rock Supports

Soft Ground Support

Rock Support
Project Challenges

AND

CMT Benefits
Project Challenges

600 lf Soft Ground/Mixed Faced Conditions w/ Boulders
Launch Shaft

Contractor Means/Methods
Project Challenges

Boulders and Cobbles
Proactively Dealing With Claims

- Continuous review of schedule
- Knowledge of day-to-day changes/events
- Identify activities that could cause delays
- Identify activities early in process
- Excessive time on one particular activity
- Evaluate contractor means and methods
Solution:

- CMT conducted actual measurements of boulders
- Reviewed contractor’s daily reports
- Compared CMT notes with daily reports to insure consistency
- Based on documentation, the CMT was able to settle claim for minimal amount
Project Challenge – Buried Valley

KEY
- Ohio Shale (OS)
- Bedford Shale (BS)
- Decomposed Rock

Outfall Shaft
Shaft 1
Tunnel
Buried Valley
Project Challenge – Buried Valley
Benefits of the CMT

Claims Avoidance

- Know the Contract Requirements
- Prepare a strategy to deal with problems
- Follow the Contract
- Contemporaneous Documentation
- Communication
Project Challenges – Buried Valley

Solution:

- CMT evaluated what contractor should have anticipated on bid
- Determined the differential
- CMT and contractor negotiated and settled for 1/3 of original claim amount
- Fieldwork continued during claim negotiation process.
- Issue resolved prior to TBM arrival – No Impact
Additional Benefits of CMT

Keys to Success

❖ Proactive communication addressed potential issues before they became problematic

❖ On-site managers and engineers provided extensive oversight

❖ 24/7 responsiveness to issues aided in community acceptance of the project and homeowner concerns
**Additional Keys to Success**

- **Active Owner Participation**
  - RFIs, RFPs, and Change Orders were turned around quickly
  - Quick resolution of potential risks as they arose
  - Savings were realized as city was able to auction off property that was no longer needed

- **Positive Contractor Contributions**
  - Proactive project approach, communication and knowledgeable superintendent led to foundation of cooperation and successful project

- **Partnering**
  - Not formal, but understood between all parties
Questions