

Case Study: Pipe Jacking & Utility Tunneling



Project Name:
Mainline Segment 9, I-20/
Railroad Crossing



General/Subcontractor:
Culberson Construction, LLC/
J & J Boring, Inc



Location:
Midland, TX



Ground Conditions:
Varying UCS caliche and limestone rock



Akkerman Equipment:
TBM 48SCII, 50-in. OD Disc Cutter Head,
Tunnel Boring System with 5200 Pump Unit,
524 Haul Unit



Pipe:
48-in. OD Steel Casing



Total Length/Hard Rock Section:
550-lf./250-lf. (DCH used for 250)

Disc Cutter Head attachment fractures hard caliche and limestone into pieces while maintaining alignment

PROJECT OVERVIEW

The project involved the construction of a 36-inch diameter HDPE water line inside of a 48-inch diameter casing, that ran under highway I-20 and a Union Pacific Railroad near Stanton, TX.

While using their 48SCII TBM with standard carbide cutter head, J & J Boring, Inc. encountered rock conditions midway across the bore which were not stated in the pre-bid GDR. The unanticipated ground proved challenging to mine with the initial TBM cutter head setup. After a few worn tooling changes, the contractor decided to develop a better solution to mine the rock.

THE CHALLENGES

- Installation in hard caliche/limestone rock
- Crossing under active rail line and I-20 Highway
- Actual project rock rating was 40 percent harder than pre-project GDR indicated
- Hardest rock encountered within sensitive rail road Zone A, requiring 24-hour non-stop construction and no surface access

THE SOLUTION

Key benefits of owning an Akkerman TBM is the interchangeable cutter heads feature and the ability to access the face for obstruction removal. J & J Boring, Inc. contacted Akkerman for a Disc Cutter Head attachment for their 48SCII TBM to fracture the hard caliche and limestone rock into pieces while maintaining alignment despite geological variations.



Key benefit of the Akkerman TBM is ability to access the face for obstruction removal



Material encountered was 40% harder than pre-project GDR indicated

- The 48SCII TBM Cutter Head features:
- (16) 6.5-inch disc cutters, capable of 5 tons of thrust each
 - Cutter head rock scrapers assist in transferring cuttings away from the face, to the conveyor, then to the haul unit for removal from the tunnel
 - Heavy-duty bearing to handle disc thrust loads
 - Recommended Uni-directional operation foreffective mining
- The lead 48-inch casing was welded to the TBM to counteract the rotational torque necessary to mine the rock with the uni-directional cutter head. The operators monitored



Great Christmas present for the J & J Boring crew to complete tunneling before the holidays!

the thrust loads on the cutters to ensure they did not become overloaded.

OUTCOME

- J & J Boring, Inc. completed the drive in challenging rock that would have been otherwise improbable
- No cutter head tooling replacements required
- Mid-project rock testing indicated project rock samples of 13,000 PSI UCS

For more information please visit:

www.akkerman.com



J & J BORING, INC.
BORING & TUNNELING

Jennifer Bouquet
President

41 CARDINAL HILL Rd. • P.O. Box 357 • WINFIELD, MO 63389
OFFICE: 636-566-6766 • FAX 636-668-6816
jennifer@jjboring.com • www.jjboring.com