ROUND ROCK, TEXAS
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Texas Municipal Utilities Association Annual Conference
Inn on Barons Creek
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Pipe-Bursting Success with AC Pipe

Pre-chlorinated Pipe Bursting to Replace Potable Waterlines in Round Rock, Texas 2007 - 2012

Pre-chlorinated Pipe bursting – Round Rock, Texas 2007 - 2008

- Presentation Summary
  i. History of Pipe Bursting
  ii. Engineering / Construction Overview
  iii. The Process
  iv. Round Rock Projects 2007 - 2012

The History of Pre-chlorinated Pipe Bursting

P.C. Pipe Bursting History

This method was originally developed by British Gas and patented in the 1980's for rehabilitation on natural gas distribution lines.

- It's success led to use on potable water lines.
- P.C. pipe bursting has been the standard method for replacement of waterlines in Europe for about 30 years.
- Pre-Chlorinated pipe bursting is now accepted in 37 states in the U.S. The first U.S. approval came in 1999.

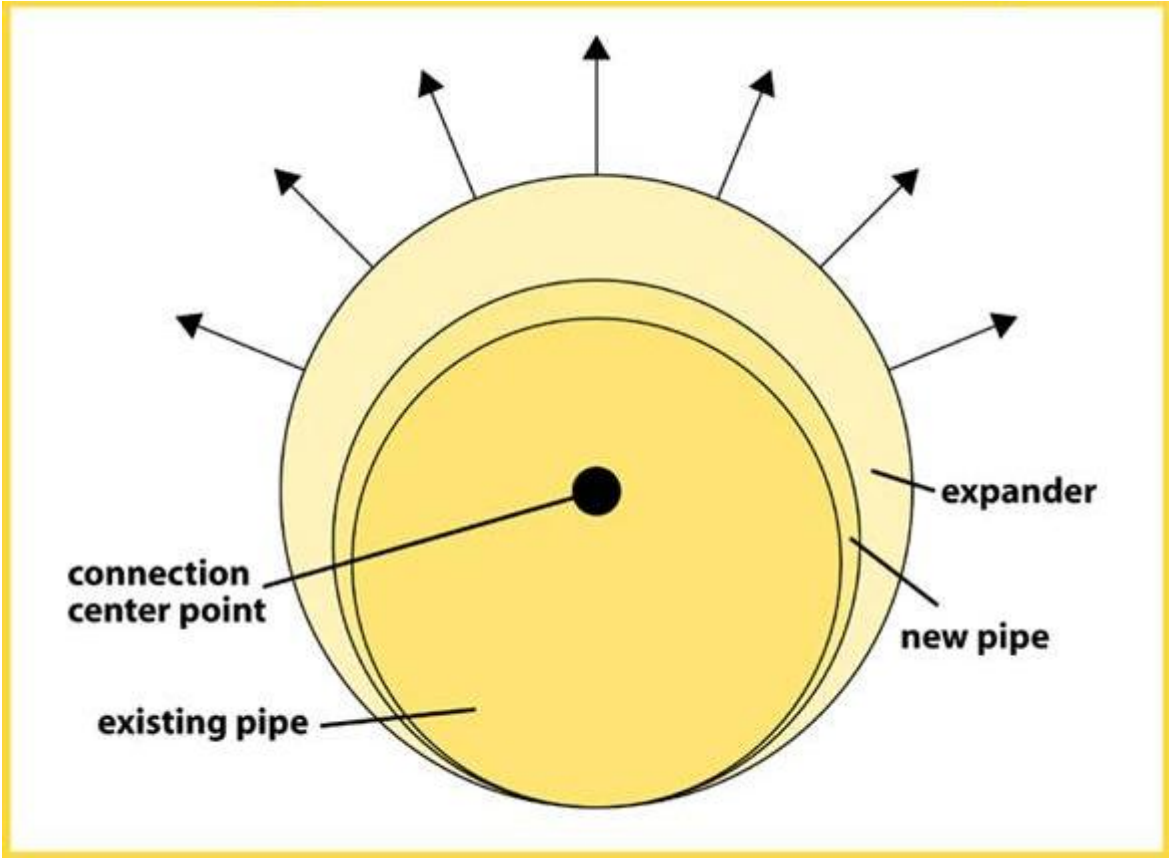
Engineering and Construction Overview

Pre-chlorinated Pipe bursting Overview

- Pipe bursting follows the path of the existing water line.
  - Reduces (does not eliminate) potential for damage to other utilities (like wastewater and gas service lines)
  - Reduces infrastructure congestion by not adding new lines
  - Easement issues and line separation issues are reduced
  - Engineering design hours reduced
  - Allows the ability to increase pipe flow
- Replaces pipe without decommissioning, removal or disposal issues.

Overview - Upsizing

- Replace existing pipe with pipe providing suitable flow
- Reduce project risks of surface heave by limiting water projects to size on size or one diameter upsize replacement



Equipment Selection

- Static burst equipment used
  - Does not contaminate the new pipe (like pneumatic)
  - Ability to pull through Cast Iron, Ductile Iron, and repair couplings with slitter
  - Can replace existing A/C, PVC, or Galvanized pipe

Ductile Slitter Video

Pre-chlorinated Pipe bursting – REPLACEMENT PIPE MATERIALS

- HDPE – Preferred material
- Fusible **PVC** – Higher Cost than HDPE
- Both materials offer:
  - Improved flow rates - C Factor of 150 for life of the pipe
  - DIP OD size pipes - Allows for O&M using standard fittings
  - No joints = No leaks on the pipe
  - Electro-fusion or mechanical fittings for mains and service connections
  - Full-butt fusion above ground connecting and testing pipe prior to bursting

Pre-chlorinated Pipe bursting Overview

- Replacement rates 300–600 ft of pipe / day
- Crews visible to the homeowner for one day
- Reduction in restoration (up to 85%)
- Social costs reduced as process enables fewer lane and intersection closures, and less business disruption
- Pre-chlorination saves the cost of installing temporary services and de-commissioning the old pipe

Pre-chlorination Overview

- Residents and neighborhood groups notified early and often
- Water outages to homes limited to b/n 8 AM - 6 PM Mon. thru Fri.
- Pre-chlorination and testing conducted above ground
- Contractor pre-qualification requirements
  - Minimum 30,000’ of pre-chlorinated pipe bursting experience
  - Contractor certified by bursting manufacturer and butt/electro-fusion manufacturer

Pre-chlorinated Pipe bursting Overview

Engineering Considerations

- Perform a Preliminary Feasibility Study & Cost Analysis
- Perform a Pilot Project if desired
- Bidding Method
  1. Bid project as an alternate – (not done in Round Rock)
  2. Burst only (CORR selected method)
  3. Fixed Term Price Contract – Long term maintenance oriented solution

The Construction Process

Staging Area – Butt Fusion

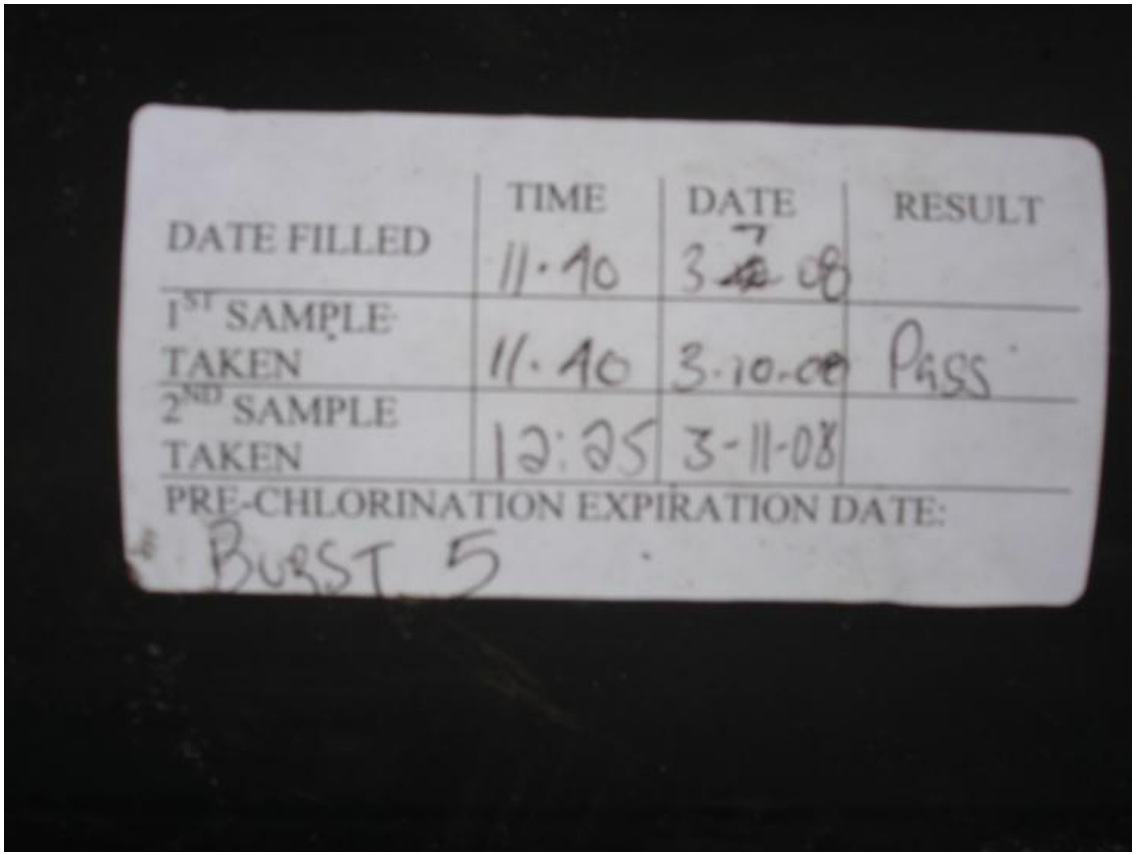
The Process - Staging Area – Pre-construction

- Full butt-fusion used to join 40’ pipe sections into a single pipe of tailored length for each burst

- Lines capped and disinfected with hypochlorite solution of at least 25 mg/L
- Two BAC-T samples taken 24 hours apart
- Pipe is pressure tested

Pre-chlorination Bac-T's

- After 2 samples pass, line remains sealed. Log pasted on pipe (TEST IS GOOD FOR 14 DAYS)
  - If pipe is not installed within 14 days, bacteriological is repeated
- Pipe is burst into place
- Connections are made onto the new main
- All tools and connections sprayed with hypochlorus solution of 1% to 5%
- Super chlorinated swab of 300 ppm is passed through the line
- Line flushed and placed into service



Pre-chlorination - services

- Services can be exposed prior to burst, so ready to be reconnected immediately after burst
- No temporary services required due to the pre-chlorination and testing of the pipe prior to installation

The Process - Entry and Exit Pits

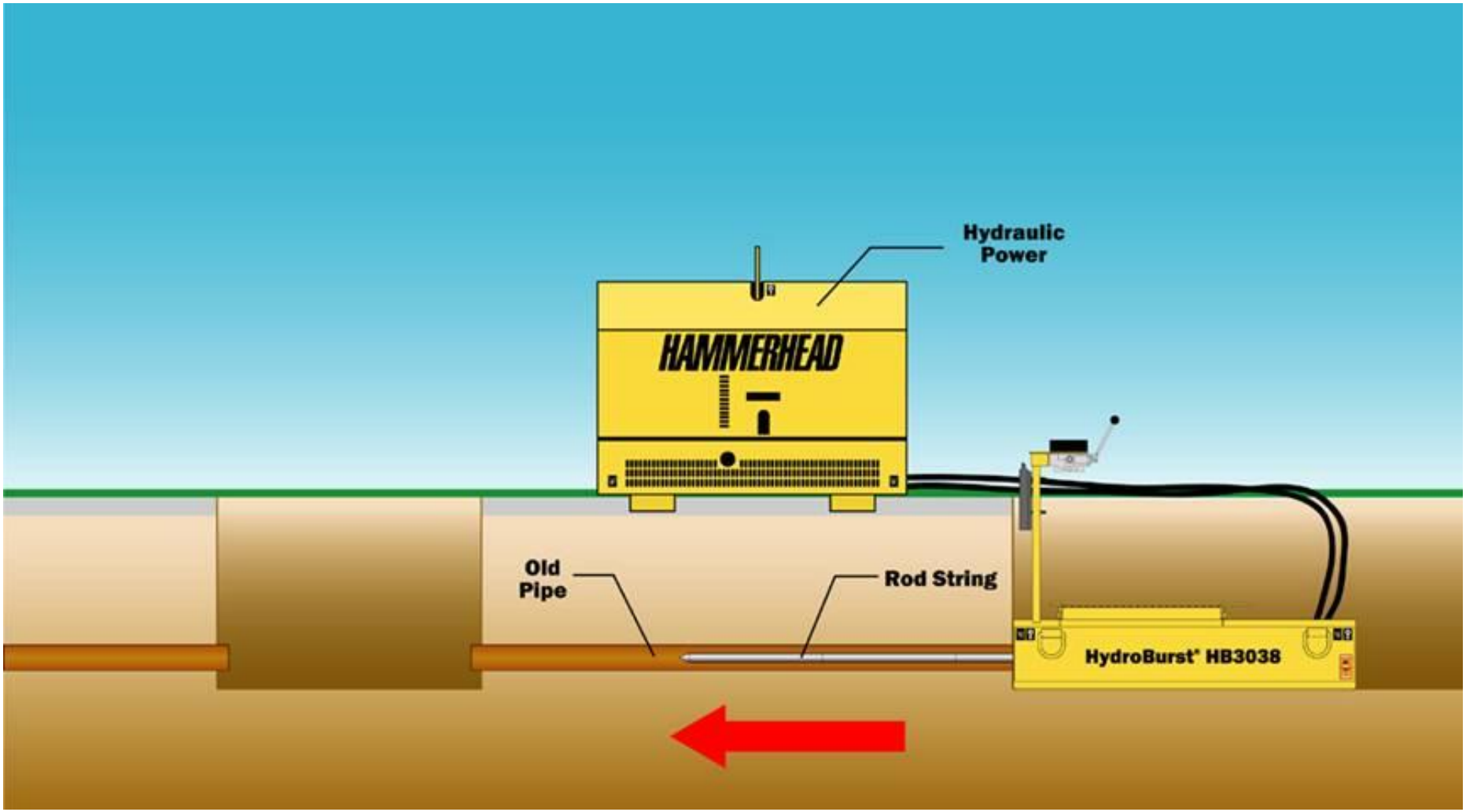
- Pits dug on entry and exit end of the pipe (pit dimension 4’ x 12’)
- Service connection pits to reconnect services (pit dimension
- 4’ x 4’)

The Process - Day of Bursting Operations

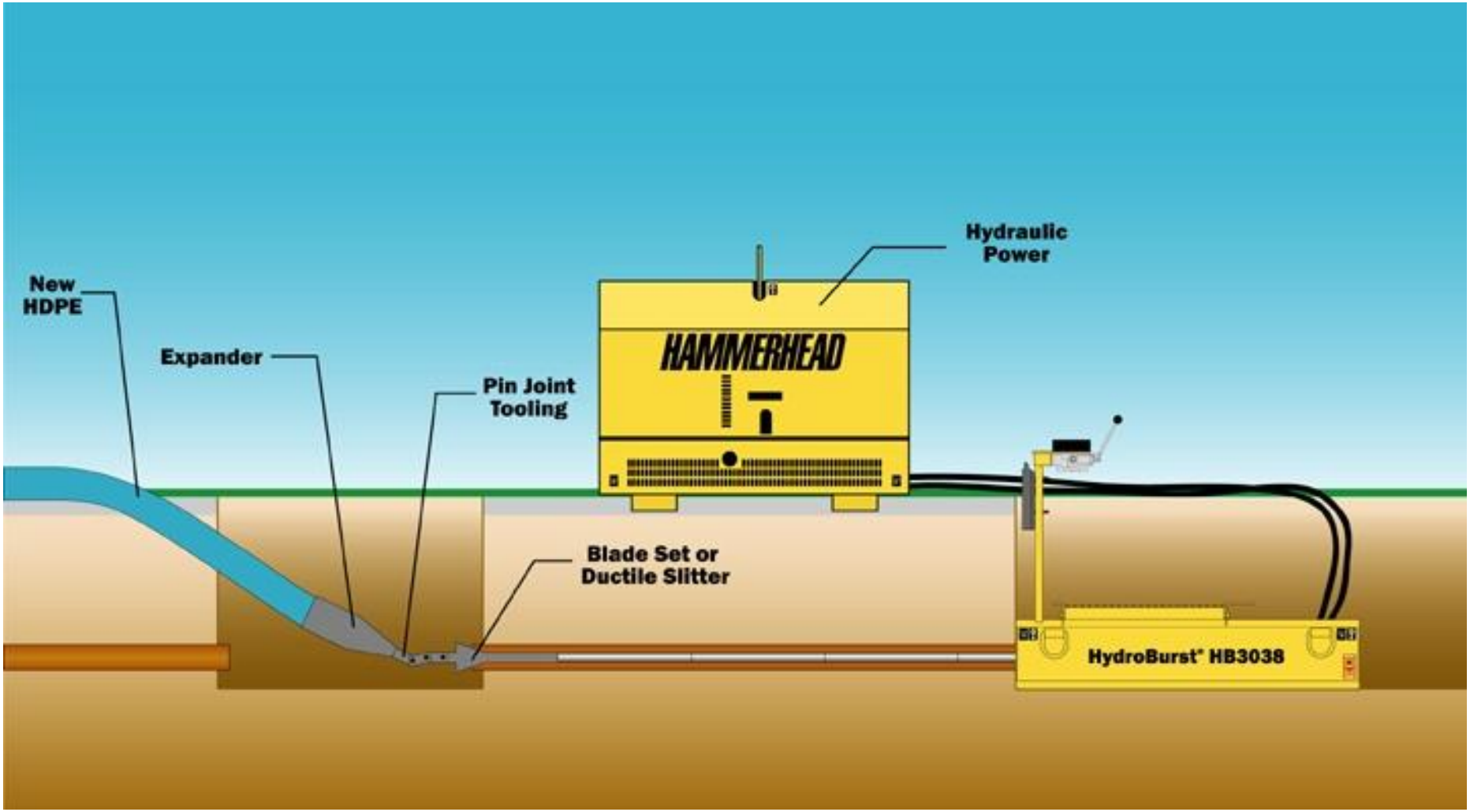
- ~8 AM: the main is decommissioned

- Equipment set in-place - rods paid out through the host pipe

Pipe Bursting Setup – Push out rod

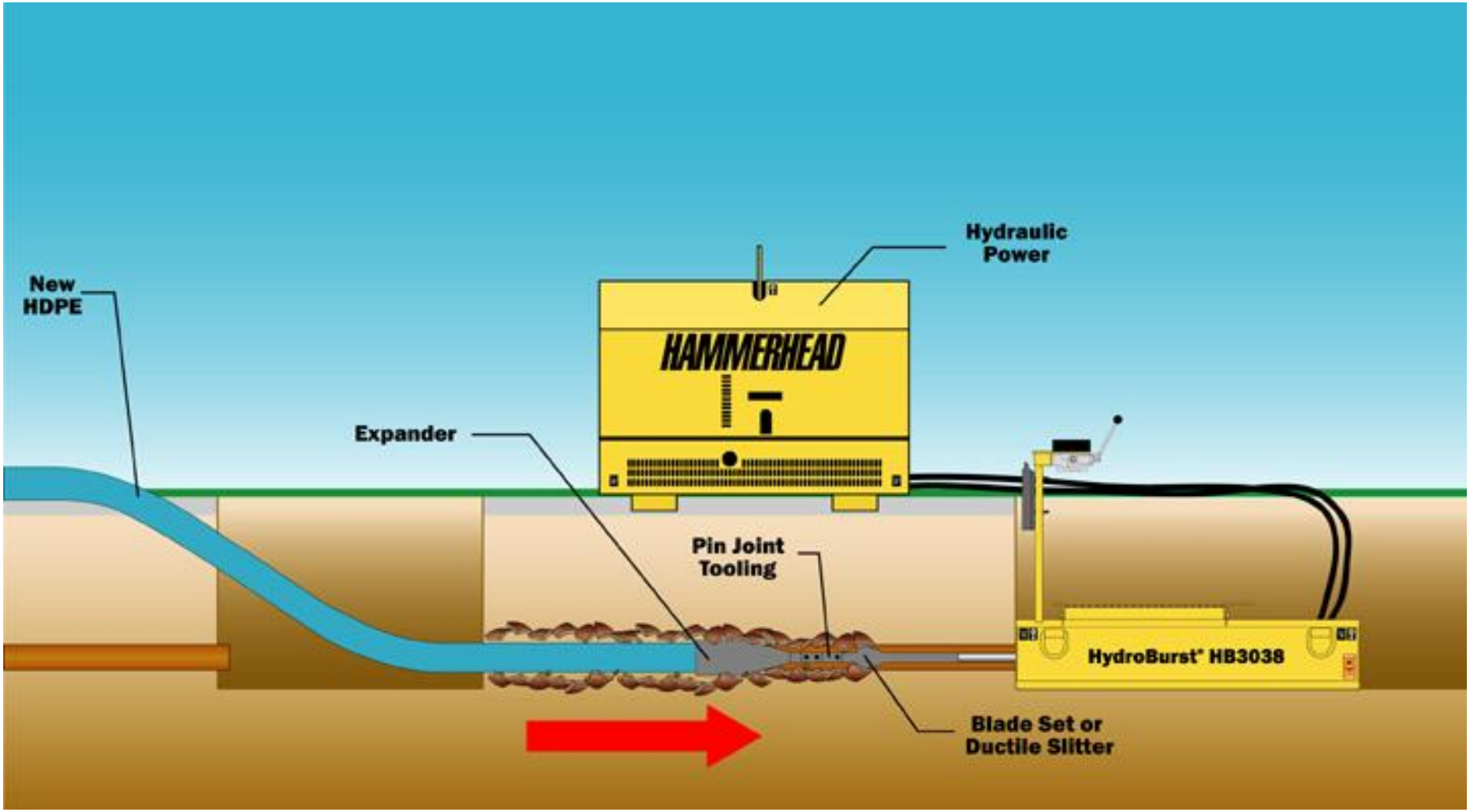


Pipe Bursting Setup – Attach tooling and pipe



Pipe Bursting Setup – Pull back

- Pull Back Process 100 ton static pipe bursting.mpg



Bursting Head and Expander

- The bursting head (spear or ductile slitter) & expander are attached to the rod
- Pre-chlorinated and sealed HDPE pipe is attached behind the expander

Fused-on Pulling Head

Pipe Bursting Setup – Attached tooling and pipe

Rods Recovered at Exit Pit

- Rods are removed from the exit pit as pipe is pulled into place
- By noon the new pipe is in-place
- For the next burst the exit pit becomes new entry pit

Squeeze-off Tool

Hydraulic Static Pull

- Double blade set bursting existing Cast Iron Water main.avi

Service Re-connection

Mechanical service saddles connected to the new main

New services lines installed using a piercing tool

Services: Fused vs. Mechanical

Connections:
Electro-Fusion or Ductile Iron Fittings

Fused, or

Mechanical ?

Post Chlorination

- Around 2 PM the crews super-chlorinate the new pipeline with a 300 ppm chlorine solution

- A de-chlorination unit with ascorbic acid is used to reduce the excess chlorine then the line is flushed


Round Rock Projects
2007-2012

Round Rock, Texas – The Scenario

- Greenlawn Blvd./Gattis School Rd. are major collector streets with 12”/16” WL surrounded by typical sensitive residential areas including parks all have 6” and 8” WL. The usual heavy peak hour traffic, new construction easements would have to be within the pavement.
- Multiple water main breaks every year
- Asbestos Cement water mains >30 years old in heavy clay soils

Round Rock, Texas – All Projects

-Replaced 2,700 lf of 12” A/C

-Replaced 36,000 lf of 6” & 8” A/C

-Cost savings estimated at ~23% versus open cut

Round Rock, TX Project - Conclusions

-This process is *fast* - 18,000 feet of pipe replaced in 3 months

-Cost & time savings

-Replaced more pipe in less time with the given funds

?? QUESTIONS & COMMENTS ??

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