



NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY

**PACIFIC NORTHWEST CHAPTER
NASTT 2017 SYMPOSIUM**

**GAS LINE & PVC TRENCHLESS SLITTING
METHODOLOGY, A SHORT HISTORY &
CURRENT OPERATIONS**

JIM MOORE, HAMMERHEAD

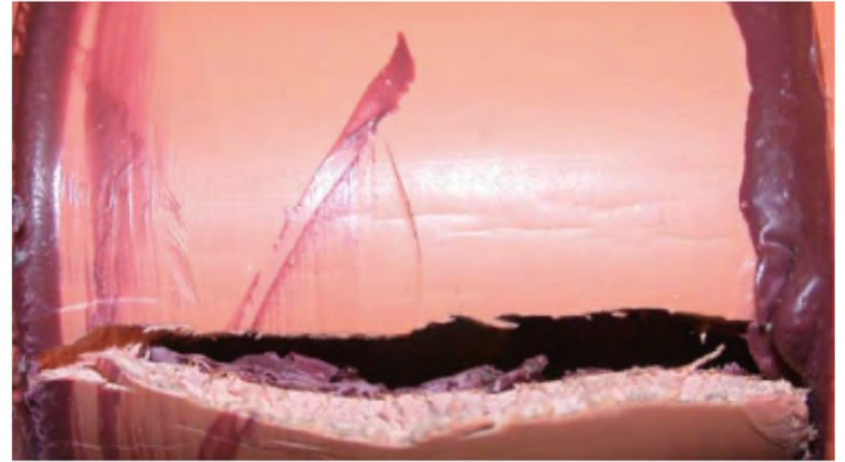
AGENDA

- HISTORY
- METHODOLOGY & TECHNOLOGICAL UPDATES
- TOOLING & EQUIPMENT ADVANCEMENTS
- CASE STUDIES
 - REHABILITATION OF ALDYL-A PLASTIC GAS PIPE
 - MAIN LINE & RESIDENTIAL SERVICE REHABILITATION
- CONCLUSION



A little history

By 1983 these materials began to show susceptibility to brittle-like cracking that made them prone to leaking and rupture.



“They’ve found in some areas this type of plastic pipeline has become brittle.”

Brad Underwood
Public Works Director
Foster City, California

Source: *The San Francisco Examiner*



A little history

At that time the plastic pipe manufacturer changed the resin in the product, and the cracking phenomenon has not been observed since.

The product, however, was discontinued in 1998 due to the industry's distrust of the initial product, which persisted even after the change in composition.



A little history

MDPE replacement

A large majority of gas companies are in the process of replacing these pipes with proven medium-density polyethylene (MDPE).

An efficient method of replacement is needed.



METHODOLOGY & TECHNOLOGICAL UPDATES



Why Slit & Pull?

- Same Hole Technology
- Minimized Cross Bore Issues
- Lower Restoration Costs & Time
- Less evasive to neighborhood and traffic flow
- Upsize capability for increased capacity
- Reduce the need for spoil removal
- Minimize damage to pavement and disturbance of other utilities



PROCESS & METHOD

- Call 811
- Post 811 markings, independently mark & locate all underground facilities
- Verify running line and depths of existing gas and electric
- Pothole crossing and conflicts using vacuum excavation
- Camera all sewers
- Determine slitting profile



PROCESS & METHOD

- Dig the pits at the service connections
- Dig the entry and exit pits, crib and shore where necessary
- De-Gas planned replacement section
- Sever the service connection while leaving the main intact
- Blow mule tape in existing gas main, from exit to entry pit
- Erect & deploy telescoping boom on constant tension winch into entry pit
- Install necessary cribbing to support winch leg supports
- Attach mule tape to winch line, pay out winch line and pull back cable through entire main to exit pit
- Connect winch line to Slitter head & tooling



PROCESS & METHOD

(ESID SAFETY)

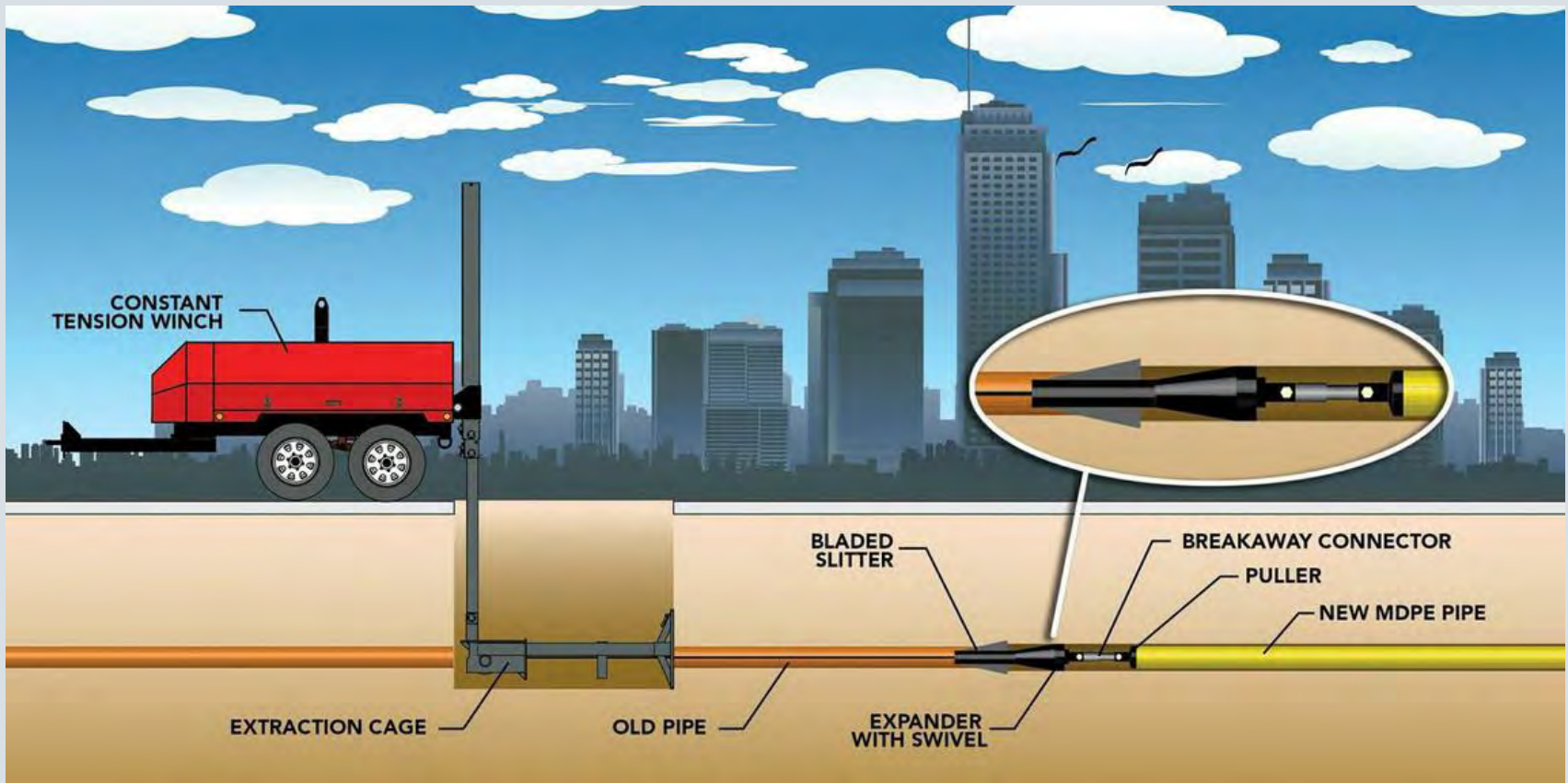


**Ditch
Witch®**

- ❑ During Pullback and Slitting Continuously Monitor:
 - ❑ Running line and depth of slitter head with Ditch Witch Tracking electronics and beacon
 - ❑ Hydraulic Pullback Pressures via dashboard gauges
 - ❑ Electrical Strike System, which will immediately detect the presence in the winch cable of any Amperage over 20 milliamps or Voltage over 30 volts.
 - ❑ If any “strike” is indicated, stop pullback, determine location of tracking beacon, and excavate to determine course of action and conflict.



Jobsite



PREPARE FOR SLITTING



Squeeze off main, evacuate gas & cut pipe at both ends.



Blow mule tape through existing pipe and pull back winch cable.



Install blade, expander assembly with jaws, integrated breakaway and attach puller



Start the Slitting Process



Start the Slitting Process



- Highly efficient process (production)
- Specialized tooling
- Cost efficient



TOOLING & EQUIPMENT ADVANCEMENTS



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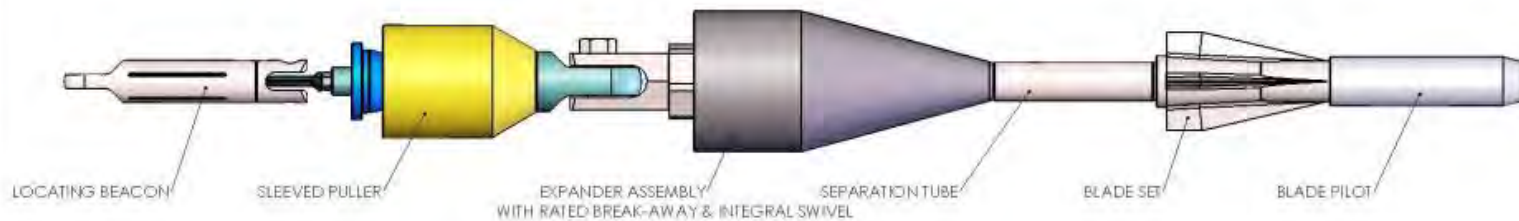
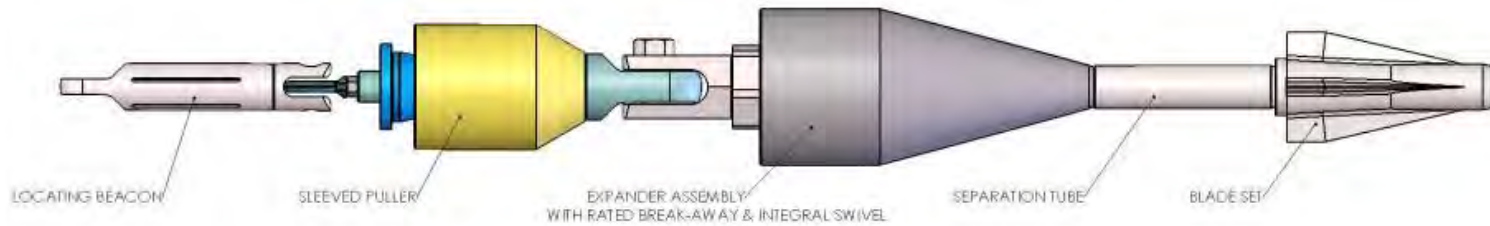
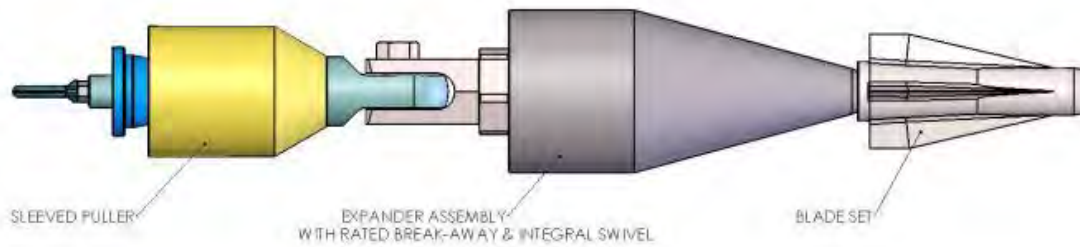




Gas Line Slitter Tooling String with integrated breakaway and swivel.

Not shown – Breakaways and locator housing and puller.





HAMMERHEAD CONSTANT TENSION WINCH SLITTING UNITS:

- HG375T.....for service lines
- HG12T.....for mainlines
- HG20.....for mainlines



HG375T CONSTANT TENSION WINCH



HG12 CONSTANT TENSION WINCH



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Cable Winch System

- Cable winch system
- Integrated ESID systems
- Available in 3, 5, 12 and 20 ton units



Integrated ESID System



CASE STUDIES



CASE STUDY #1 (BIG BEAR, CA)

CONTRACTOR: NPL IN CONJUNCTION
WITH DITCHWITCH OF CALIFORNIA &
HAMMERHEAD





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TOTAL HAMMERHEAD GAS PIPE INSTALLATION

- ❑ IN CALIFORNIA & NEVADA, TOTAL GAS PIPE INSTALLED USING HAMMERHEAD SLIT & PULL METHOD =

WELL OVER 50 MILES!

(SINCE 07/02/2012)

- ❑ IN LAKE TAHOE, CREWS HAVE COMPLETED OVER 10 MILES OF SLITTING SINCE 2014.



EXAMPLE PRODUCTION RATES

DAY	PULL	FOOTAGE	TIME
1	1 ST	190'	8 MINUTES
1	2 ND	267'	9 MINUTES
2	1 PULL	230'	9 MINUTES
3	1 PULL	100'	6 MINUTES
4	1 ST	150'	7 MINUTES
	2 ND	260'	9 MINUTES
5	1 PULL	480'	23 MINUTES
6	1 ST	268'	11 MINUTES
	2 ND	150'	7 MINUTES
TOTALS:			
6 DAYS	9 PULLS	2,095'	89 MINUTES
AVERAGE FOOT PER MINUTE:			23.5 FPM



CASE STUDY #1 CONCLUSIONS

- Pipe slitting method gives gas line distributors a solution to overcome the obstacles of some of the early brands of plastic gas line.
- Its machinery and tooling are simple to use and have a small footprint.
- These specially designed tools overcome the characteristics of brittle pipe that cannot be pulled out or successfully burst.
- Pipe slitting method can be used in the confines of urban settings.
- It entails the least demolition and restoration of pavement, surface structures or coexisting utility lines.
- Replacements can be scheduled to take place with minimal impact on end user daily routines.



CASE STUDY #2 (NORTH OGDEN, UT)

UTILITY: QUESTAR GAS

CONTRACTOR: TEMPEST ENTERPRISES
& HAMMERHEAD



Background:

City of Ogden, UT was incorporated in 1851 and was the central operations and construction Hub for the Transcontinental Railroad. Ogden is nestled snugly against the Wasatch Mountain Range to the East and the Great Salt Lake to the West at an elevation of 5,200'.



The scope of the project:

The North Ogden Project consisted of 175 1/2" and 3/4" Gas Line Services installed in the 1960s and '70s. The Host Pipe is Aldyl-A Plastic Pipe rehabbed to Medium Density Poly (yellow) Gas Line Pipe.

This was a Prototype Project using Trenchless Methodology to reduce the excavation foot print.





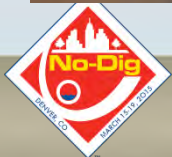
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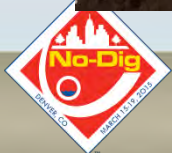
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Tooling & Equipment:

- 3.75 Ton Constant Tension – Dual Capstan – Track Mounted Winch including ESID (Electric Shock Identification System) System
- Slitter Tooling - $\frac{1}{2}$ " & $\frac{3}{4}$ " 4 Blade Slitter, $\frac{5}{16}$ " Jaw Assy., 2.5" Expander, and $\frac{3}{4}$ " Puller
- Note: Rock conditions required daily sharpening and blade re-facing



Operations:

Initially the contractor attempted single runs from the house to the curb, through a 45 degree turn and across the street to destination. **THIS DID NOT WORK.** Had to dig intermediate receiving pit at 45 degree turn, move winch twice and finish runs in two pulls



On the job adjustments:

Experimented with Expander Sizes settling on 2.5". Gas company inspector wanted to tug on the finished new pipe and be able to move it back and forth with minimal exertion

4 Blade Slitter has proven on this job and many more to be the slitter configuration of choice



Conclusion:

Gas Line Slitting on this Prototype Project proved to be a successful Re-Hab Trenchless Technique. Slitting small gas line services in difficult soil/rock conditions is a greater challenge than main line slitting.

Bottom Line: There is many miles of Aldyl-A Gas Line Service and Main Line Pipe in the United States today that must be replaced via open cut or Trenchless.

The North Ogden Project, Avista/NPL in Spokane, huge California, Nevada, and Arizona slitting Projects, and projects in the South Eastern U.S. are currently using Trenchless Slitting Methodology.





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QUESTIONS

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