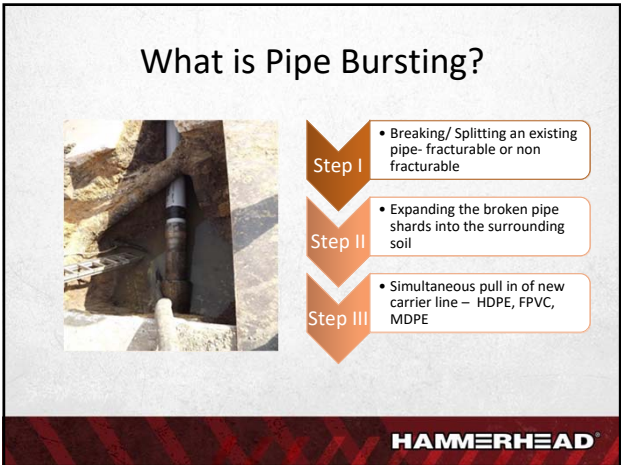




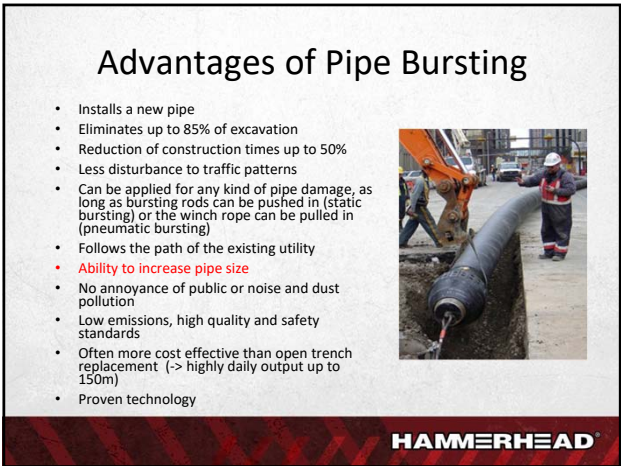
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4



2




5




3






6



Fracturable Pipes
Cast iron, clay tile, concrete, reinforced concrete, asbestos cement, etc.



Non-fracturable Pipes
Ductile iron, steel, galvanized, lead (require use of specialized tooling and static bursting machines).



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UPSIZING: A CLOSER LOOK

Class B Pipe Burst
8" to 10" (single upsize)

Expander OD: 12.90"

New pipe OD: 10.75"

Connection center point

Existing pipe ID: 8.00"



Note: Illustration assumes flow line remains the same.

PROJECT CONSIDERATIONS

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IPBA PROJECT CLASSIFICATION

Class	Degree of difficulty	Depth of Pipe	Existing Pipe Dia. (in)	New Pipe Diameter Compared to Existing Pipe	Burst Length (ft)	Original Trench Width	Soil Type
A	Minimal	<12 ft	2 - 12	Size on Size	0 - 350	Relatively wide trench compared to expander head outside diameter.	Compressible soils outside trench (loose sand, gravel, soft clay).
B	Moderate	>12 ft < 18 ft	12 - 18	Single Upsize	350 - 500	Trench width less than 4" wider than the expander head outside diameter.	Moderately compressible soils outside trench (medium dense to dense sand, medium to stiff clay).
C	Compreh ensive	> 18 ft	20 - 36	Double/Triple Upsize	500 - 1,000	Constricted trench geometry (width less than or equal to outside diameter of burst head).	Incompressible soils outside trench.
D	DEVELOPMENTAL						

Project classifications per IPBA (International Pipe Bursting Association) pipe bursting specification.

PROJECT CONSIDERATIONS

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UPSIZING: A CLOSER LOOK

Class C Pipe Burst
8" to 12" (Double Upsize)

Expander OD: 15.30"

New pipe OD: 12.75"

Connection center point

Existing pipe ID: 8.00"



Note: Illustration assumes flow line remains the same.

PROJECT CONSIDERATIONS

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UPSIZING: A CLOSER LOOK

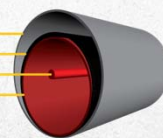
Class A Pipe Burst
8" to 8" (size on size)

Expander OD: 10.35"

New pipe OD: 8.625"

Connection center point

Existing pipe ID: 8.00"



Note: Illustration assumes flow line remains the same.

PROJECT CONSIDERATIONS

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UPSIZING: A CLOSER LOOK

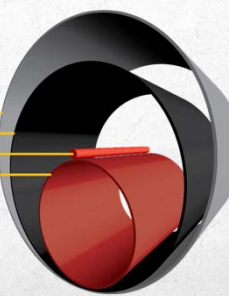
Class C Pipe Burst
10" to 18" (Triple Upsize)

Expander OD: 21.60"

New pipe OD: 18.00"

Connection center point

Existing pipe ID: 10.00"



Note: Illustration assumes flow line remains the same.

PROJECT CONSIDERATIONS

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UPSIZING – EXPANSION (WHERE IT GOES)

Pipe Bursting:
Typical Compaction

Expander
New pipe
Connection center point
Existing pipe

Approximately 90% of compaction occurs upwards from the existing line.

PROJECT CONSIDERATIONS

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SOIL CONDITIONS

Original Backfill
Expandable Clay
Loose Cobble
Beach and Running Sand
Densely Compacted Clay
Sandstone

Less Difficult
More Difficult

PROJECT CONSIDERATIONS

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UPSIZING AND DEPTH

- Has flow monitoring been completed?
- Is upsizing necessary if I/I is eliminated?
- A minimum of 4' (1.2m) of cover should be used when upsizing one size
- Greater cover should be used if upsizing more than one size

Note: any compaction recedes over time. The deeper the line, the less chance of surface disruption.

PROJECT CONSIDERATIONS

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Use of Lubrication (Lube Manifold)

Maybe
Always

Small Dia. (6"-10") Good Soil
Medium Dia. (12-16")
Large Dia. Poor Soil
Large Dia. (16" and larger)

Large or long bursts: lubrication can increase production and the bursting distance capability

PROJECT CONSIDERATIONS

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DEPTH OF COVER

General rule is one (1) foot of cover for every inch of expansion

Expander OD (11.50)
Existing Pipe ID (5.94)
Calculated minimum cover: 5.56 feet

8" DIPS Burst Head Expander OD – 11.50"
6" Clay Pipe Existing Pipe ID – 5.94"

PROJECT CONSIDERATIONS

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Mainline Pipe Bursting

- Pneumatic Systems
 - Full range of equipment for projects from 6" through 42"
 - Winches
 - Hammers
 - Tooling

TOUGH AND RELIABLE HAMMERS FOR YOUR PIPE BURSTING PROJECTS.

PROJECT CONSIDERATIONS

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Pneumatic Pipe Bursting – Sewer Replacement
2" Diameter- 42" Diameter Fracturable Pipes



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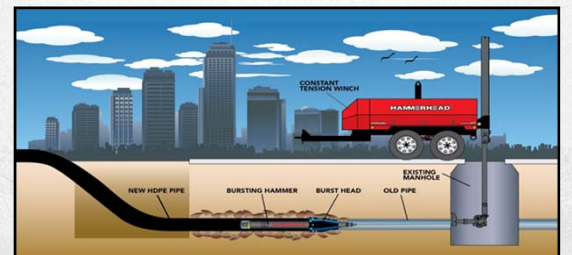
Large Diameter Upsize Charlottesville, VA



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Pneumatic Pipe Bursting – Sewer Replacement

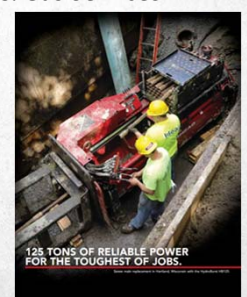



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Static Pipe Bursting
for Water, Sewer, & Gas Services

- Full range of equipment for projects from 2" - 24"
- PB30X
- HB5058
- 100XT
- HB175
- Winches



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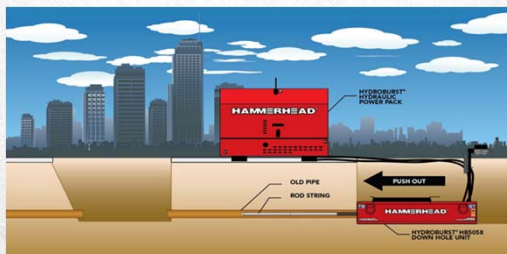
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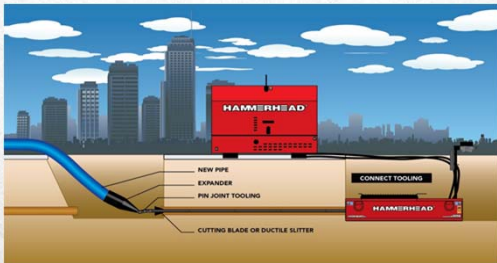
Push Out – Static Pipe Bursting Process



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Connect Tooling - Static Pipe Bursting Process



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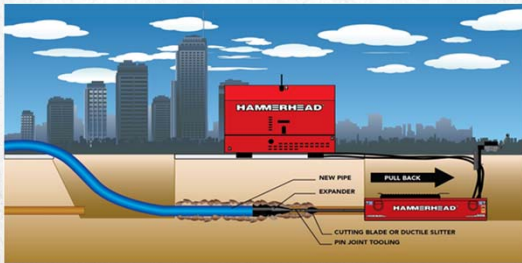
Splitting through repair clamps



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Pull Back - Static Pipe Bursting Process



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Specialized Tooling

- Ductile Slitter
 - Ductile iron
 - Steel
- HydraSlitter
 - Lead



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TRENCHLESS TELEVISION

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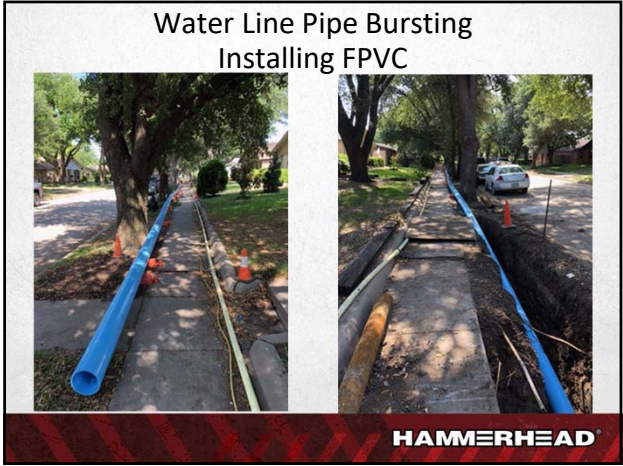
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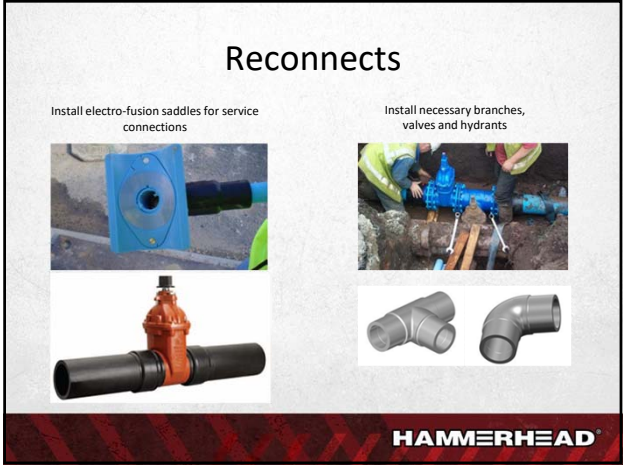
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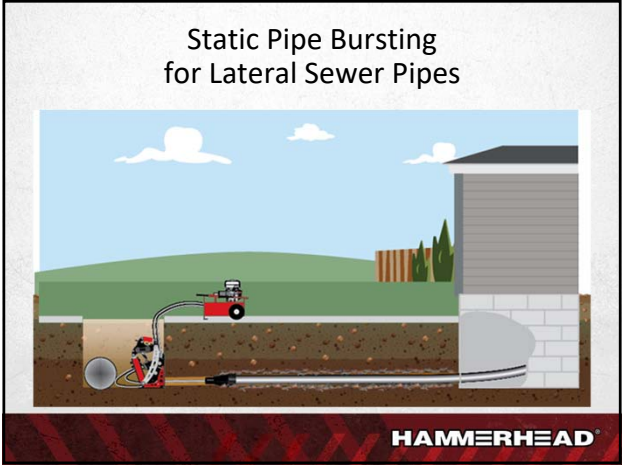
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Static Pipe Bursting
for Lateral Sewer Pipes



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PB30X – Take Power to the neXt level



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MODULARITY


MODULAR DESIGN

➤ The PB30X can be broken down into individual assemblies making assembly, disassembly, and portability easier.







JAW CARRIER ASSEMBLY
4.6 LBS (X2)



PULLING JAW BLOCK
36 LBS



SHEAVE ASSEMBLY
76 LBS




DOUBLE CYLINDER ASSEMBLY
83 LBS

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Using PB30X for Water and Gas

- 3/8" Jaw Set
- Specialized Tooling for Lead



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CAPABILITIES

- 3/4" JAWS
 - INCLUDED WITH THE UNIT
 - COVERS ALL TRADITIONAL PB30 GEN II WORK
- 3/8" JAWS
 - OFFERED SEPERATELY
 - COMPATIBLE WITH FLEXI-SLITTER & HYDRASLITTER TOOLING
 - CONFIGURED FOR WATER AND GAS WORK
 - JAWS INSTALL AND FUNCTION THE SAME AS 3/4 JAWS



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Vortex Case Studies

There isn't a "one size fits all" trenchless alternative to open cut out there.

- Certain Force Main Replacements:
 - Specifically, where capacity is needed, and upsizing is important.
 - Longer pulls between segments
 - Fusible HDPE end to end for truly monolithic pipe from a flange or MJ adapter to the terminus MH or pipe connection
- Certain Water Main Replacements:
 - Raw water feed or intake lines are often found to be cross country lines that can be great burst candidates.
 - Easy bypass for Raw Water
 - There typically aren't a lot of conflicting utilities and loose soils so upsizing for longer distances presents few obstacles.

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Case Study

- Any existing pipe where the current condition is too far gone:
 - Even when not upsizing – but installing size on size, bursting can sometimes be an only option given the current condition of the pipe.
 - When rehabbing a pipeline, the overall condition of the host pipe needs to be in a condition to allow the process to take place.
 - Hinge fractures, offset joints, heavy infiltration and partial collapses can be problematic when installing CIPP liners.
 - With pipe bursting: you need to be able to get a cable through it for pneumatic bursting or rods thru it for static. If you can get a nozzle thru it – most of the time you can burst it.
- Pipe Size/Capacity Issues:
 - While most trenchless methods will promote and offer increased efficiencies at full pipe due to reduced friction coefficients, which is true – They all reduce the inside diameter of the pipe.
 - Pipe bursting is the one process that can increase the inside diameter of the host pipe when using it as conduit to install.
 - Even for size on size - When bursting with Fusible HDPE or FPVC - it also carries one of the lowest Mannings coefficients as well if 0.01 or 0.009.

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Questions?

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