

NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY

PILOT TUBE & PIPE RAMMING METHOD INSTALL LARGE DIAMETER CASING UNDER RR

TOM LOYER, ENGINEERS CONSTRUCTION INC JOHN HRABOSKY, HAMMERHEAD TRENCHLESS



What is pipe ramming?

A pneumatic hammer installs an open ended steel casing that is cleaned out during and after completion of pipe installation.

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Pipe Ramming

- Absolutely No Steering Control
- Soils can dictate where the pipe goes





Applications

- Installation of Casings
- Assist HDD if pipe is stuck
- Use oversized casing- install gravity line within the casing
- Conductor Casings
- Culvert
 Replacement





Pipe ramming advantages

- Minimum equipment outlay
- Relative simplicity of operation
- Can be used in a wide variety of ground conditions
- Suitable for use in sensitive ground
 - Does not disturb ground around the pipe or construction, surface features or traffic above.







Swallows large obstructions

- Rock swallowed during ram
- Spoil removed post ram









What is the guided boring method?

 The Guided Boring Method (GBM) is an extremely accurate, multiple-step method of installing pipelines with the grade and alignment precision required to meet the demands of the sewer, water and utility industry.





GUIDED BORING METHOD





GUIDED BORING METHOD OVERVIEW

- Diameters: 4-48 in. (102-1,220 mm) OD w/ standard system; up to 120 in. (3 m) when applied to other technologies
- Quick setup
- Small footprint
- Versatile
- Common Types of Pipe:
 - Clay
 - Concrete
 - FRP/GRP
 - Polycrete
 - Steel Casing









GROUND CONDITIONS, LENGTHS AND APPLICATIONS

- Ground Conditions:
 - Displaceable
 - N Value or SPT = < 50
 - Non-Displaceable
 - UCS = < 12,000 psi (homogeneous)
- Drive Lengths up to 500lf.+





Guided Boring applied to other technologies

- Guided Auger Boring
- Pilot Tube Rock
 Drilling
- Guided Pipe Ramming
- Utility Pullback Installations for HDPE, PVC, Fiber Optic Cables









8" pipe installed with pilot tube and ready for connection to 8" to 30" adapter





8" Steel Pipe to 30" Steel Pipe Adapter

Ramming of 30" x 100'







Condition of 8" to 30" adapter after ramming 290'





24" to 72" adapter showing cutting shoe and gussets.







Finished adapter. welding detail





24" Hammer hooked up to 72" pipe.





- Project owner: Vermont Transportation Agency (VTRANS) & Vermonter Rail Service- Amtrak Rail Road
- Job: Install 3 72" Culverts.
- **Depth below rail:** 10' at deepest point
- Ground conditions: Clay
 Ground conditions
- Issues: relieve ponding after large precipitation events along a section of railway bed.

Case Study





Contractor

- Engineers
 Construction Inc
 - Offices in Williston, VT.
 - Specializes in all forms of geotechnical solutions
 - Completed pilot tube and pipe ramming technique for large diameter casing.







What led to this event?

- Hurricane Irene in 2011- 10 costliest hurricanes to make landfall in the U.S.
- Irene had made its way as far north and inland as Vermont.
- White River Railway Bridge was victim to the storm, with one granite pier sinking more than 6 feet and threatening total bridge collapse.
- Track washouts west of White River Junction completely shut down Amtrak's high-speed Vermonter rail service from Aug. 29 to Oct. 1.
- While rail service has long since been restored, preparation begins for the next big storm.



How to tackle the next storm

 2 Contracts- VTRANS FEMA-funded rail system projects in 2018 focused on ground stabilization and drainage upgrades near sections of the line near Ferrisburgh and New Haven.







Tool support & guidance

- HDD DW 20x20 was used to install the 5" casing on line and grade vs a GBM.
- 5" Steel Pipe to 24" GBM Adapter (a GBM WORH was used)





Ramming operations

- Of the three culverts to be installed, one was a new, 100-footlong culvert at the New Haven location.
- The other two were replacement culverts near Ferrisburgh to upgrade their flow capability, 49 and 50 feet in length.





Conclusions:

- Engineers Construction Inc completed job the project on schedule.
- VTRANS is satisfied the guided boring technique can be considered even for significantly long culvert runs.
- Value over other techniques:
 - Unimpeded traffic.
 - Minimal impact on the environment.



QUESTIONS



For more information, contact John Hrabosky, HammerHead Trenchless Equipment info@hammerheadmole.com

