Swagelining for Water Transmission & Sewer Force Main Renewal

16" through 65"



SW



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United Kingdom – British Gas

Development of Swagelining[™] & Pipe bursting in 1970's





Swagelining[™] History

History

- Method developed by British Gas (1970's) and patented for gas distribution
- Success led to potable water crossover
- Swagelining[™] over 28,200,000 feet installed in the past 32 years

Today

 Currently used for water, force main, gas, oil, mining, slurry, chemical, industrial, salt water and off-shore pipelines world wide

Swagelining™ Process



FOR NEW AND EXISTING PIPELINES







Swagelining[™] Video



LIFE EXTENDING TECHNOLOGY FOR NEW AND EXISTING PIPELINES



Swagelining[®] Engineering Value

- Follows path of existing utility
- Maintains or slightly increases flow
- Install HDPE pipe that is Solution to the Problem
 - Fully structural HDPE (Class IV plus)
 - Design for both Internal Pressures and External Loading
 - Full "Stand-Alone" Capability
 - Semi structural HDPE
 - Thin walled HDPE

SwageliningTM Construction Overview

- Insertion lengths up to 5,000 feet
- Pipe sizes of 4" through 65"
 - Static Pipe Bursting most suitable 4" through 16"
 - Water Transmission & Sewer Force Mains most suitable 16" through 65"
- Negotiates field bends
- Surgical excavations of 92% less than open cut
- Environmentally sensitive
- Undertake projects year round
- Social costs reduced

HDPE Pipe Value

- Ultra long term design life of 100 plus years by third party testing (Jana Laboratories, 2009; AWWA Journal and EPRI)
- Corrosion & Chemical Resistance
- Leak Free, Fully Restrained Joints
- Handles surge events 2 times operating pressure (ASTM F714, ASTM D3035 and AWWA C901/C906/M55)
- Unmatched Fatigue Resistance
- Hydraulically Efficient
- Temperature Resistance
- Zero failures in past earthquakes in Chile, Japan and Christchurch (per Water RF)
- Lowest failure rate among water piping systems (UKWIR)
- Resistance to RCP



Swagelining[™] Installation – Preparation of Host Pipe

- Camera/man entry inspection
- Cleaning
- Proving pig sent through host pipe to ensure free bore path





Swagelining[™] Installation – Butt Fusion



- Sections of HDPE pipe are butt fused together
- External bead removed



Swagelining[™] Installation -Shuttle Rods through host pipe



Swagelining[™] Installation – Attach pipe once rods reach entry pit



Swagelining[™] Installation – Reducing Die

- HDPE pipe has an OD slightly larger than the ID of the pipe to be renewed
- Pipe is pulled through a reduction die which temporarily reduces its diameter



Swagelining[™] Installation – Rods recovered at exit pit



- Rods are removed from the exit pit as pipe is pulled into place
- For the next pull the exit pit becomes new entry pit

Swagelining[™] Installation – HDPE enters receiving pit

- Pulling force removed
- Natural relaxation of HDPE
- 90% of reversion occurs in 2 hours
- Remaining reversion occurs overnight





Swagelining[™] Process – Results

- No gaps all annular space is eliminated
- Fully structural pipe
- Interactive pipe
- Thin walled liner



Swagelining[™] Installation – Final Connections





Advanced Engineered Solution

- Follows exiting utility path
- Provides largest Internal Diameter possible
- Long pull lengths
- Rapid installation
- Cost effective
- Solution to problem
- Long term design life
- Rural areas environmentally friendly
- Urban areas reduced social costs



General background information about large diameter Swagelining projects



LIFE EXTENDING TECHNOLOGY FOR NEW AND EXISTING PIPELINES

A summary of project references from the USA and around the world



Swagelining[™] Case Study Fully Structural

Gulf Coast Water Authority, Texas

- 6,800 feet of existing 39" PCCP Water Transmission Main
- Swagelining selected over slip lining due to 4.45" larger ID
- DR 17 HDPE PE 4710 selected through liner system design
- 1,250' to 2,100' installations distances
- Awarded 2014 Trenchless Project of the Year





Swagelining™ Case Study Semi Structural

Amarillo, Texas

- 5,300 feet of existing 30" Cast Iron (circa 1927) Water Transmission Main
- Swagelining selected to maximize flow rates, speed of installation (short shut down times allowed), follow existing utility path, limit excavation
- DR 32.5 HDPE PE 4710 selected through liner system design







Swagelining[™] Case Study Thin Walled Liner

Fort Collins, Colorado

- Five year program to renew 19,850 feet of existing 24" Reinforced Concrete (110 years old) and 27" Steel (45 years old) Raw Water Transmission Main
- Host pipe is structurally sound. However with failure of internal coating, several leaks occurred at the joints. Additional transverse cracks occurred most likely due to lateral displacement of the pipe from improper bedding during original construction.
- DR 41 HDPE PE 4710 selected through liner system design





Case Study New Orleans Sewerage & Water Board





Case Study New Orleans Sewerage & Water Board



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