UCT
UNDERGROUND CONSTRUCTION TECHNOLOGY
The Underground Utilities Event | July 13-15, 2021 | Music City Center | Nashville, TN

Think Outside the Pipe

Presented By: Warren Watkins
Canline Pipeline Solutions

Underground Construction/Rehabilitation

Canline pipeline solutions Ltd.

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Shout Out To: Cathy Schmermund, Robert Carpenter, and Karen Francis of the UCT Team

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Today's Talking Points

- Safety Moment
- Traditional Pipeline Installation Methods
- Typical Slip-Lining Materials
- Pulling Equipment Technology
- Environmental Benefit Overview
- Cost Analysis
- 8 Steps to a Safe and Successful Installation
- Conclusions
- Q&A

Safety Moment

In the state of **Tennessee**, State **Law** requires anyone about to engage in either **digging**, excavation, moving of earth, demolition or any type of activity that disturbs the earth and therefore possibly involving a danger to damaging underground utility lines, to notify **Tennessee** 811, of their intent to **dig**.

Traditional Pipeline Installation Methods

- Above Ground
- Open Cut/Direct Bury
- HDD/Boring
- Jacking
- Slip-Lining

Typical Slip-Lining Materials

Non-Metallic Piping (Low Pressure):

- HDPE
- Fiberglass
- PVC/CPVC
- Insituform/Cured-In-Place (CIPP)

Non-Metallic Piping (High Pressure):

- GRE Piping
- Spoolable RTP

Slip-Lining Materials

Material Type	Connection Type	Diameter Range	Pipe Lengths	Pressure Capability (120° F)	Temperature Capability	Typical Application
HDPE	Butt Fusion	1" - 72"	Pipe Lengths 50' Reel Lengths/Dia	171-PSI	140° F	Municipal/ Industrial/O&G
PVC	Glued/Butt Fusion	1/4" - 24"	20'	92-PSI	140° F	Municipal/ Industrial
CPVC	Glued/Butt Fusion	2" - 24"	20'	149.5-PSI	200° F	Municipal/ Industrial
Fiberglass	Bonded/Mechanical Connection	1" - 160"	40'	100-PSI	180° F	Municipal/ Industrial/O&G
Epoxy	Bonded/Laminate	1" - 160"	37'	150-PSI	210° F	Municipal/ Industrial/O&G
Epoxy	Threaded	2" - 24"	37'	1500-PSI	210° F	Water/O&G
Spoolable	Mechanical Connection	2" - 10"	Reel/Line Length	3000-PSI	160° F	O&G/ Industrial
Insituform	Joinless	6" - 96"	Manufacturered to fit line being rehabilitated	Atmospheric	140° F	Municipal/ Industrial

Slip-Lining Material Manufactures

NOV

FLEXSTEEL

SHAWCOR

Baker Hughes

SMARTPIPE TECHNOLOGIES

FPI FUTURE PIPE INDUSTRIES

United Poly Systems

IPEX by aliaxis

HOBAS®

PIPELINE® PLASTICS

Performance Pipe

Pulling Equipment Technology

- Horizontal Directional Drill Machinery
- Construction Equipment
  (dozer, track-hoe, etc…)
- Hydraulic Winches
- Wireline Trucks
- Capstan Hydraulic Winch Systems

Environmental Impact Overview

New Construction – Open Cut/Direct Bury:

- Some cases are unavoidable
- Requires real-estate, or access to the development of pipeline right-of-ways
- Reduction of community greenspaces and wooded areas
- Disrupts neighborhoods, communities, and businesses
- Creates issues for road and highway transportation
- Typically requires longer construction times.

Environmental Impact Overview

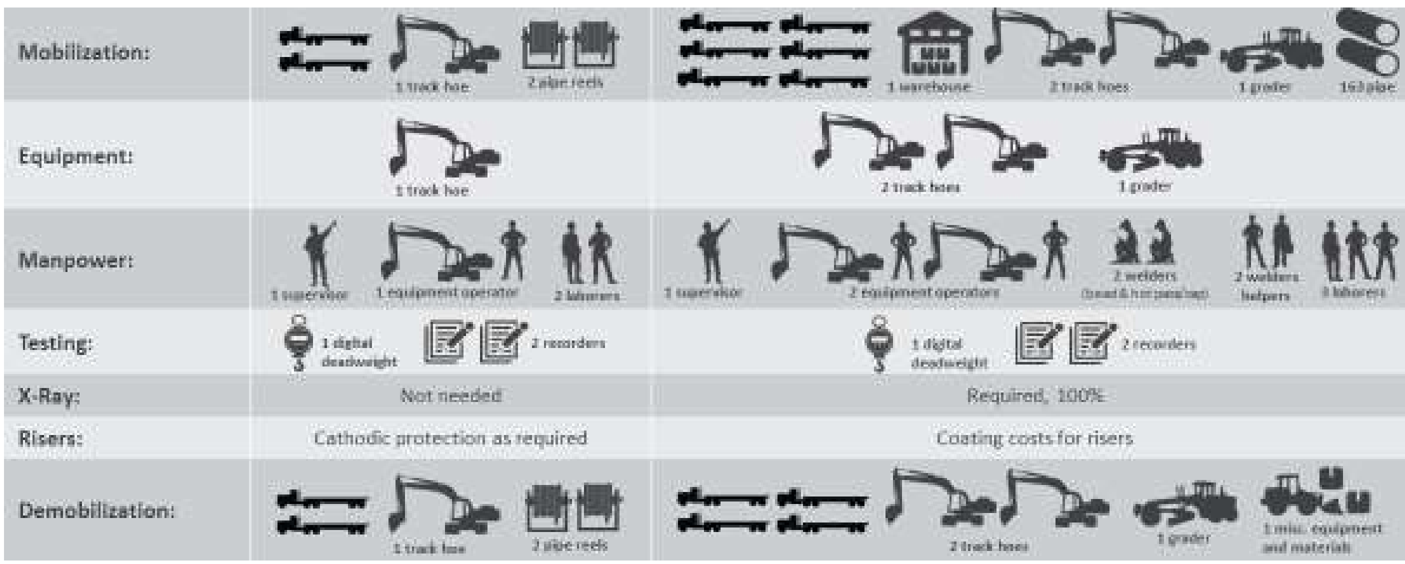
Slip-Lining:

- ✓ Utilizes available current infrastructure in existing pipeline right-of-ways
- ✓ Limited to pre-existing pipelines
- ✓ Minimizes the magnitude of the construction site
- ✓ Reduces disruptions to communities, neighborhoods, businesses and road traffic
- ✓ Lessens impact to trees, greenspaces, and forests
- ✓ Decreases installation times.

Cost Comparison

Comparing Installation Requirements of Identical Installations

Slip-Lining vs **New Pipeline Construction**



Cost Comparison

Comparing Installation Requirements of Identical Installations

Pipeline Replacement Options	Application	Construction Type	Installation Challenges	Environmental Considerations	Pros/Cons		Construction Duration = Cost (≤ 1)
New Construction	Municipal	Open Cut/Direct Bury	Traffic, Roads, Buildings . . .etc.	Established Communities, and Greenspaces	Design Based on Flow Requirements	Greater Impact to the environment and local areas, longer construction schedule and higher costs	1
	Industrial		Existing Underground Utilities	Land, Forests, Rivers, Bays . . .etc.			
	Oil & Gas		Pipeline rights-of-way	Pipeline rights-of-way			
Remove and Replace	Municipal	Open Cut/Direct Bury	Traffic, Roads, Buildings . . .etc.	Removal and Disposal of Existing Materials	Design Based on Flow Requirements	Greater Impact to the environment and local areas, longer construction schedule and higher costs	1.5
	Industrial		Operating Process Units, Hazardous Conditions				
	Oil & Gas		Pipeline rights-of-way				
Abandon and Replace	Municipal	Open Cut/Direct Bury	Traffic, Roads, Buildings . . .etc.	Abandoned lines need to be maintained, Impact to adjacent greenspaces and wooded areas	Design Based on Flow Requirements	Greater Impact to the environment and local areas, longer construction schedule and higher costs	1.4
	Industrial		Operating Process Units, Hazardous Conditions				
	Oil & Gas		Pipeline rights-of-way				
Pipeline Rehabilitation	Municipal	Slip-Lining, Jacking, HDD Boring	Traffic, Roads, Buildings . . .etc.	Impact Limited to Bell Hole Locations, lay-down and staging areas	Less Impact to the environment, shorter installation time and lower installation costs	Reduced Flows	0.6
	Industrial		Operating Process Units, Hazardous Conditions				
	Oil & Gas		Pipeline rights-of-way				

Cost Comparison

Users typically yield a 25% - 40% savings on pipeline rehabilitations over typical pipeline replacement

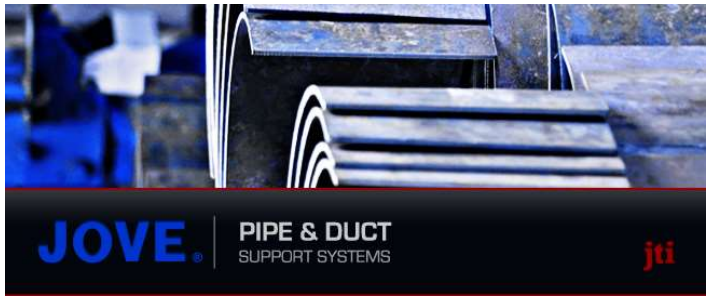
8 Steps to a Safe and Successful Pipeline Installation

- ✓ Understand and follow all local, state and federal laws and regulations.
- ✓ Involve the material manufacturer and installation contractor in the design process early in the development of the project.
- ✓ Have the pipeline material manufacturer review the service application data and generate a written product recommendation specific to the service application.
- ✓ Perform an engineering hydraulic flow and stress analysis as required.
- ✓ Require that the pipeline installation contractor be proficient with the specified materials and be trained and certified by the material manufacturer.
- ✓ Develop and follow a written hydro test procedure.
- ✓ Include the items above in the pipeline material and installation specification.
- ✓ Closely adhere to the pipeline material and installation specification during all phases of the project.

Non-Metallic Materials and Pipeline Design Consultants

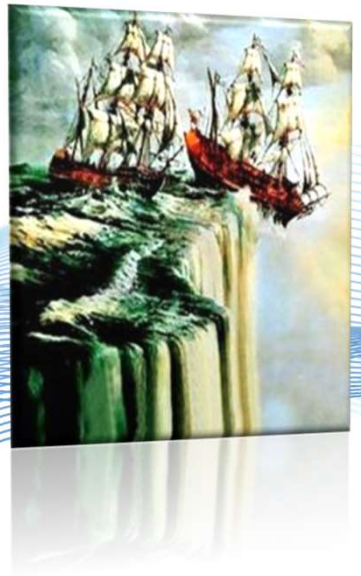
rtconsults
REPUTABLE TRUST

Maverick
Applied Science



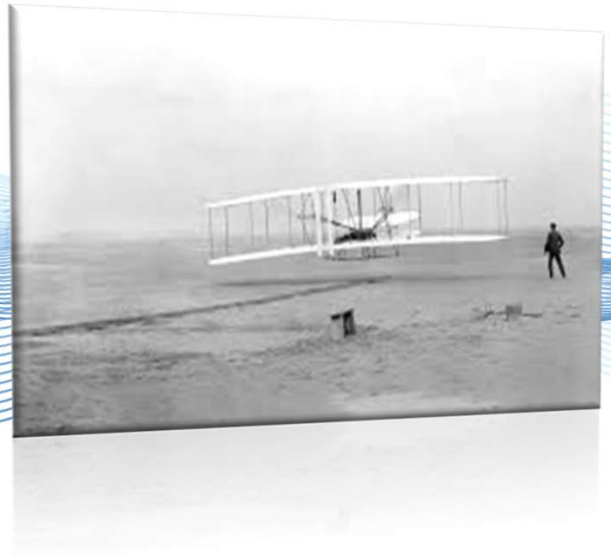
ALLIANCE FOR
pepipe
Responsible Infrastructure

Conclusion



People once thought that if you sailed too far from land, that you would fall off the edge of the earth.

Conclusion



Two bicycle mechanics from Dayton, Ohio dreamed of being able to fly.

Conclusion

President Kennedy Challenged Americans and industry, to put a man on the moon by the end of the decade.

Conclusion

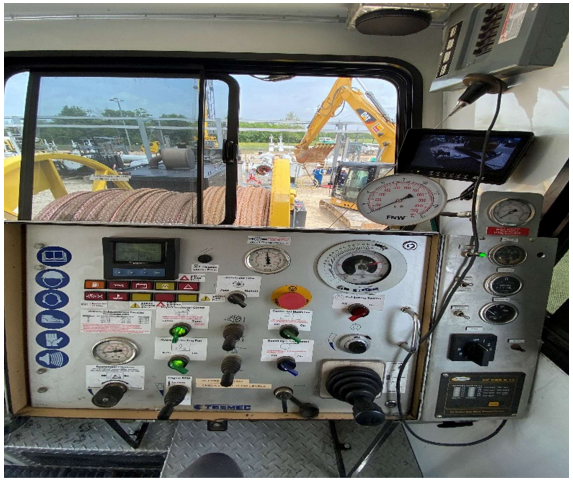
Historical evidence of

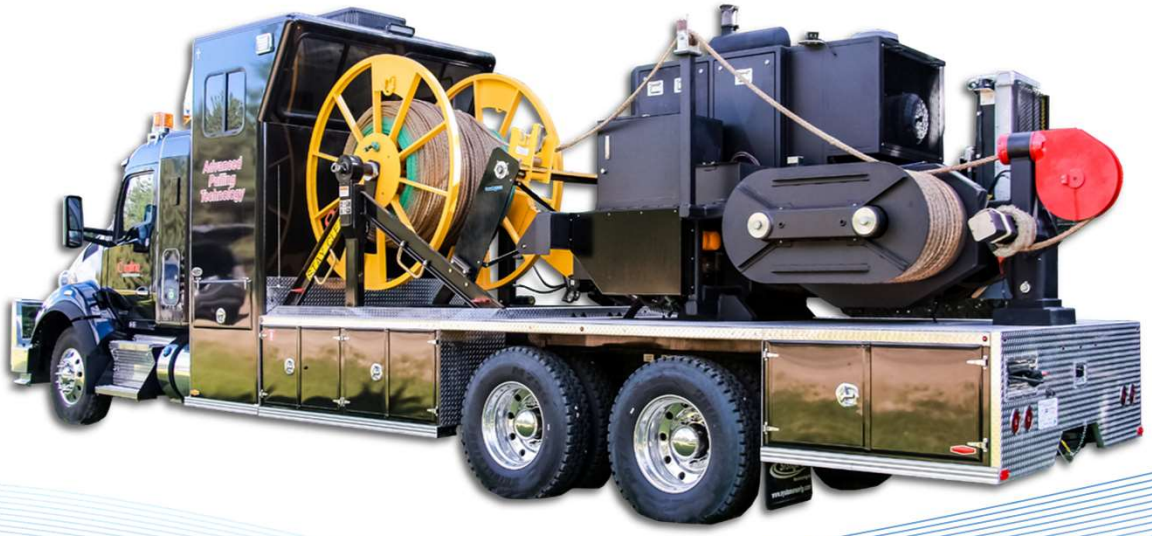
Thinking Outside the Pipe

Conclusion

Significant advancements in liner pulling equipment technology and composite pipeline materials for slip-lining have provided a solution to our existing failing metallic pipeline infrastructure.

“Think Outside the Pipe” We challenge you to explore alternative materials and the pipeline rehabilitation process that decreases construction times, lowers costs, and reduces the substantial environmental impact over complete pipeline replacement.





Q&A

Canline pipeline solutions Ltd.

Service Offerings

Pulling Services

- Composite (non-metallic) pipeline liners.
- ILI Pipeline Inspection Tools

Pipeline Services

- Composite pipe specialists.
- Consulting and project management.
- Certified composite pipe crimp fitting installation Technicians.
- Certified HDPE fusion Technicians.
- Certified Fiberglass Technicians.
- Certified Canusa Scarguard Technicians.
- Pre-job consulting.

Offices in the USA & Canada

Calgary, Alberta
Canada

Billings, Montana
USA

Houston, Texas
USA

Engineered and Purpose Designed Equipment

Canline pulling units utilize direct drive hydraulic capstan winch systems. This approach allows Canline to apply maximum pull forces at any speed, at any distance through each tethered pull with smooth, and consistent pull speeds. This distinct feature makes Canline's complete offering far superior over conventional wireline trucks for pulling Pipeline Liner Systems.

Engineered and Purpose Designed Equipment

- **Real Time Data Monitoring and Acquisition**
- Weight indicator with adjustable pull force weight limiter.
- Speed indicator.
- Distance measurement (Note: Can indicate where the inspection tool or pull head is at any given time).
- Data logging system recording the run data above. Real time logging. Print out and USB stored information of run data is available immediately following each pull.
- Complete quality control job package is available at completion of the project.

Specialized High Performance, High Strength Synthetic Rope

- There are several manufacturers and literally hundreds of types of rope used in many industries for all types of applications.
- There are multiple factors that are considered for the selection of the specific type of rope used for pulling tethered inspection tools and pipeline liners.
- Canline's extensive experience along with our years of collaboration with major rope manufacturers gives us the leading edge on using the highest quality synthetic rope product available for this specialized application.

Synthetic Rope Advantages Over Steel Cable

- **Safer** – Significantly less stored energy under load, making it much safer for the operators.
- **Lower recoil** – Steel cable has higher mass. Higher risk.
- **Lighter** – 7 times lighter than steel wire rope. Allows for much longer blow downs, especially in smaller diameter.
- **Stronger** – 15 times stronger than steel wire rope.
- **Abrasion resistant, wear resistant, flexible, spliceable.**
- **Does not cause internal damage** to pipelines in bends, risers, and bores.
- **Nonconductive** – Eliminates the possibility of arcing during severe service operation.

Please give us a call to discuss what Canline can do to help with your next pipeline installation or Rehabilitation Project

THANK YOU

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