



**PIPELINE
MANAGEMENT CO.**

Pipeline Inspection, Maintenance, Repair and Rehabilitation

Structural Rehabilitation of Culverts Using UV-Cured CIPP Liners

Where Trenchless Rehabilitation Fits in Bridge & Culvert Maintenance

Mike Czartoszewski – Pipeline Management

POWERVAC
EXTENSIVE JET-VAC CLEANING SERVICES

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PLUMBING • ELECTRICAL • MECHANICAL

ABLE
GREASE-TRAP SERVICE

The Culvert Challenge

- Aging culvert infrastructure across Michigan
- Increased maintenance demands
- Limited replacement budgets
- Environmental Sensitivity in many locations



Replacement Reality

- Excavation and road disruption
- Traffic control and detours
- Utility conflicts
- Permitting and environmental impact
- High and increasing costs



Lifecycle Window

New >> Good >> Deteriorating >> Rehabilitation Window >> Failure >> Replacement



(b) Invert Abrasion



(a) Corrosion of Invert



(e) Joint Infiltration



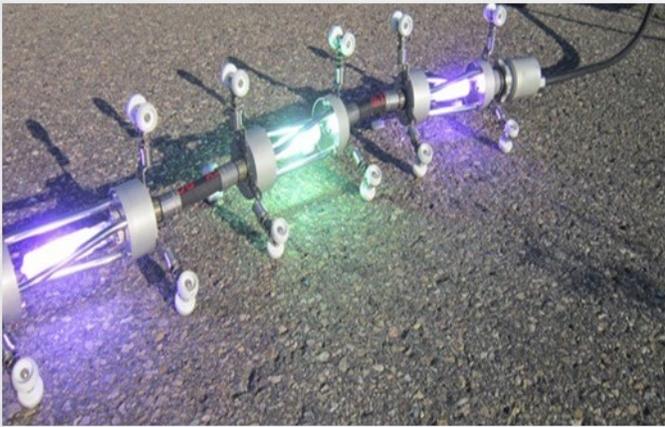
What is UV-CIPP?

- ECR Glass fiber reinforced liner
- Ultra Violet light activated resin
- Installed inside existing pipe
- Cured using Ultra Violet light
- Creates a structural pipe within a pipe



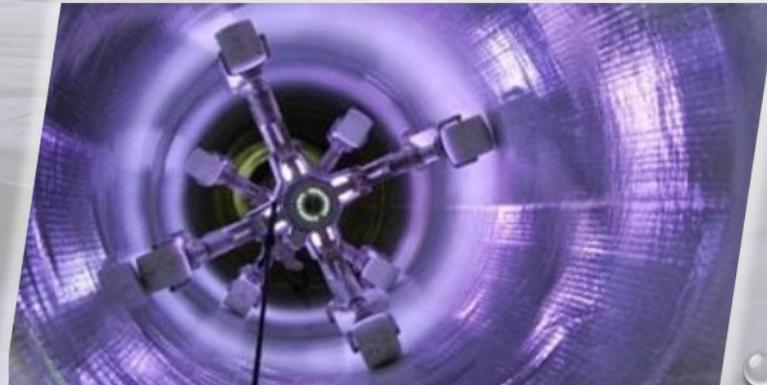
Why UV Technology Exists

- Improved curing control
- Higher strength materials
- Faster Installation
- Consistent structural performance



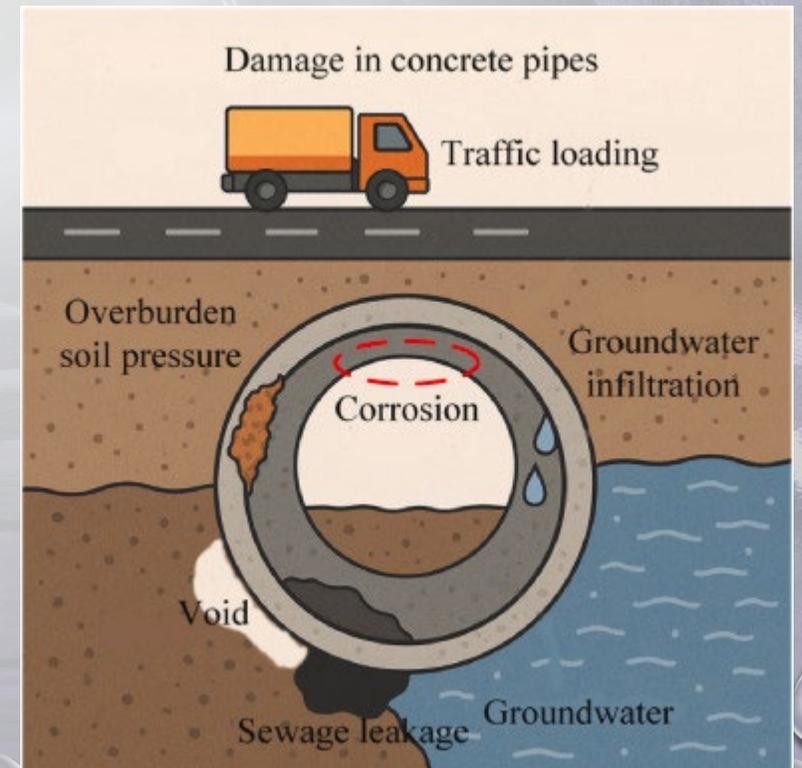
Installation Process

1. Cleaning
2. Inspection
3. Liner install
4. Inflation
5. Curing
6. End finishing



Structural Capability

- Designed using ASTM standards (F1216, F2019)
- Emerging ASCE standards (MOP 145)
- Accounts for soil, groundwater, and traffic loads
- Can be designed fully independent of host pipe



Where it Works Best

- Corrugated metal pipes
- Deteriorated concrete pipes
- Deep culverts under roadways
- Environmentally sensitive areas
- Limited access locations



Where it Does Not Work

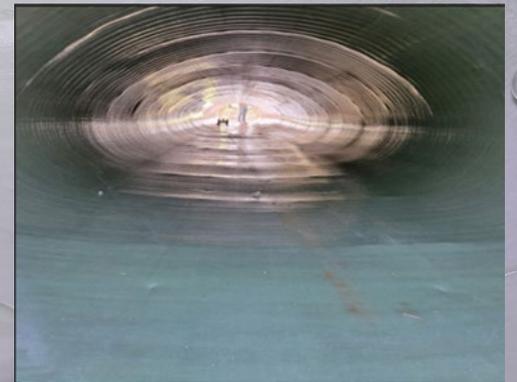
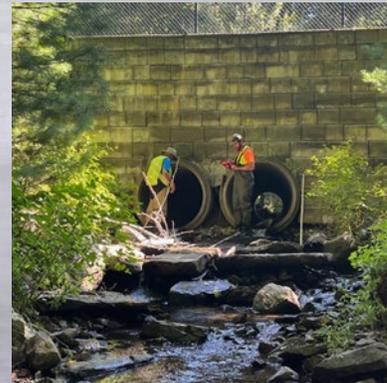
- Collapsed structures
- Severe deformation
- Hydraulic under sizing
- Major alignment issues



What does SUCCESS look like?

Success Is

- Structural load transferred to the liner
- Uniform, verified cure throughout the length
- Predictable performance under live traffic
- Liners installed and cured in a timely manner



24" RCP w/ Longitudinal Cracking

USMH: A 13475+35
DSMH: B 13475+35



LC2: -0000.60 ft
LC1: +0048.00 ft

47.3 ft. 26.08.20

USMH: A 13475+35
DSMH: B 13475+35



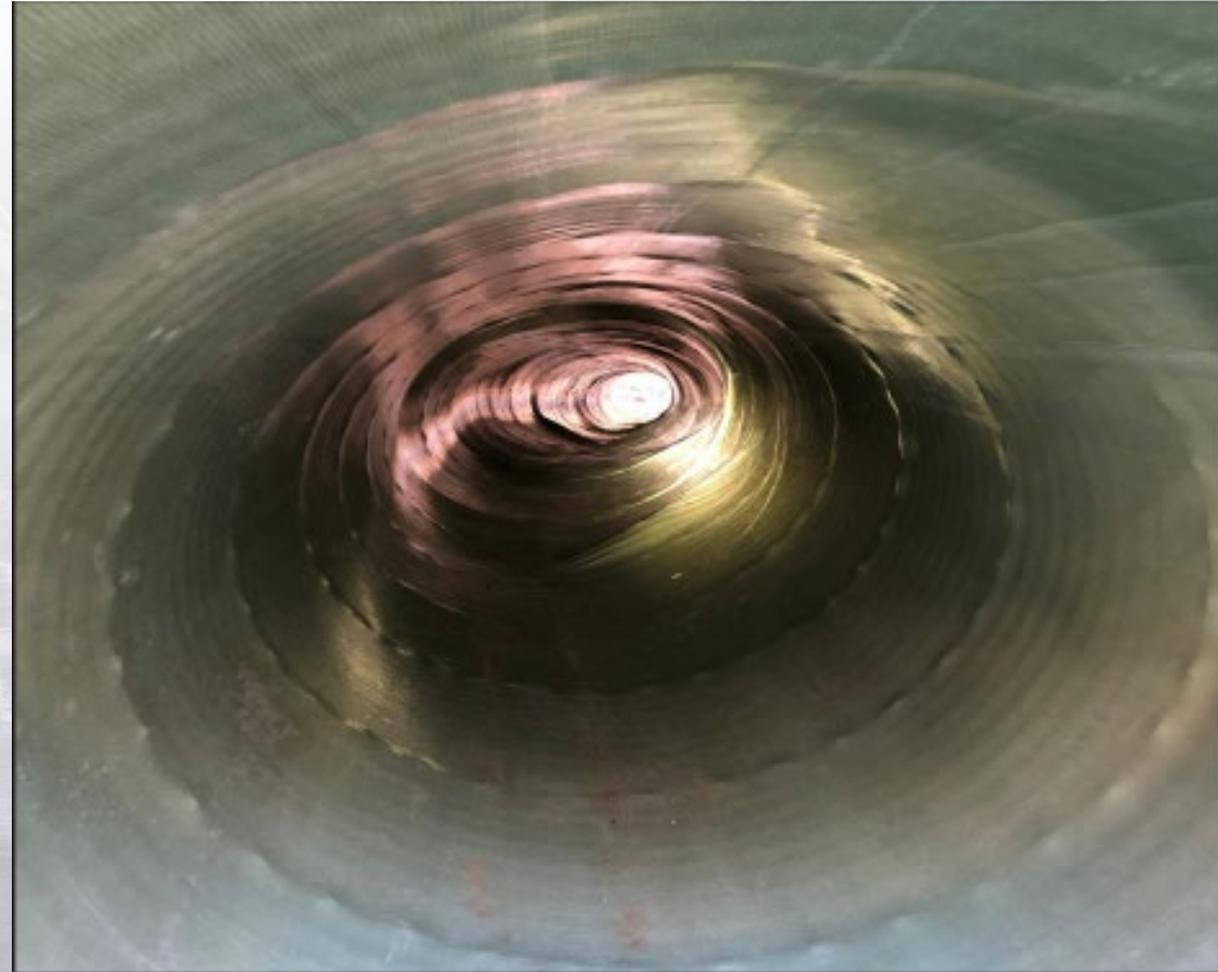
LC2: -0000.60 ft
LC1: +0048.20 ft

45.1 ft. 26.08.20

**30" RCP w/ Joint
Separation**



**54" CMP w/
Abnormalities**



48" Arch Pipe



**CMP w/ Deteriorated
Invert**



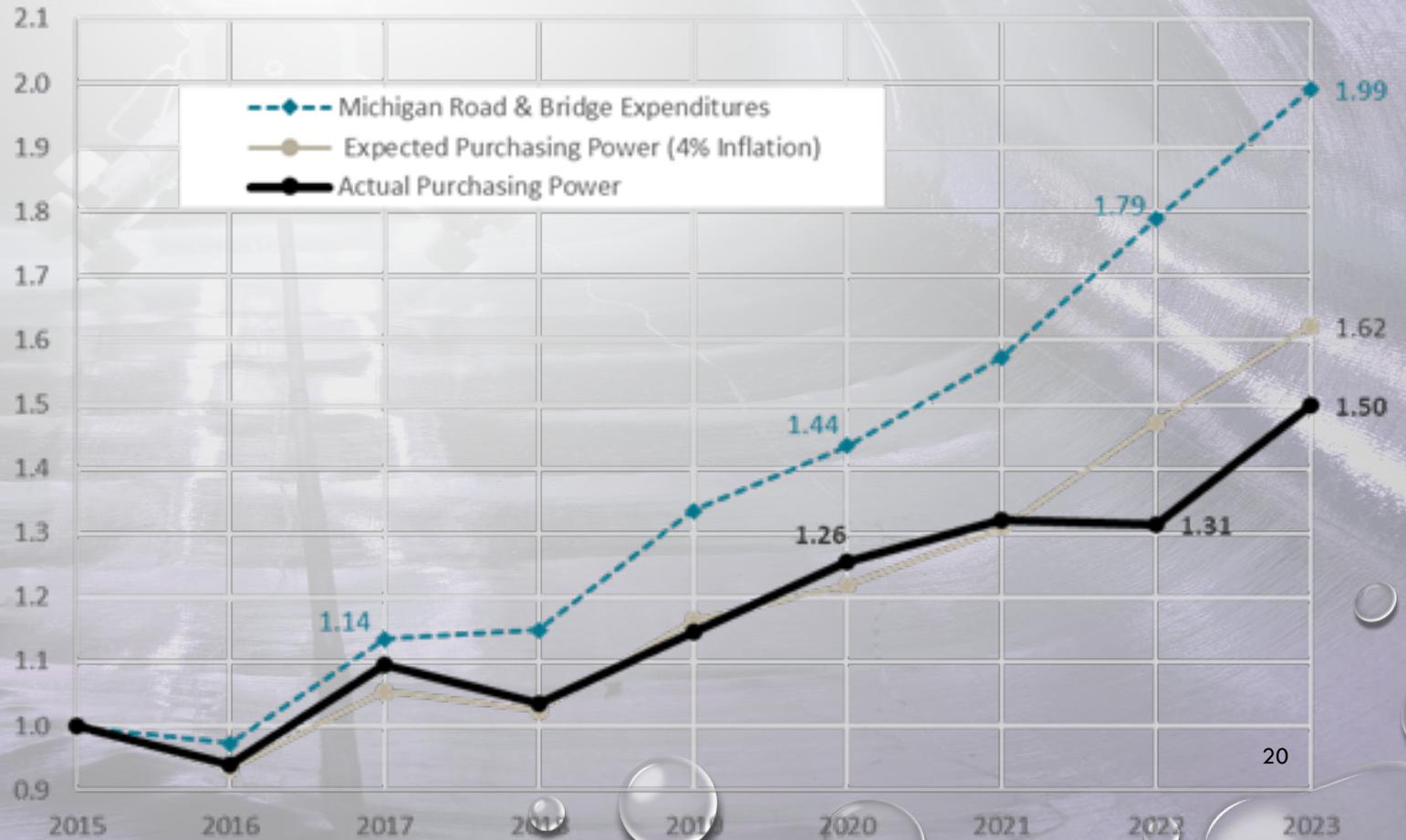






COST & IMPACT

- Cost
- Traffic disruption
- Environmental impact
- Permitting complexity
- Project duration



BIG PICTURE

- Balance of budget, risk, and planning
- Extending service life of viable structures
- Delaying replacement strategically
- Minimizing community disruption and impact



Closing

- Better Information = Better Decisions
- Right Solution >>> Right Time





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