

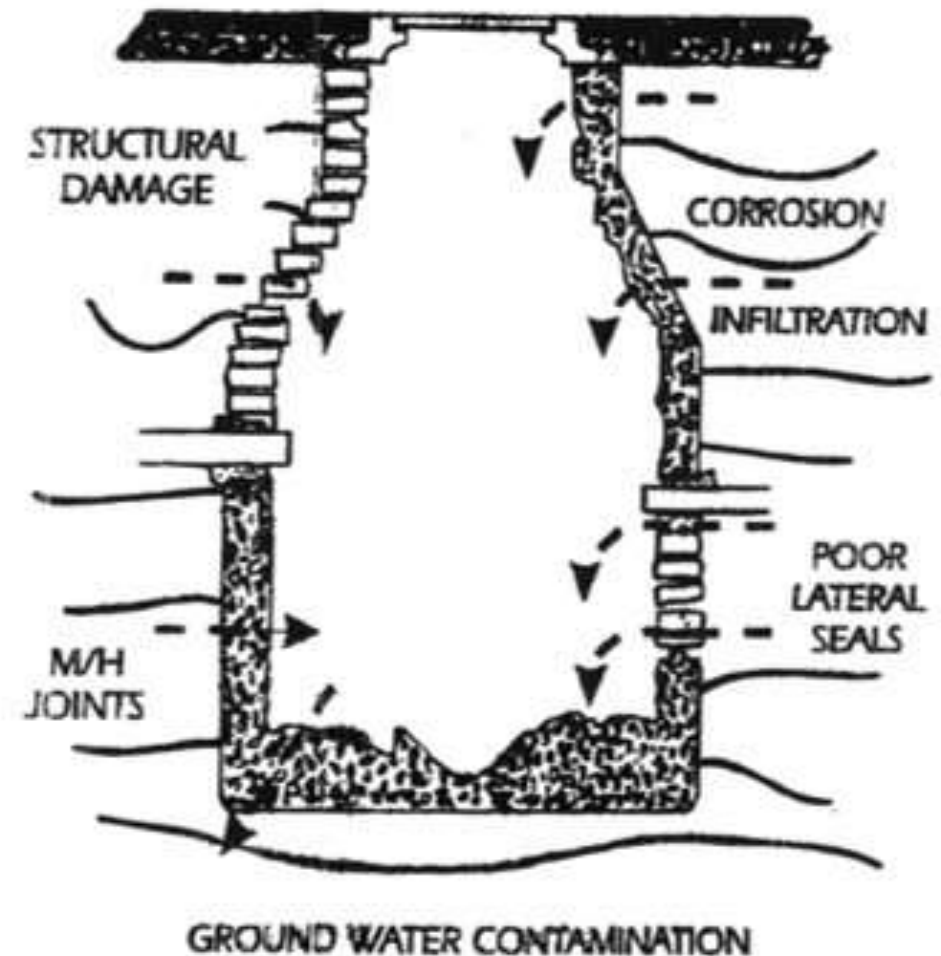
## Epoxy Coatings: Manhole rehabilitation solution of choice

Presented by Phil Warren, Technical Manager



## Common Manhole Issues

- » Structural damage cause by age, movement, etc.
- » Leaking joints
- » Corrosion caused by microbial attack (H<sub>2</sub>S)
- » Infiltration and Inflow (I&I)
- » Poor lateral seals



## Versatile Manhole Solution

### 100% solids epoxy coating

- » A spray applied structural polymer capable of rehabilitating and renovating the entire manhole without the need for excavation
- » Capable of extending service life of the sewer structure by at least 75 years
- » Highly-resistant to the conditions that lead to the need for rehabilitation



Sewer Rehabilitation Project  
Town of Wareham, MA





## Confined Space Safety

100% solids epoxy benefits

### Non-explosive

No risk of explosion from spraying with flammable solvents

### No airborne solvent

No risk of inhalation of noxious airborne solvents

### Combustion resistant

No risk of combustion of the coating during or after installation

### Free of volatile organic compounds

No volatile organic compounds that are common in industrial coatings

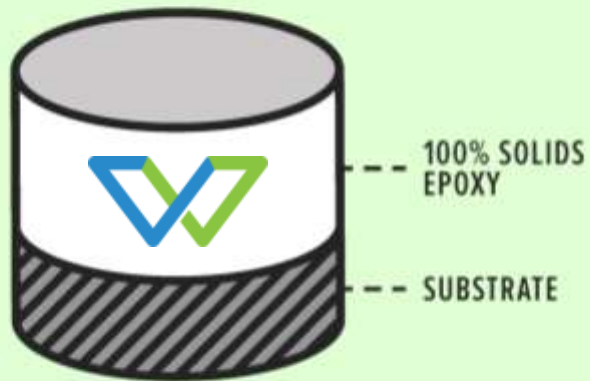
## Adheres to Damp Surfaces

Unlike a solvent thinned spray system, Warren's epoxy coating system performs well in 100% humidity and wet environments



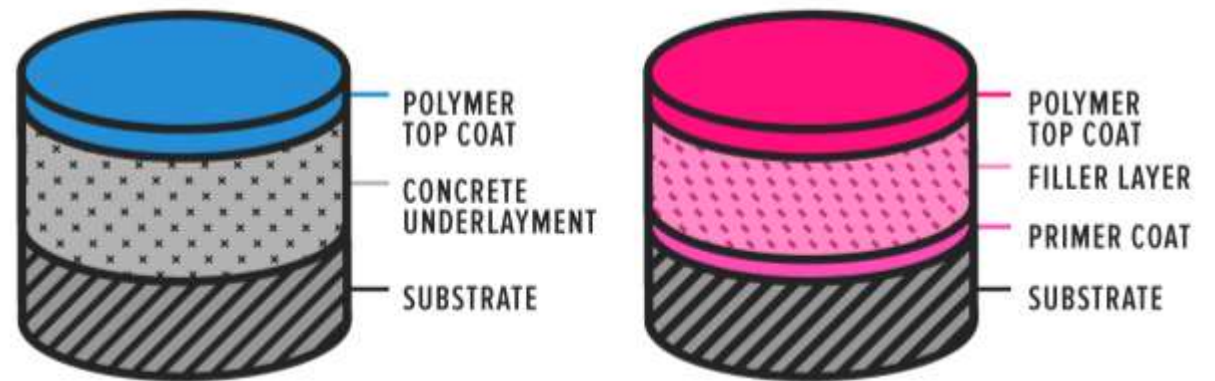
## Single Coat Difference

### S301 SINGLE COAT EPOXY



**PROVEN RELIABLE**

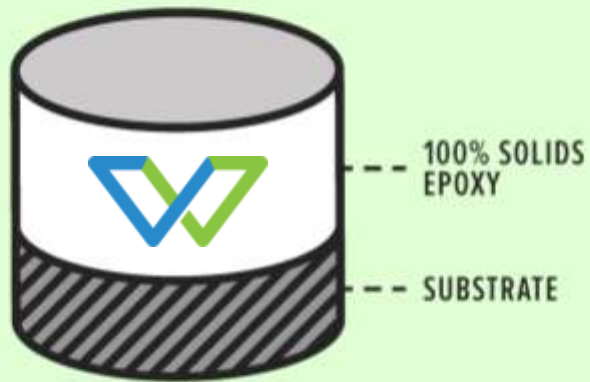
### MULTI-COAT APPLICATION TECHNIQUES



**INCREASED RISK**

## Single Coat Difference

S301 SINGLE COAT EPOXY



**PROVEN RELIABLE**

### Single Coat

Capable of being sprayed in excess of 500 mils (1/2") thick in a single coat

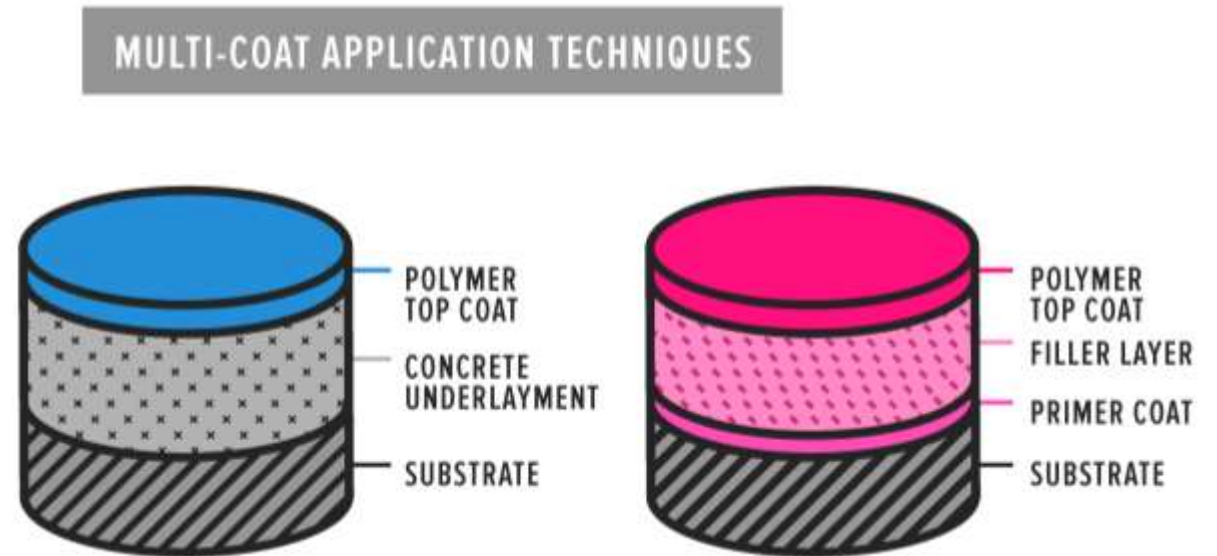
## Single Coat Difference

### Underlayment

Cement underlayment less than 28 days old leads to long term failures

### Multiple Coats

Every additional layer of coating increases the risk of failure



**INCREASED RISK**



## Functions of the Coating

### Structural rehabilitation

- » Resists hydro static loading
- » Bridges voids, gaps, and cracks
- » Replaces missing concrete

### Protects substrates

- » Corrosives
- » Microbial attack
- » Sewer gases



## Concrete Manhole Rehabilitation Process

- » Surface preparation
- » Bypass invert with flow-through plug
- » Line invert with fast setting epoxy
- » Coat manhole with 125-500 mils



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## Concrete Manhole Rehabilitation Process

### Testing & inspection

- » Perform holiday testing per NACE SP0188
- » Verify thickness of the coating
- » Adhesion pull testing per ASTM D7234 for concrete and ASTM D4541 for metal



**19 Year Reinspection**  
Adhesion pull test of a DeKalb County manhole

## Conclusions

- » Reduced life-cycle costs
- » Quick return-to-service
- » Safe for the environment and applicators
- » High-build, single coat
- » Structural
- » Industry-leading adhesion
- » Time-proven solution





## Questions?

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