

Innovative FRP Solutions for Repair of Tunnels and Manholes

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Outline of Presentation

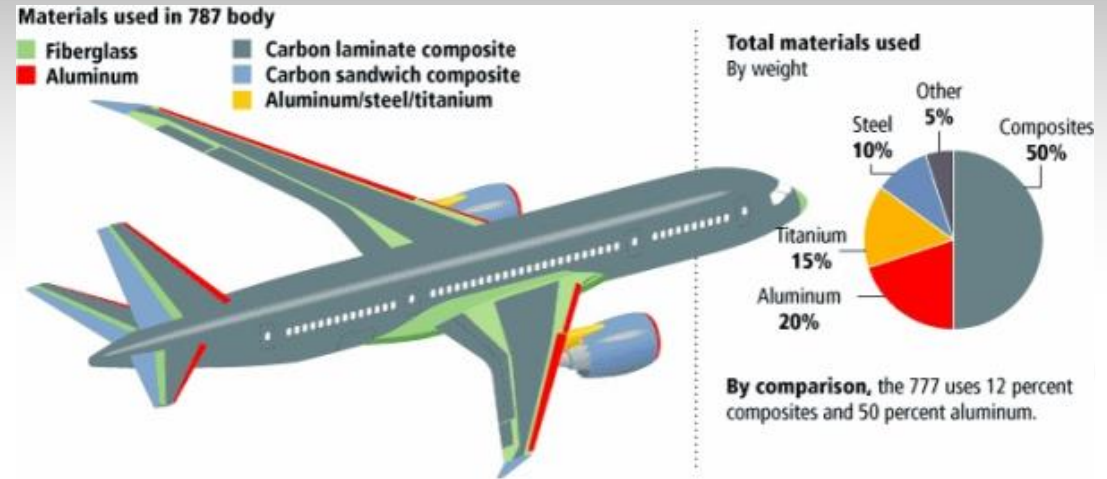
- **Introduction to FRP**
- **Wet Layup**
 - **Tunnel Repair**
 - **Pipe Repair**
- **Sandwich Construction for Manholes & Walls**
- **InfiniPipe®**

FRP Products



History of FRP in Various Industries

Corvette C1 - 1953



100% FRP Hull



Original Concept Demonstration

Carbon FRP instead of reinforcing steel



Blast Protection



Advantages of FRP

- **High Tensile Strength** *(3-5 times stronger than Steel)*
- **Low Weight** *(no foundation adjustments required)*
- **Corrosion Resistance & Protection**
- **Chemical Protection**
- **Waterproof**
- **Speed of Construction**
- **Versatility**
- **Odorless & Non-Toxic (QuakeWrap Products)**
- **NSF-61 Certified for pipes $\geq$ 8 inches**
- **Minimal Investment**



Sample Projects



Testing + R&D



Condo, FL



Piles, Australia



Bridge, NM



Settling Tank, MX



UN Lebanon



High Rise, AK



Pipe, Costa Rica



Kazakhstan

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Utility Vault (Pull Box)

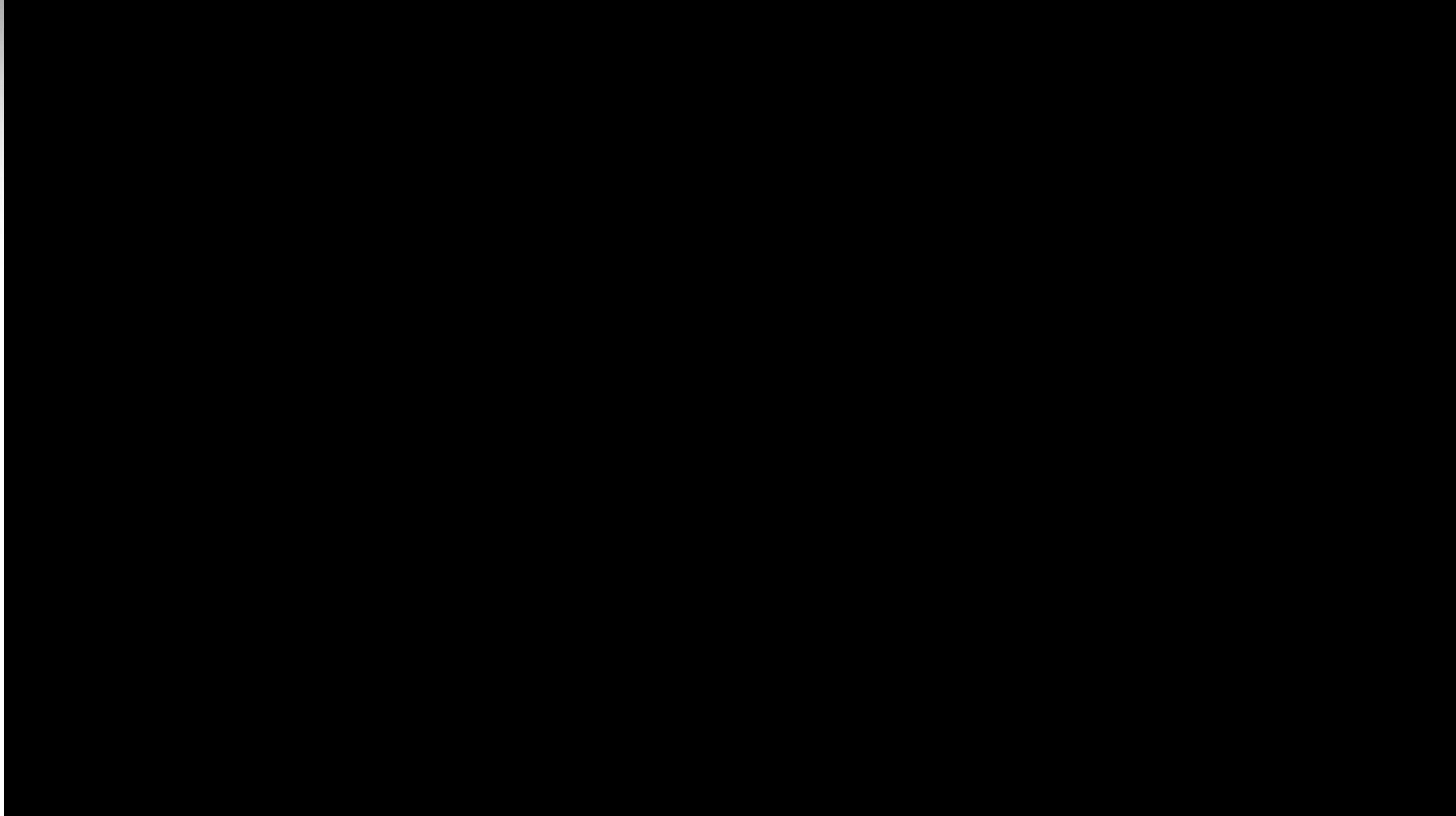
Tucson Electric Power



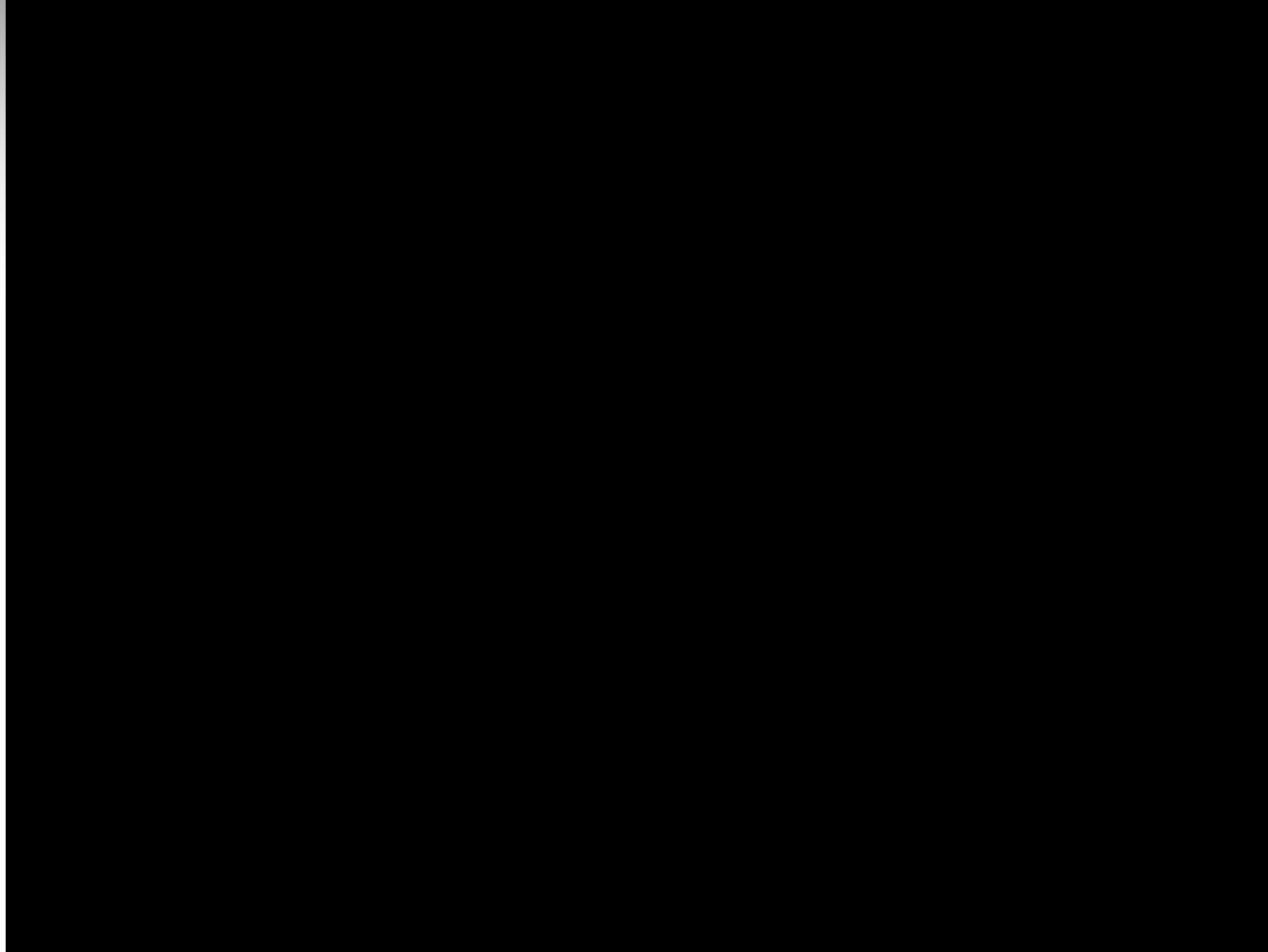
Univ. of Arizona North Tunnel



Univ. of Arizona North Tunnel



Univ. of Arizona North Tunnel



Pipe Repair

➤ Internal Wrap



➤ External Wrap



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Composite Sandwich Concept



Steel I-beam



T 

RELATIVE STIFFNESS

1

WEIGHT (Pounds/ft²)

0.910

Gillies Road Culvert

Cairns, QLD

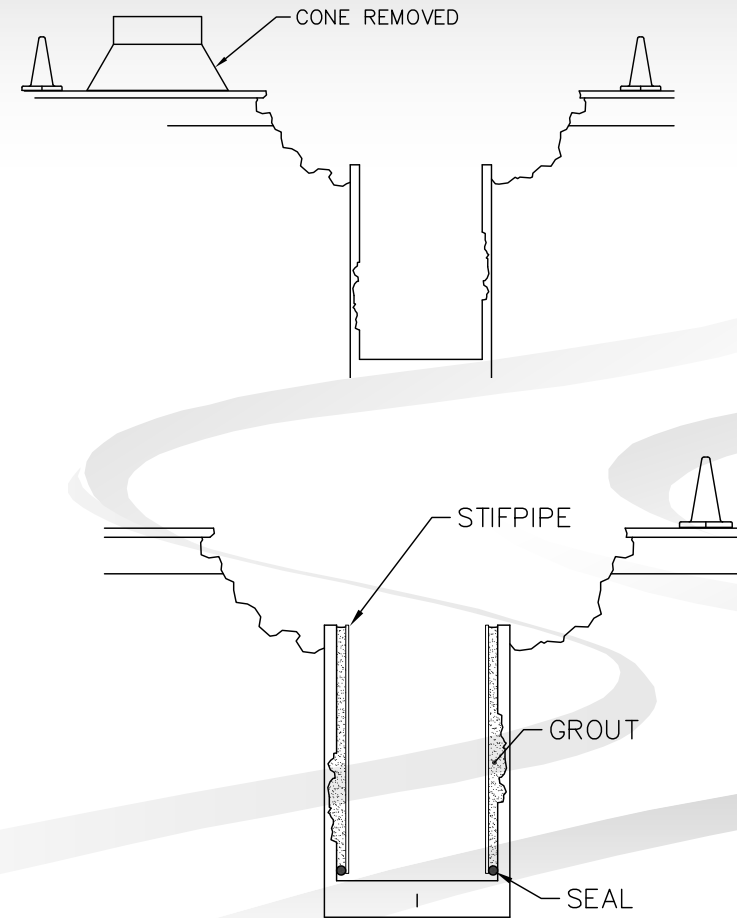
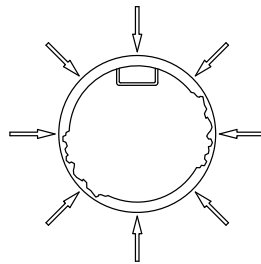
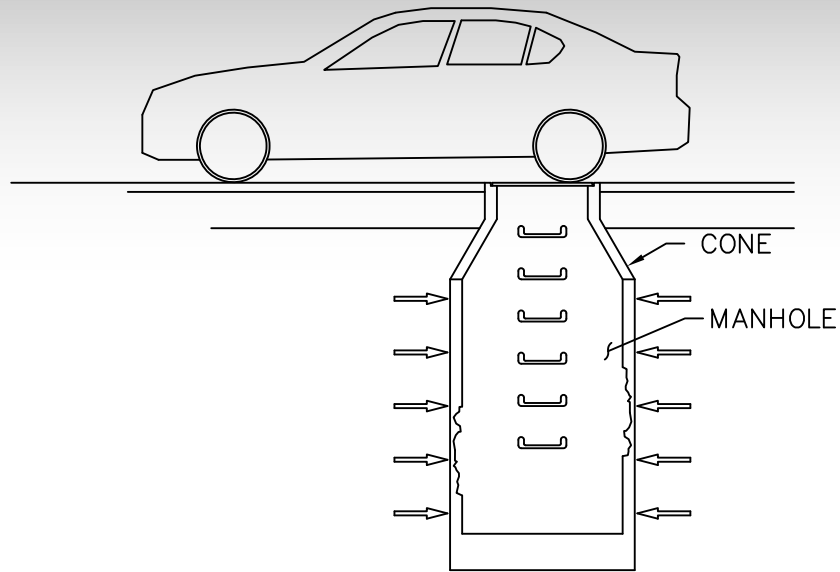


Gillies Road Culvert

Cairns, QLD



Repair of Manholes with StifPipe®



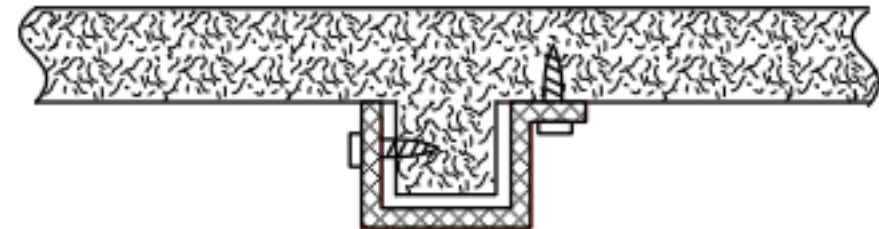
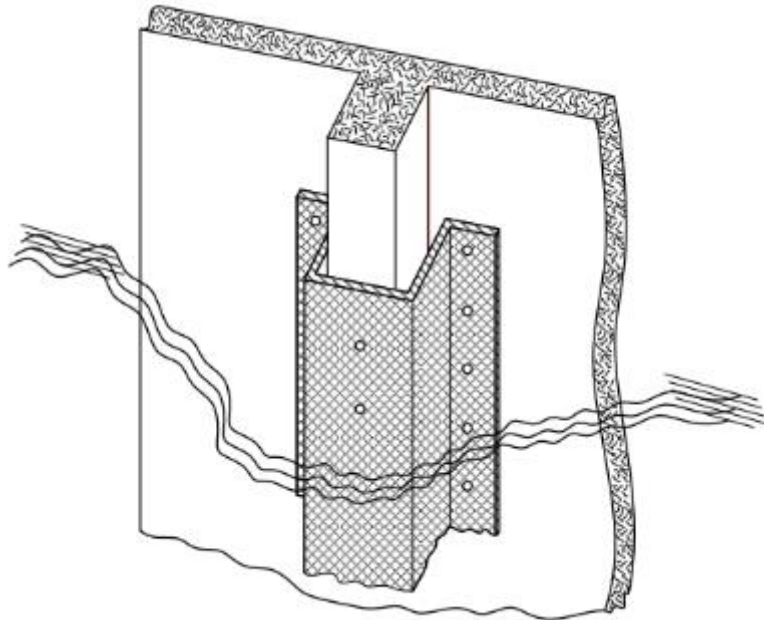
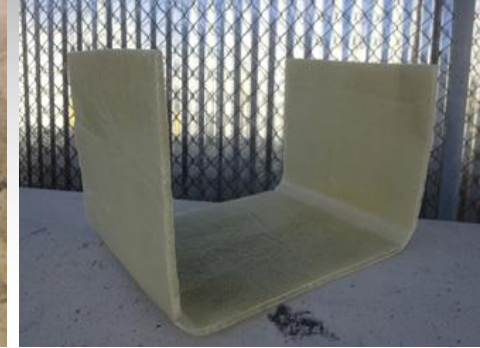
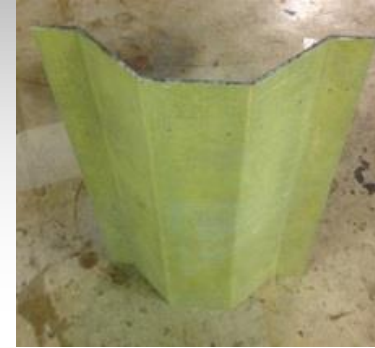
Repair of 29 Manholes in Pressure Pipe

(Aguirre, Puerto Rico)

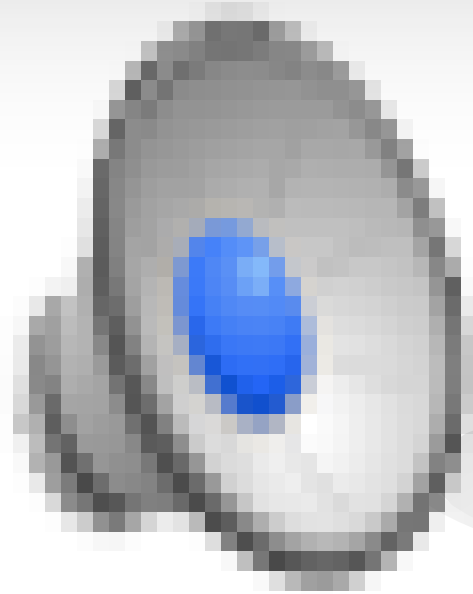


Stay-In-Place Forms

(Patent Pending)



Onsite-Manufactured InfnitPipe®



Thank you for your Attention!

Questions?

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