

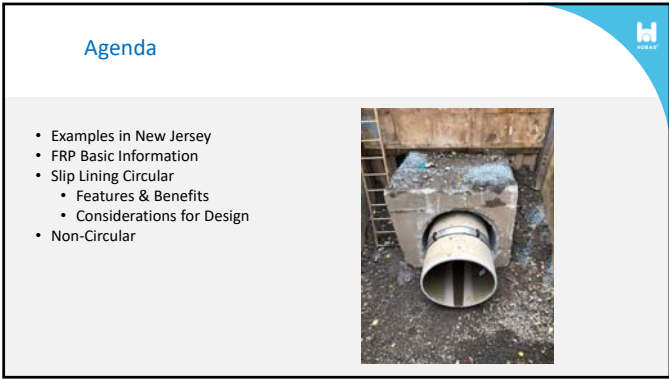
NJWEA - Winter Tech Transfer 2025 Trenchless Technologies



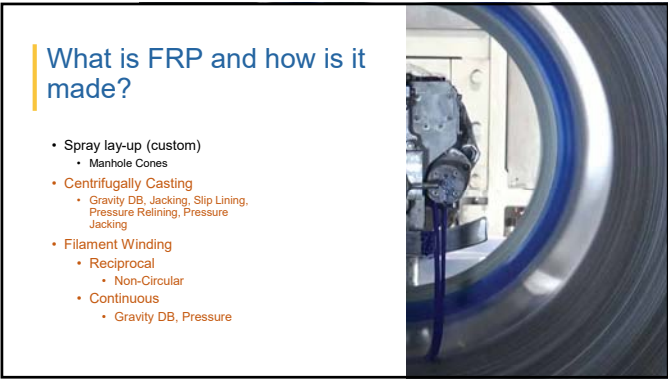
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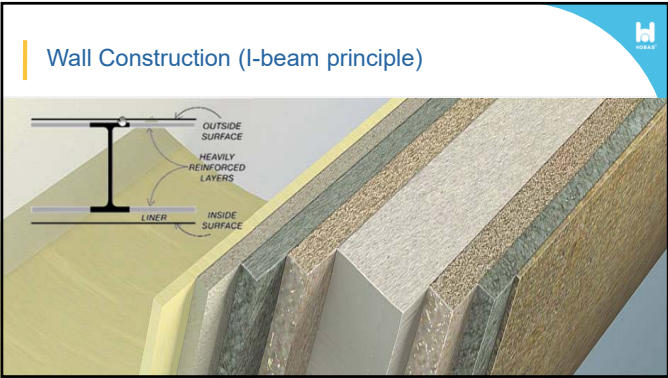
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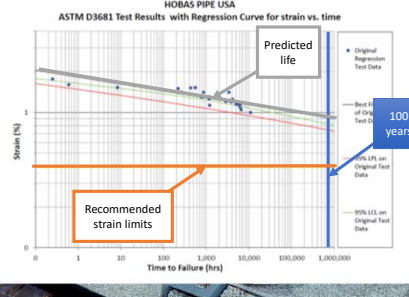
Materials



- High quality, commercial grade fibers
 - E-Glass & ECR Fibers
 - 1" & 2" chopped
 - Continuous + chopped + veil (non-structural)
- Thermosetting resin
 - Polyester
 - Vinylester (\$\$\$)
- Precisely graded sand

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Strain-Corrosion Testing




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Related Standards

• ASTM D3262	Fiberglass Gravity Sewer Pipe
• ASTM D3754	Sewer Force Mains & Industrial
• AWWA C950	Potable Water Pressure Mains
• ASTM D3517	Raw Water Pressure
• AWWA M45	Fiberglass Pipe Design Manual
• NSF 61	Drinking Water System Components
• ASTM D4161	Fiberglass Pipe Joint Using Flexible Elastomeric Seals
• Greenbook Standard Specifications for Public Works Construction	

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Sliplining



- Improved flow capacity (increased hydraulics)
- Do live (no bypass required) \$\$\$
- Long pushes (fewer pits) \$
- Easy to grout with higher safety factors
 - Thermoset v Thermoplastic
- Elastomeric gasket push together joints
- Smaller pits
- Faster assembly

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Testing Standards



- **ASTM D3681 Long-term Strain Corrosion Test**
 - The only pipe with an actual test standard
 - Can demonstrate 100+ year service life
- **ASTM D2992 Long-term Pressure Regression**
HDB Basis Determination
- **ASTM D2412 Pipe Stiffness Test**
 - Flexible Pipe Design
 - Resilient

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Sliplining vs. Other Methods



Long Distance with Fewer Small Pits
No Flow Diversions
No Cleaning or Surface Preparation
No Bypass Pumping

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FRPM Features & Benefits

Features

Benefits

- Corrosion resistant
- Computer-controlled consistent manufacturing process
- Lightweight
- Constant OD (circular)
- High Jacking Capacity
- Smooth Interior Manning's 0.009

- Long maintenance-free life
- Reliable performance
- Fast assembly
- Leak-free
- Excellent long-term hydraulics
- Abrasion resistant
- Consistent high quality
- No need for cathodic protection or coatings

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Hydraulics

QHOBAS / QExisting

		Host Pipe Existing Flow Coefficient, n									
		0.013	0.014	0.015	0.016	0.017	0.018	0.020	0.022	0.024	
18	0.009	0.722	0.777	0.833	0.888	0.944	0.999	1.110	1.221	1.332	
into	0.010	0.649	0.699	0.749	0.799	0.849	0.899	0.999	1.099	1.199	
24	0.011	0.590	0.636	0.681	0.727	0.772	0.817	0.908	0.999	1.090	
20	0.009	0.961	1.035	1.109	1.183	1.257	1.331	1.479	1.627	1.774	
into	0.010	0.865	0.932	0.998	1.065	1.131	1.198	1.331	1.464	1.597	
24	0.011	0.786	0.847	0.907	0.968	1.028	1.089	1.210	1.331	1.452	
24	0.009	0.860	0.926	0.992	1.059	1.125	1.191	1.323	1.456	1.588	
into	0.010	0.774	0.834	0.893	0.953	1.012	1.072	1.191	1.310	1.429	
30	0.011	0.704	0.758	0.812	0.866	0.920	0.974	1.083	1.191	1.299	
30	0.009	0.945	1.017	1.090	1.163	1.235	1.308	1.453	1.599	1.744	
into	0.010	0.850	0.916	0.981	1.046	1.112	1.177	1.308	1.439	1.570	
36	0.011	0.773	0.832	0.892	0.951	1.011	1.070	1.189	1.308	1.427	
36	0.009	1.008	1.086	1.163	1.241	1.318	1.396	1.551	1.706	1.861	
into	0.010	0.907	0.977	1.047	1.117	1.186	1.256	1.396	1.535	1.675	
42	0.011	0.825	0.888	0.952	1.015	1.079	1.142	1.269	1.396	1.523	
42	0.009	1.057	1.139	1.220	1.301	1.383	1.464	1.627	1.789	1.952	
into	0.010	0.952	1.025	1.098	1.171	1.244	1.318	1.464	1.610	1.757	
48	0.011	0.865	0.932	0.998	1.065	1.131	1.198	1.331	1.464	1.597	
48	0.009	1.103	1.187	1.272	1.357	1.442	1.527	1.696	1.866	2.036	
into	0.010	0.992	1.069	1.145	1.221	1.298	1.374	1.527	1.679	1.832	
54	0.011	0.902	0.972	1.041	1.110	1.180	1.249	1.388	1.527	1.666	

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Benefits

Great Hydraulics

- Increased flow capacity due to better hydraulics

Manning's Equation

$$Q = \frac{1.49}{n} \times A \times R^{2/3} \times S^{1/2}$$

Q_1

Q_2

n_2

n_1

A_1

A_2

$\times \left(\frac{R_1}{R_2}\right)^{2/3}$

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Considerations for Design

- Pit Locations
- Pit Size
- Curves v PI's
- Lateral
- Flows
 - With Flow
 - Against Flow

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Hydraulics (Sample)

		Host Pipe Existing Flow Coefficient, n									
		0.013	0.014	0.015	0.016	0.017	0.018	0.020	0.022	0.024	
72	0.009	1.193	1.235	1.276	1.458	1.540	1.622	1.835	2.019	2.202	
into	0.010	1.074	1.116	1.238	1.321	1.404	1.487	1.692	1.817	1.982	
78	0.011	0.976	1.051	1.126	1.201	1.276	1.351	1.502	1.652	1.802	

RCP

n=0.013 Short Term

N=0.016 Long Term

7.4% Capacity Gain

32.1% Capacity Gain

HOBAS

N=0.009 Short Term

N=0.100 Long Term

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FRP Non-Circular Pipe

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Introduction

- Can make any non circular shape (egg, arch, mouth etc...)
- Sizes range between 18" & 120".
- Typical lengths are ~ 8 ft to 10 ft in length.



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Benefits

- Similar benefits to FRP Circular Pipes
 - Long expected service life
 - Long term structural solution
 - Can be installed with live flow.
 - Inherent resistance to sulfuric acid
 - Improved flow capacity due to superior hydraulics.



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Manufacturing Process

Computer Controlled Filament Winding on as steel mold

- **Computer controlled process**
 - Precise control of rotation speed.
 - Material quantity control
- **Steel mold**
 - Consistent internal pipe dimensions
 - No deformations after uses
 - Tight joint tolerances
 - 0-leakage joints



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Installation (Laterals & Grouting)

- Re-instate laterals
 - Typically done by small point excavations via inserta-tee.
 - Could be done inside with magnets and top hat CIPP
- Grouting:
 - Seal the ends with concrete bulkheads
 - Divert flow inside the pipe
 - Inject grout till refusal.
 - Control grout pressure on pipe.



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Joint System

- **Gasket Type:** Flexible EPDM or Nitrile rubber.
- **Leak tightness :** Test realized according to ISO 16611 on Circular samples & ASTM D4161.
- **Tests:** performed at 29 psi internal pressure.
- **NC is designed for non-pressure applications.**



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Sliplining Curves and Bends

TYPICAL SLIPLINING

North Outfall Sewer (NOS) Unit 10

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S-Curve under railway

- Length 200 ft curved section,
- Access Shafts on either end of the S-Curve but not one available in between (Railroad)
- 2 ~60 ft Radius, 60-degree turns

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Tools & Deliverables

Website: <https://hobaspipe.com>

- Brochures
- Technical Advice & Recommendations
- Case histories
- Newsletters
- Videos
- Contact information
 - Sales
 - Engineering
 - Commercial

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Condition and Survey

515-01-001 TO 495-13-131				
Number	Length	Angle (Deg)	Start Station	Rad (ft)
C16	16.8	9.2	1+27	104.5
L9	4.3	N/A	1+44	N/A
C17	11.0	4.2	1+48	150.9
C18	27.6	2.2	1+59	733.5
L10	30.8	N/A	1+87	N/A
C19	13.8	2.3	2+18	338.7
C20	0.2	2.4	2+32	4.8
C21	27.7	0.8	2+32	1878.5

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Questions/Comments

Bryant L. Welch
Project Development Mgr
N. America East
Hobas Pipe USA
[E \[bwelch@hobaspipe.com\]\(mailto:bwelch@hobaspipe.com\)](mailto:bwelch@hobaspipe.com)
C (919)592-5668

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North Outfall Sewer (NOS) Los Angeles, CA 2024

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