NETC Webinar - MaineDOT's Implementation of the NETC project on Advanced Composite Materials Bridge Drain System

2009-Current

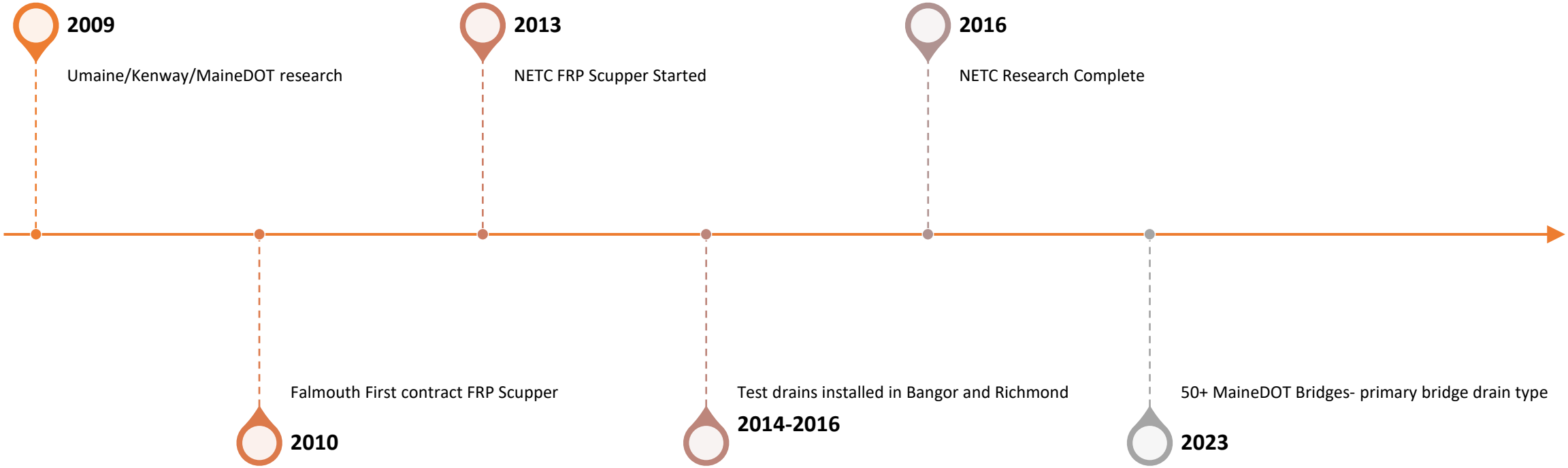
Why Use FRP Drains?

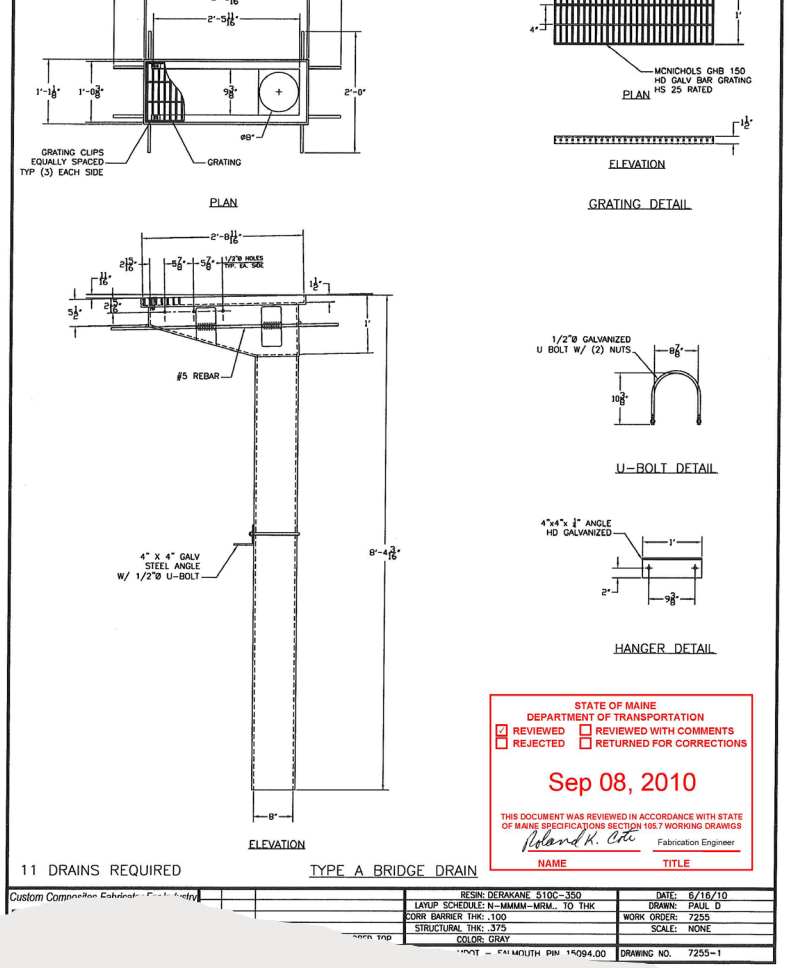
Sagadahoc

Bath-Woolwich

- Built in 2000

Brief history on FRP Drains at MaineDOT





2010 Falmouth Project

NETC 09-3: Advanced Composite Materials: Prototype Development and Demonstration

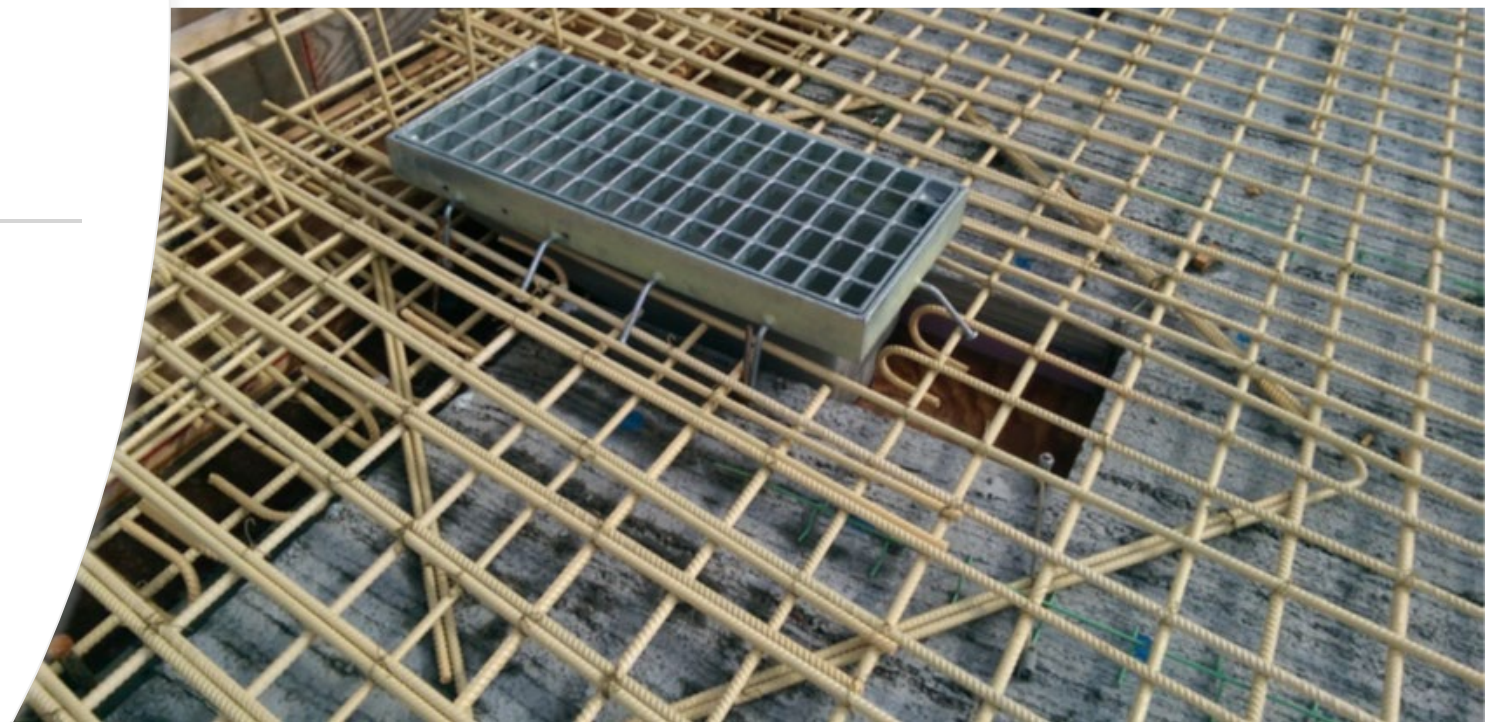
- **Technical Committee:**
- Dale Peabody, ME DOT (Chairperson)
- Michael Wight, ME DOT
- Kevin Daigle, NH DOT
- Christopher Mooney, VAOT
- Alrezai Jamalipour, CT DOT

- Research University: University of Maine-Orono
  - PI- Roberto Lopez-Anido, Ph.D., P.E.
- Goal:
  - Develop the design and fabrication methods of a standard fiber-reinforced polymer (FRP) composite drain that can be produced economically for use throughout New England bridges.
- Two Field Trail Projects
  - Richmond-Dresden Kennebec Bridge-2014
  - Bangor Union Street Bridge-2015/2016

Richmond-Dresden

- Built: 2014
- 1480’ long
- 7 Span
- 36 Drains

United Fiberglass & Kenway Composites



Union St

- Built: 2016
- 192’ long
- 2 Span
- Hybrid-Composite Girders
- 8 drains

Kenway Composite

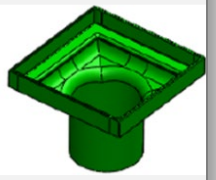
Design, Fabrication, and Installation of a Standard Fiber-Reinforced Polymer (FRP) Composite Bridge Drain System

AUTHORS: Roberto A. Lopez-Anido and Keenan Goslin, University of Maine

REPORT # NETCR98

ABSTRACT

The project report presents the design and fabrication of a standard fiber-reinforced polymer (FRP) composite drain that can be produced economically for use throughout New England bridges. The installation of the fabricated drain system in representative bridge applications in New England is documented to provide information on its performance, and ease of construction. The major obstacles or gaps for the implementation of FRP drains in highway bridges are the lack of material, fabrication and installation specifications, the unavailability of standard designs, and the unknown performance during service. The proposed standard FRP drain system can be used both for new construction and



ACKNOWLEDGMENTS

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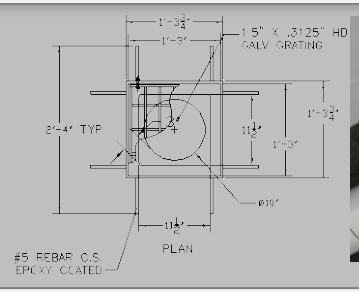
DATA

The following activities were conducted to address the current gaps, and design, fabricate and install the standard FRP composite drain:

1) Establish specific performance requirements for FRP composite drains for highway bridges;
2) Draft standard specifications for FRP drains in bridge applications;
3) Identify and contact qualified composite manufacturers to get input on the standard practice for fabrication and installation of FRP drains; and
4) Identify representative bridges to demonstrate and document the FRP drain installation methods.



ANALYSIS

Two FRP drain suppliers provided composite material samples for testing and qualification for use in bridge drains according to Appendix A of the specification. This one time series of tests was conducted to ensure materials used would be durable and meet the requirements of bridge projects. The material coupons for the two suppliers met the specification criteria.

FRP drains were inspected on two bridge projects. One of these bridges, the Union Street Bridge in Bangor, ME, used the NETC FRP drain specifications. Maine DOT also implemented the FRP bridge drain specifications developed in this NETC project for the Howland-Enfield Bridge and the corresponding shop drawings were presented in the technical report.

CONCLUSIONS

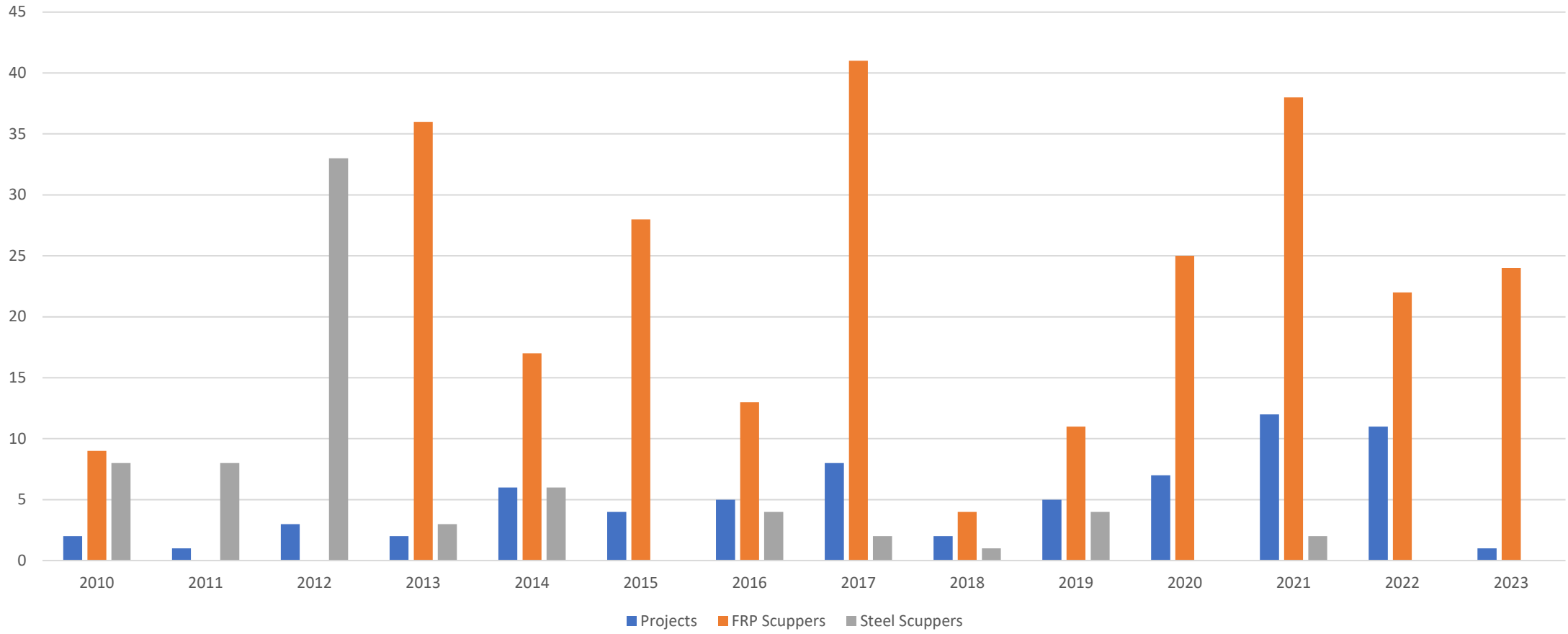
NETC FRP bridge drain details and specifications have been drafted and are available in the technical report, as follows:

- FRP Composite Bridge Drain Components Specification;
- Appendix A: FRP Composite Drain and Pipe Material Requirements; and
- Appendix B: Preferred Inlet/Scupper Sizes And Overall Geometries.

MaineDOT FRP Drain Spec vs. NETC Spec

- Updated reference specifications
- Require the use of Stainless steel bar and grates or HL-93 designed FRP.
- No project level material sampling and testing.
- Lower performance criteria for the materials
  - MaineDOT Tensile Strength 8,500psi
  - NETC Spec Tensile Strength 16,000psi

MaineDOT Bridge Drain History



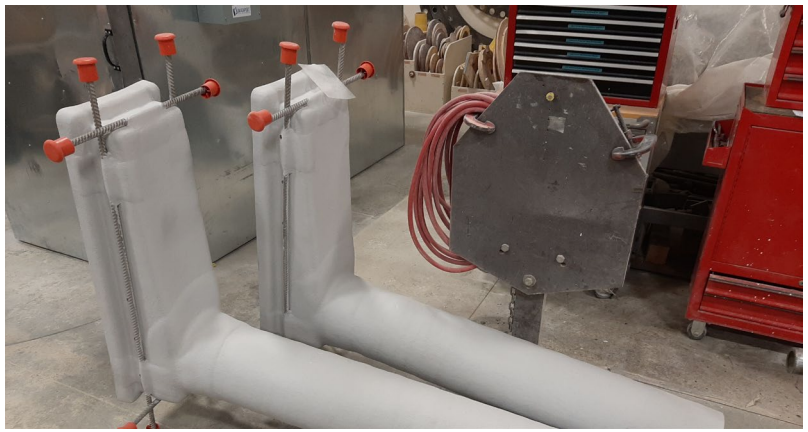
Current suppliers

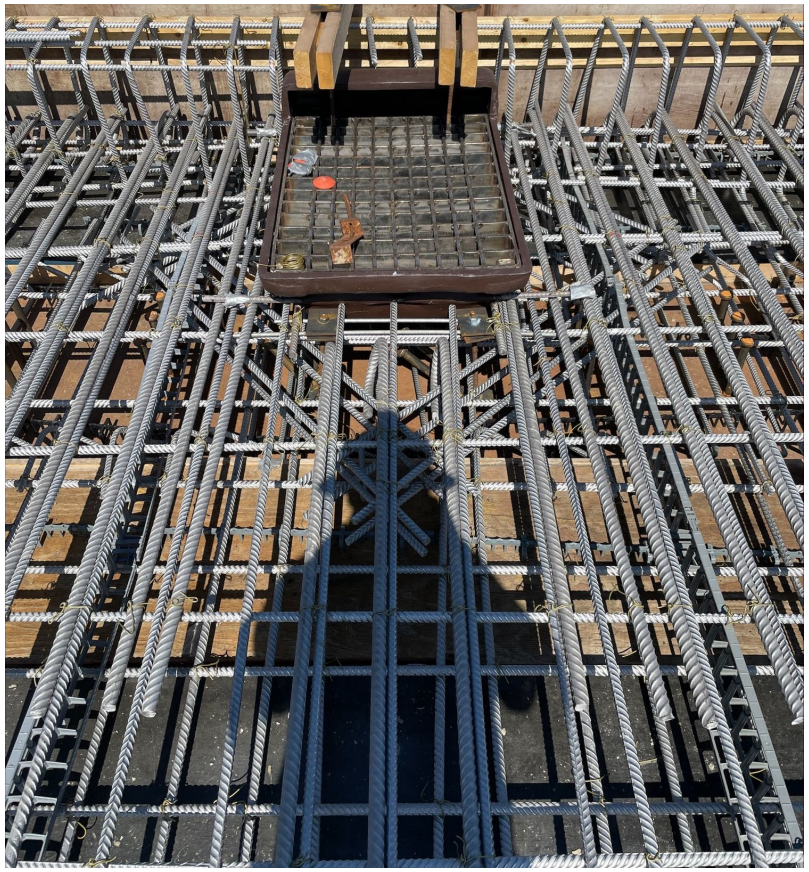
Kenway Composites: Division of Creative Composites Group

Augusta ME

FRP Bridge Drain Pipe-Grace Composites

Lonoke, AR





Evolution of FRP bridge drains

Barriers to Adoption

- Limited qualified fabricators
- Testing for properties is expensive
  - $25,000
- Lack of qualified QA inspectors
- Increased drain costs
  - 10%-15%
- Mold fabrication in expensive
- Must be part of a complete system

Questions?

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