PropTester® Inc.

Advanced Slot Flow Testing

New, Large, Comprehensive & Tortuous Path Proppant Transport Testing

Background

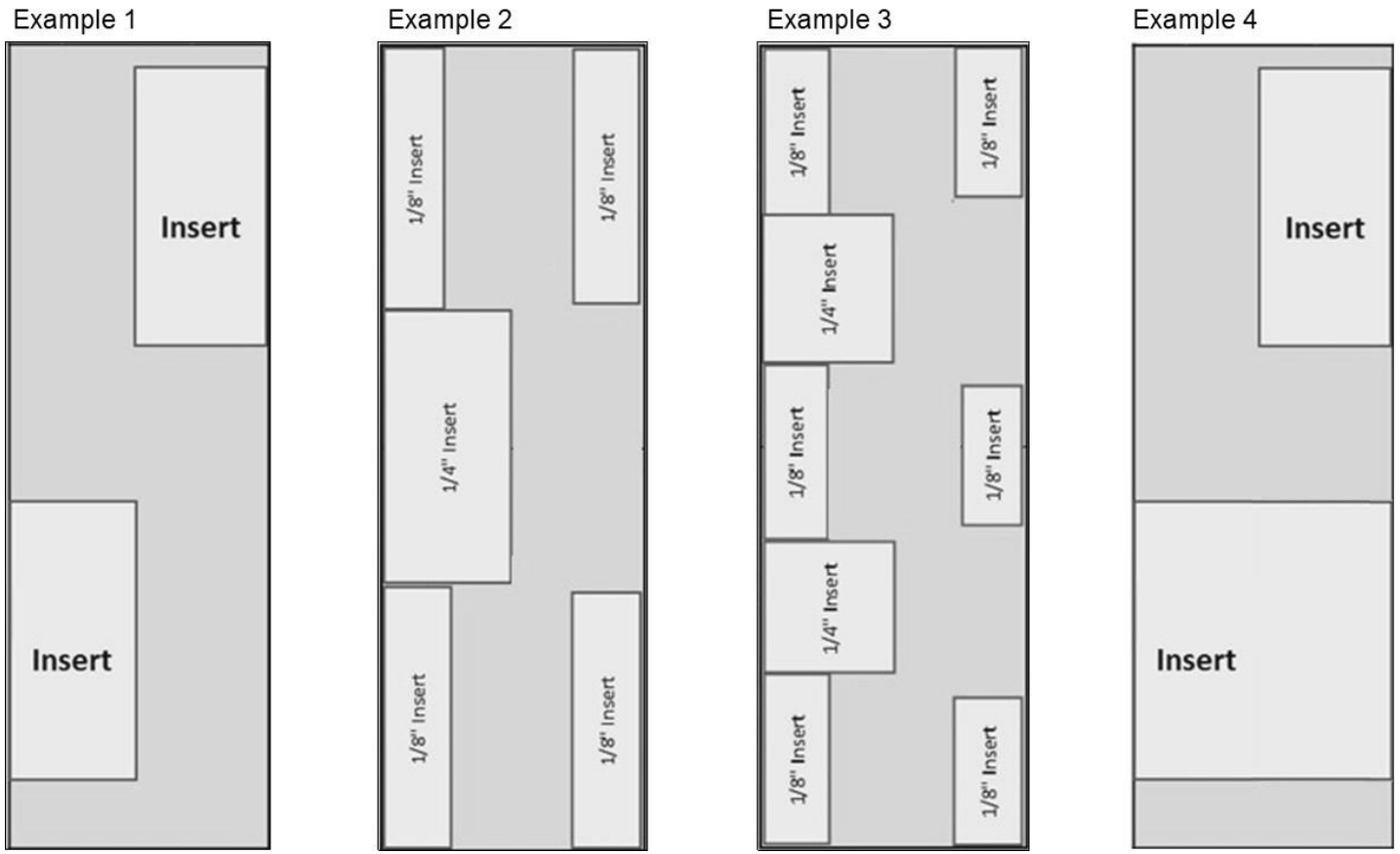
- 10’ X 20’ Wall Completed In 2019
- 4’ X 8’ Final Designs And Additions Completed In 2020
- Hosted Previous Studies Including:
  - Proppant Transport Research Council (4’x8’ only)
  - Individual Testing
  - Technical Papers/Presentations

Complete Technical Paper:

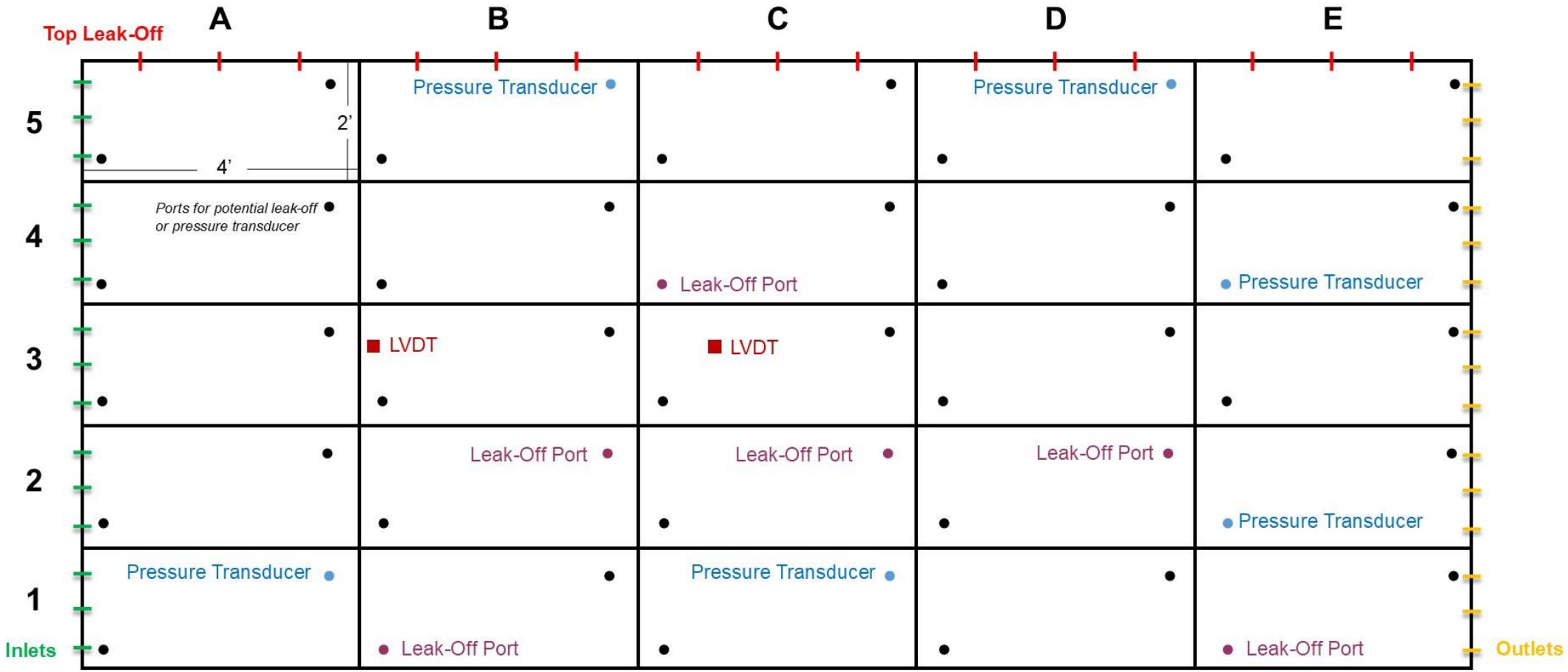
Singh, A., X. Liu, W. Jiehao, P. Reijken, M. Stribling, P. Wildt, D. Anschutz. (2020) New Comprehensive Large Tortuous Slot Flow Testing for Unconventional Fracturing. *The Society of Petroleum Engineering.* https://doi.org/10.2118/201578-MS

Creating the Tortuous Path

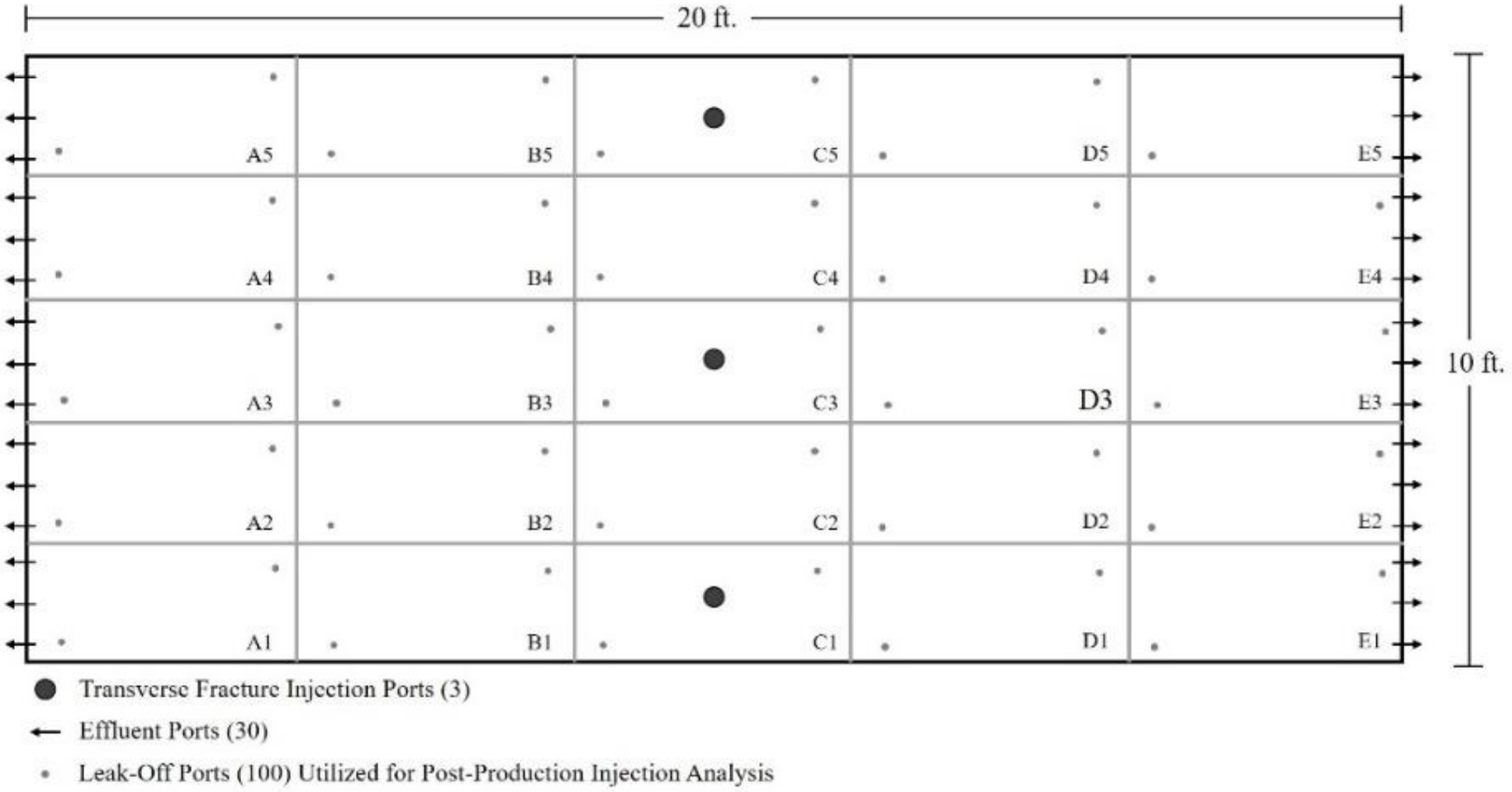
Tortuous path options using panel inserts (top view) for complex fracture system testing



10’x20’ Equipment Configuration



10’x20’ Equipment Configuration: Transverse Frature



Laboratory Equipment at PropTester

Fluid Tanks

Sand Hoppers

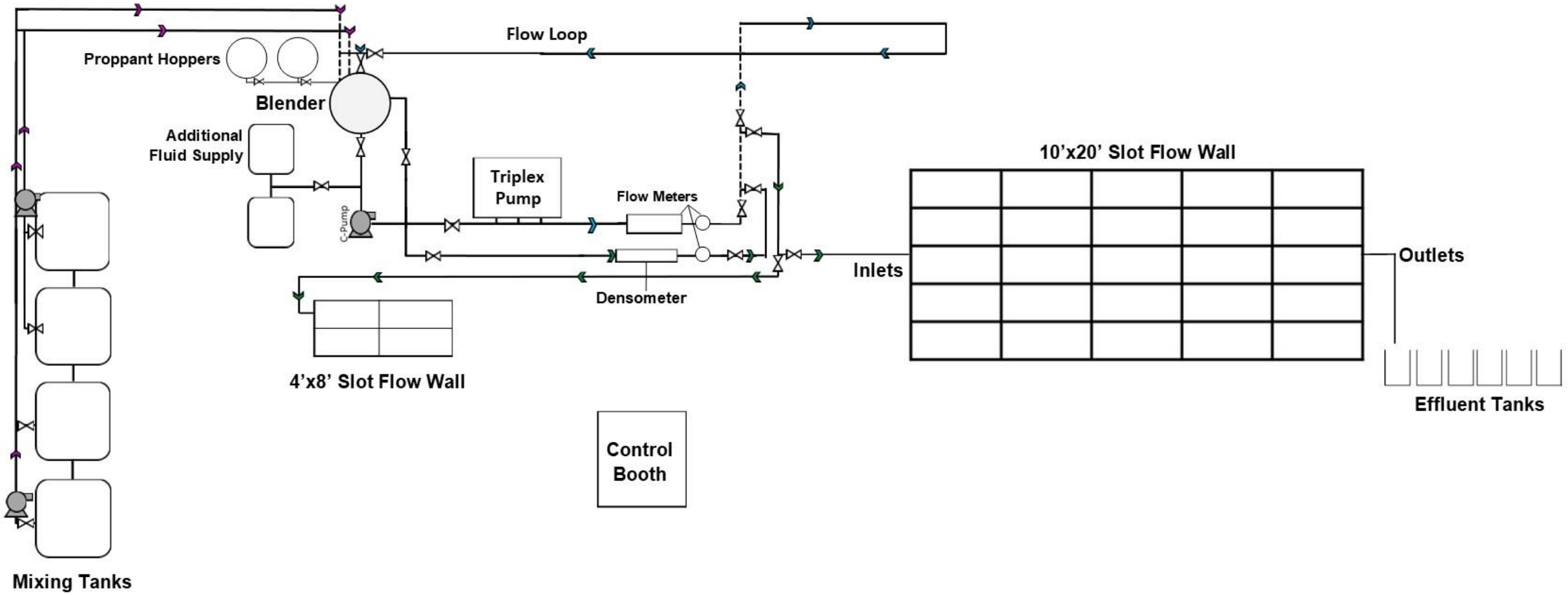
Blender

Pump

Flow Loop

Slot Flow Wall
10’x20’ or 4’x8’

Complete Flow Diagram



Test Parameter Considerations

Test parameters include:	Fracture Tortuosity
	Fracture Width
	Injection Velocity / Pump Rate
	Frac Fluid Viscosity
	Proppant Size
	Proppant Density
	Proppant Concentration
	Fracture Height Growth

10’x20’ Tests

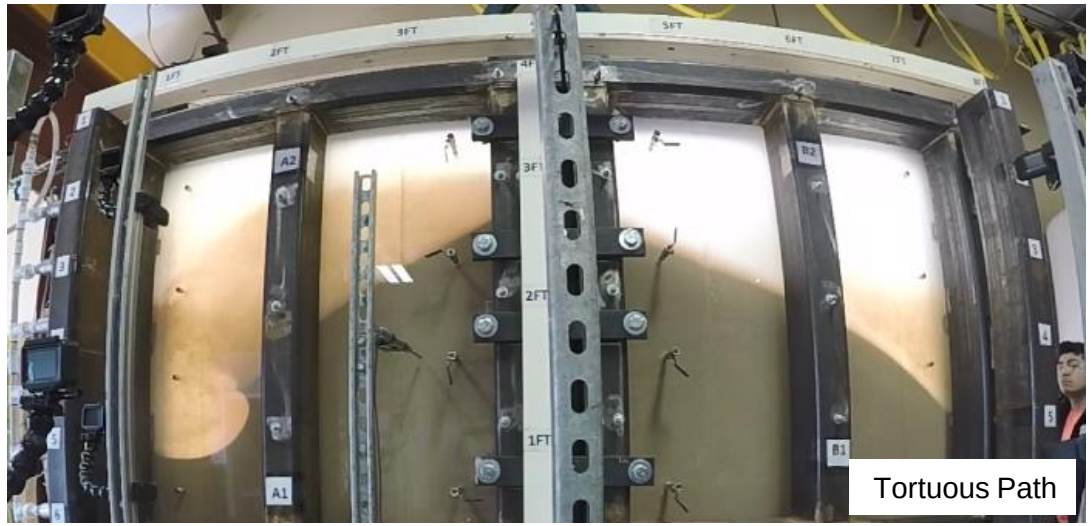

10’x20’


Specialty Proppant

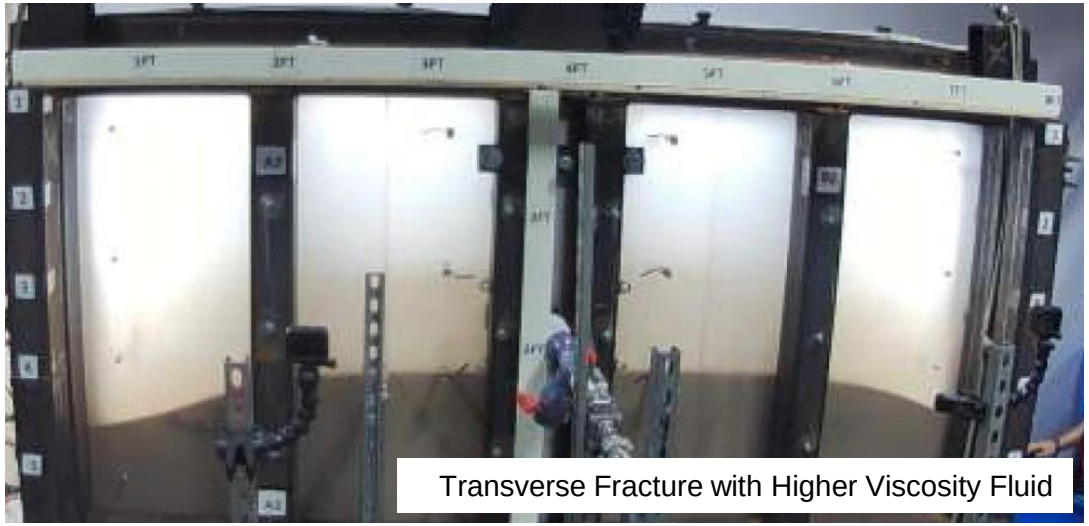

Tortuous Path


Chevron
100m Dyed Sand
Higher Viscosity Fluid

4’x8’ Tests



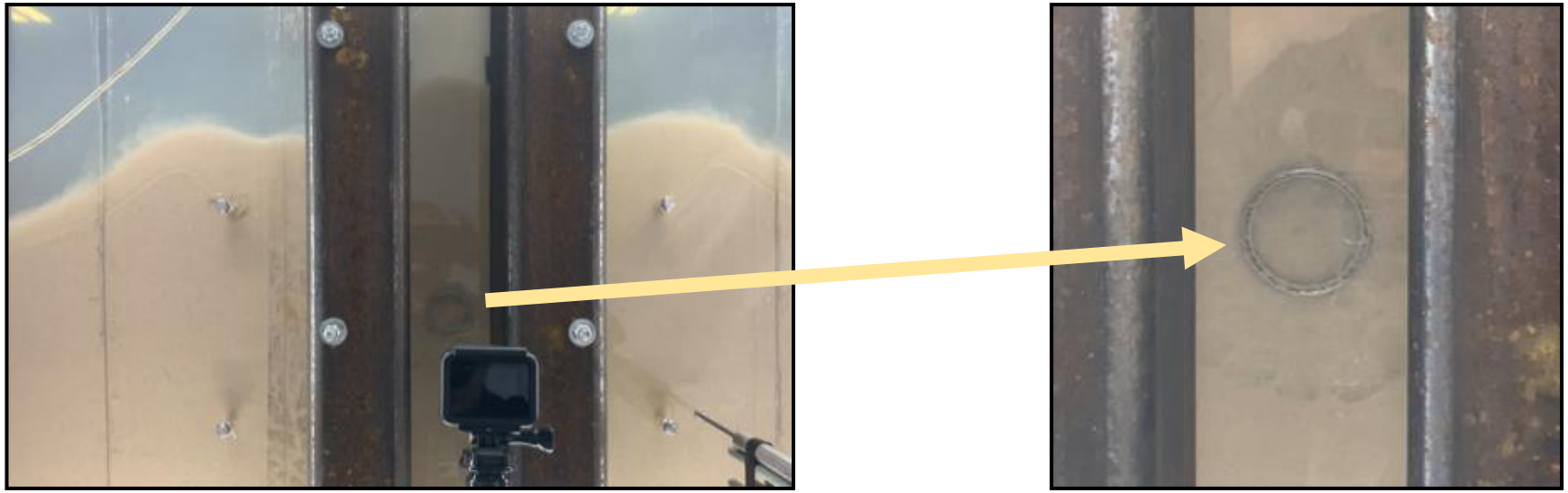
Tortuous Path


Transverse Fracture with Higher Viscosity Fluid

Winged Fracture

Transverse Fracture with Slickwater

Transverse Fracture Pictures: Back View of Inlet



The new inlet is connected to the center of the wall and is equipped with the following:

- Pipe ID: 2 inches
- Twenty-Two (22) 3/16-inch diameter holes - evenly distributed
- The panels that create the tortuous path can remain in the 4’x8’ wall
- Effluent is collected from **each** end of the structure from outlets

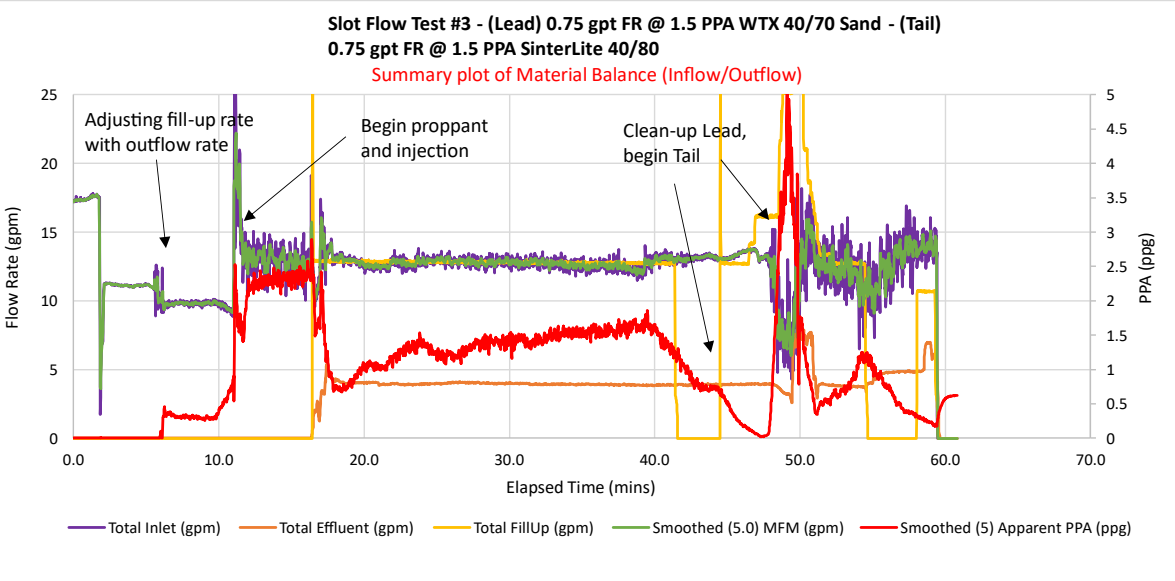
Equipment Disassembly After Test

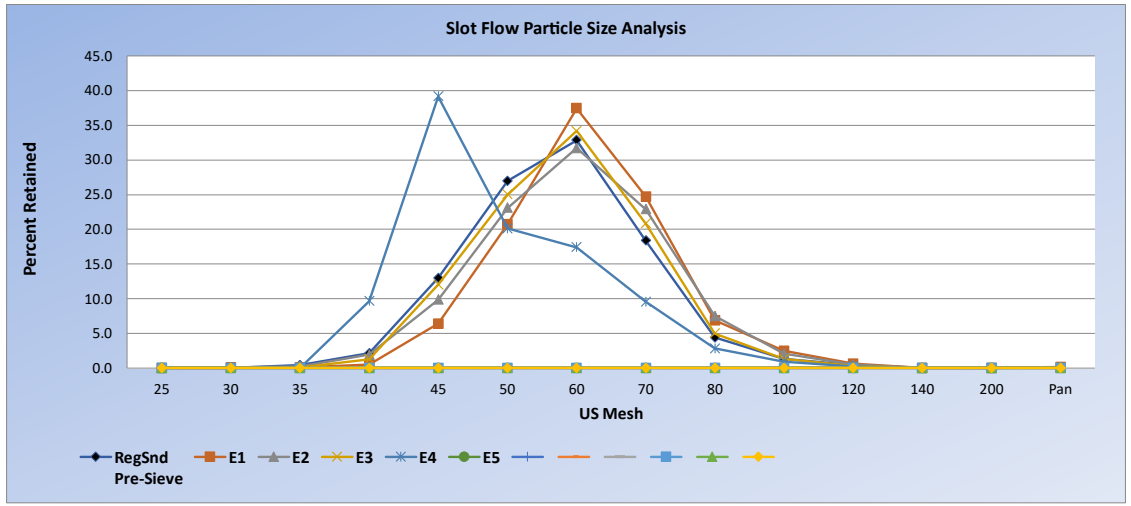
Both structures are opened for sample collection and analysis.

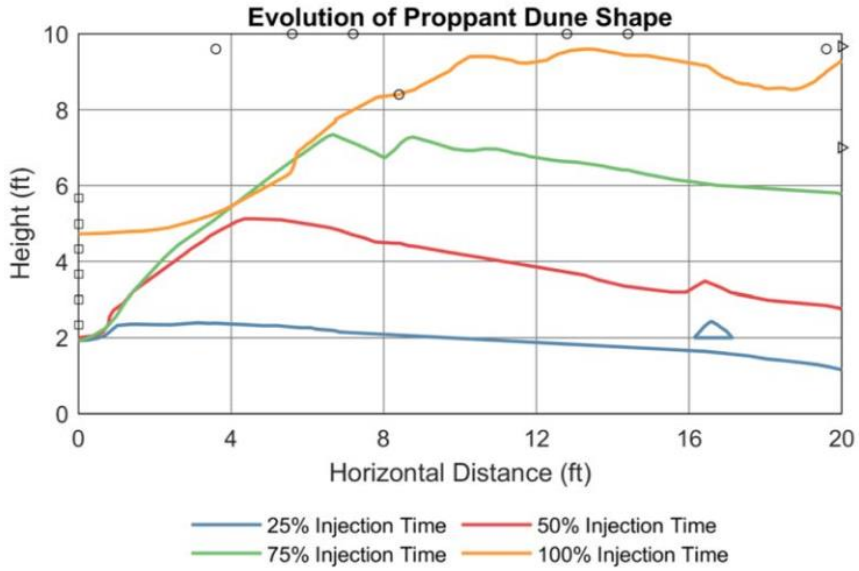
Dune Peak Height from Slot Bottom
Dune Peak Height Above Top Inlet
Dune Peak Distance from Inlet
Dune Height at Inlet
Dune Height at Outlet
Dune Peak Angle – Front
Dune Peak Angle – Back
Total proppant pack surface
Proppant in the slot
Proppant left at outlets
Proppant left at leakoff ports
Total proppant pumped
Slurry injection duration

Average injection rate
Average leak off rate
Average injected proppant concentration
Settled proppant concentration
Sieve Analysis and mean particle diameter
Proppant distribution
Proppant deposition
Conductivity testing
Fluid Rheology
Proppant bed configuration
Pictures and Videos of Test

Example of Data







Standard Price for Testing

Test Description	Typical Price Per Test*
10’ x 20’ Test	$15,000
4’ x 8’ Test	$7,500

*Typical tests include up to two proppants and two fluids in each test. Equipment will be disassembled to collect all data listed on page 12. Pricing can vary depending on the tortuous path design and other test parameters requiring additional preparation time.

Projects requiring multiple tests can be priced/discounted on a per project basis.

10’x20’ Test prices are discounted for Proppant Transport Research Council members.