



Featured Technical Topic Summary

FGI Monthly Members Meeting

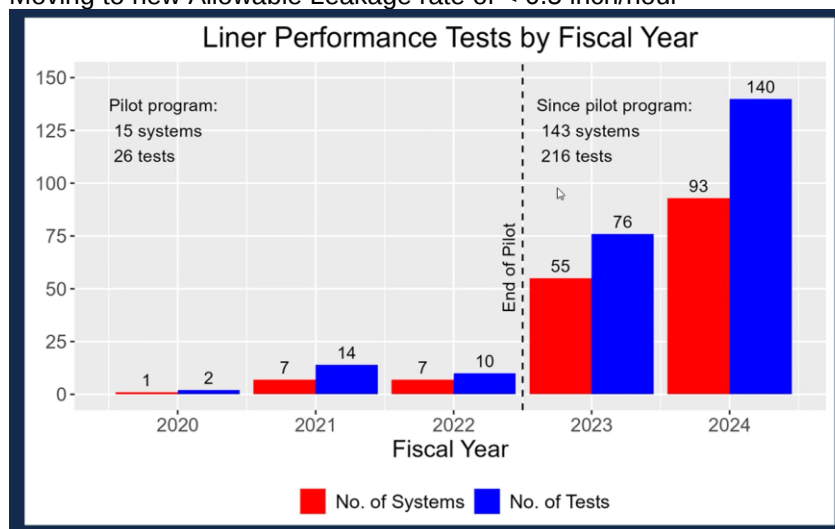
Friday, December 6, 2024

TOPIC: Geomembranes/Regulations for Stormwater Containment

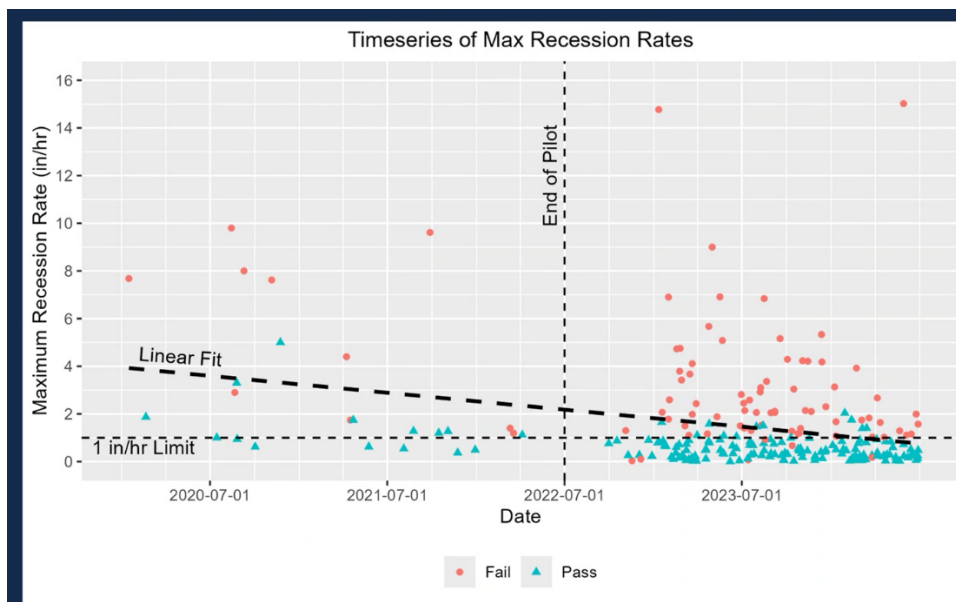
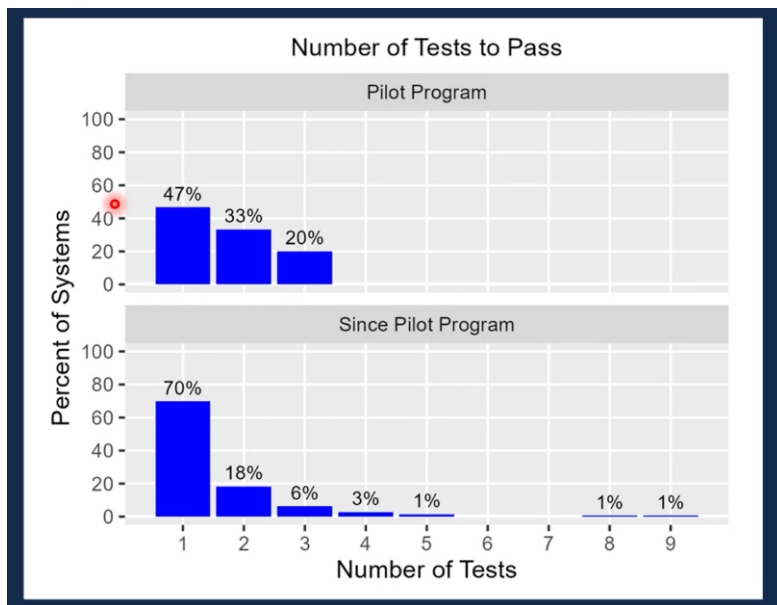
Each month Tim Stark introduces a new technical topic for discussion and possible action. This month's topic is: **"Geomembranes/Regulation for Stormwater Containment"**. This topic generated significant discussion with the main "take-aways" listed below:

Concerns/Suggestions for Geomembranes/Regulations for Stormwater Containment

- Billy Nichols of the Philadelphia Water Department (PWD) attended and discussed proposed regulations for geomembranes used in stormwater containment applications.
- Billy is in the water resources team & working on green infrastructure systems that intercept storm water before water reaches storm water system
- Stormwater Detention System is a system that retains stormwater until stormwater system can handle the flow
 - Detention Systems are fully-lined with a geomembrane - The geomembrane liner system is installed to protect nearby basements, prevent sinkholes, etc.
 - Use of geomembranes is new to PWD
 - PWD tested completed systems since 2020 and some of the systems are not holding water => the test involves filling the completed system with fire hydrant water before placing it in service
 - PWD is running leak test after stone installation – to reflect stone placement and stone weight on geomembrane with full weight of water
 - However, it is difficult to find leak with stone in-place = must vacuum out stone to locate and fix the leaks
 - Old Allowable Leakage rate = 1 inch/hour = f(size) = ?
 - Moving to new Allowable Leakage rate of < 0.5 inch/hour



- 143 systems and 216 tests performed so far and 73 systems failed on first filling or testing
- 70% of systems pass initial leakage test (see figure below)
- Leakage mostly occurring at: (1) Pipe penetrations, (2) failed extrusion welds in a tight space, and (3) holes or tears in the geomembrane
- Extrusion Welds = common failure points
- PWD thinking thicker material is better because more material to weld to
- PWD Specification says use fusion welds where possible to minimize extrusion welds
- PWD considering requiring cushion geotextiles on side walls as well as bottom on storage chamber
- Applications: storm trench (PWD and public projects) v. storage chambers (private projects)
- Storm trench used within roadway Right-of-Way = public system not private system
- Primarily 40 mil and 60 mil thick HDPE geomembranes have been used for storm trenches



	Median of Max RRs (in/hr)	Median of Passing Max RRs (in/hr)
FY20	4.78	1.87
FY21	3.10	1.00
FY22	1.19	1.12
FY23	0.78	0.48
FY24	0.67	0.31

End of Pilot

- PWD Weld Testing = ?
 - spark, vacuum box, and air channel testing specified but tests may not be performed
- **Suggestions:**
- A 12 ounce/yd cushion geotextile is a cost-effective protection for the geomembrane
- Field fabrication should be considered to minimize field extrusion welds
- Atlantic Lining Company (ALCO) has installed many of these systems – Tim Rafter of ALCO shared his experiences with Philly contractors, different geomembrane polymers, and system water testing
- PWD Testing = ? PWD water test not ASTM but developed to test final product
- PVC tube installed in stormwater trench to measure water level every five minutes and filled system sits overnight to measure leakage rate
- Tim Rafter thought a 30 mil GM could not stand up to Philly contractors and thus thought a thicker geomembrane was a good idea
- Terry Sheridan of Geo-Storage described some of his geomembrane experiences designing subsurface storage chambers
- Terry is only working on private projects so new PWD regs don't impact his private projects
- Terry thinks 40 mil PVC Geomembrane and a thick cushion geotextile are adequate for stormwater containment systems
- Terry suggested using more flexible geomembrane due to better puncture resistance, pipe boot welding, and larger tensile elongation, which is good with a rising groundwater level