Featured Technical Topic Summary
FGI Monthly Members Meeting
Friday, June 2, 2023

TOPIC: Longevity of Geonets and Geotextiles

Each month Tim Stark introduces a new technical topic for discussion and possible action. This month's topic is: "Longevity of Geonets and Geotextiles". This topic generated significant discussion with the main "take-aways" being listed below:

1. **Longevity of Geonets**

Little performance specifications
No longer using an AOS requirement; no FOS
Civil v. Environmental grade geotextiles -
What is happening under the geomembrane?

Research – check embedment of geonet on GM without a cushion GT – when to transition to a composite
Industry moving to composites from sands and gravels – so check compatibility of nets with flexible GMs – Brian and Rohit webinar on net and 40 mil GM

2. **Longevity of Geotextiles**

Little performance specifications
No longer using an AOS requirement; no FOS

Civil v. Environmental grade geotextiles -
Are geotextiles chemically resistant to liquids being contained?
Kerry Rowe – double composite liner system – GCL geotextile decomposed

No specs to excavate and check the geonet and geotextile
Intercell berm excavations look good –

Compatibility b/t net and GTs – Polyester & Polypropylene GTs -

Compatibility b/t net and GMs – use same resin for both – no spec requiring same resin as GM

"The need to consider the service life of all components of a modern MSW landfill liner system." R. Kerry Rowe; J. Reinert; Y. Li; R. Awad, Waste Management Vol. 161, 15 April 2023, pp. 43-51

Field test LDZ with dye liquid – limitations – Good Case Study
Potable water applications – is it leakage or groundwater by checking chlorine level b/c groundwater consumes chlorine

Drainage for gas relief – is good application

3. **Leak Testing Mechanical Attachments**
   i. Cannot conduct electronic leak locate survey near metal attachments because of interference so need some other type of testing of attachments

ii. Place ballast tubes around penetration, inject air below geomembrane, soap the attachment, and watch for bubbles along or around attachment
iii. Thermal imaging – not tried yet but possibly effective on sunny day to measure cooler air being pumped below geomembrane and exiting at leak(s) along attachment
iv. Vacuum below the geomembrane in tank or attachment and listen for vacuum sound along attachment
v. Vacuum Acoustic Leak Identification (VALID) method – apply vacuum between primary and secondary geomembranes and listen for vacuum sound along attachments; tests both geomembranes; the top surface of the geomembrane is scanned with ultrasonic microphones that can detect distinctive sounds of a vacuum leak.
vi. Smoke Test – smoke exits at attachment surrounded by ballast tubes
vii. Spark test with material embed but cannot be used at landfills and oil and gas sites
viii. Vacuum boxes for strips and corners but limited because not straight segments for box
ix. Dye test – divers places dye along attachment or concrete joint and see if dye disappears into attachment or crack (see video)

4. **Leak Testing Pipe Boots**
   i. Spark test with wire below pipe boot
   ii. Vertical pipe boot can be air lance tested
   iii. Pipe clamps can degrade and should be checked and/or replaced
   iv. Collar weld on Slope Pipe Boot is difficult and should be checked first – This is weld underneath or on downslope side of pipe
   v. Cannot use spark test in landfills and oil and gas sites
   vi. Try eliminating pipe boots in landfills
   vii. Apply vacuum under the pipe boot and listen for vacuum sound along attachment

5. **Preventive Measures**
   i. Coat entire attachment/connection with Fluid Applied Membrane (elastomer) – durable with time
   ii. Epoxy can be brittle so use something more flexible, i.e., Fluid Applied Membrane
   iii. Caulking around attachments may not be suitable because of freeze-thaw cycles and dirt can make caulk ineffective – less durable than Fluid Applied Membrane
   iv. Concrete or concrete joints can leak so the concrete must be tested possibly with the dye test

6. **Installation Details**
   i. Mechanical attachment and pipe boot details (see **Figure 1 below**) are available on the FGI website using the following QR code.

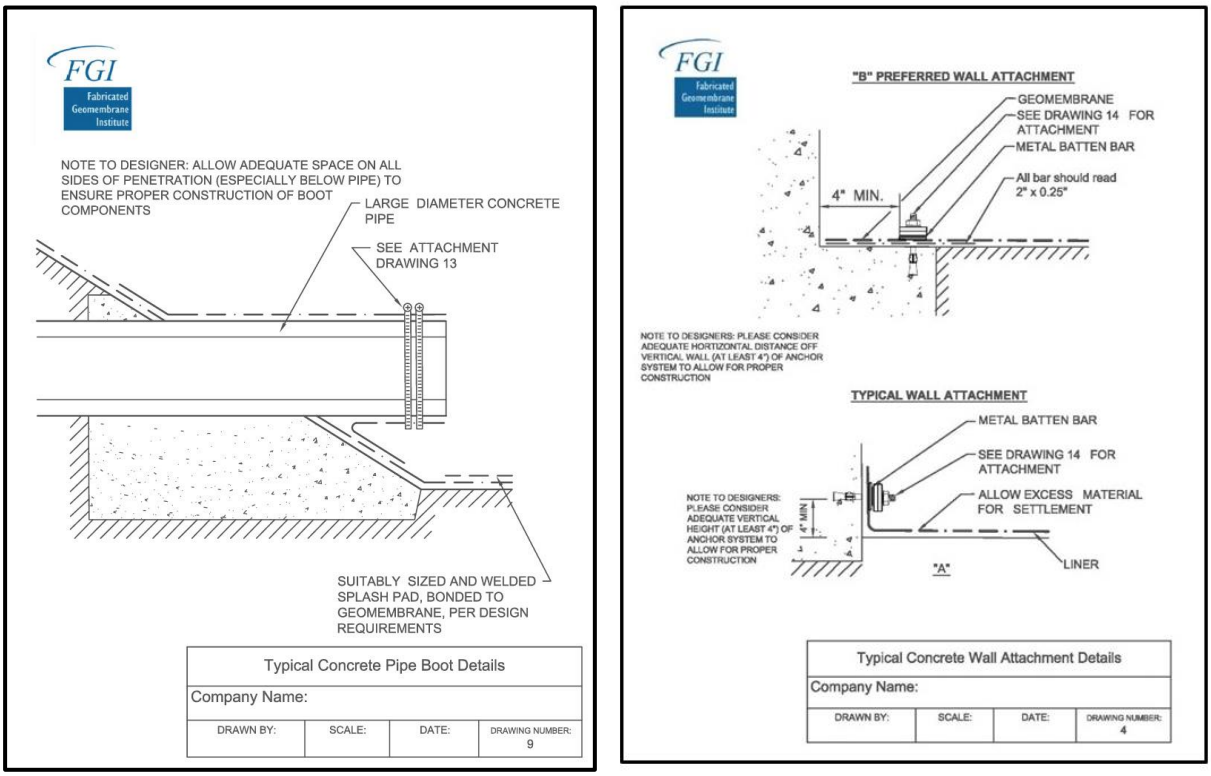

Figure 1. Sample pipe boot and wall attachment details available on FGI Website (www.fabricatedgeomembrane.com).