FGI Podcast Transcript – 2/11/21
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Embedment Strips and Mechanical Attachments
Follow-Up to Webinar on 2/4/21

Embedment Strips:

1. My experience with embedment strips is that sometimes they are not properly embedded in the concrete (not enough slump), or, they have air pockets under them. Trouble is that it's not easy to see these problems. The problem mainly comes when the concrete contractor does the embedment and does not have much experience with setting embedment strips. Answer – Correct it is crucial that the concrete contractor, Geomembrane Installer, GC and Engineer are on the same page and do not miss critical meetings and communication prior to the installation of the embedment strips.
2. When joining with mechanical batten or embedment strip, do you have a preference for geomembrane material to minimize wrinkles? Answer – Best practice to minimize wrinkles is to have the attachment flat and at the same level as the adjoining subgrade. Minimizing liner transitions and custom fitting is the best way to ensure a cleaner more leak proof system.
3. If there are multiple layers to the liner system, are more than one embedment strip needed? Or are they all welded to the strip at the same place/elevation? Answer – Typically if a 6" wide embedment strip is used you can attach both membranes to the same strip. If a 3" is used I recommend installing 2 strips about 4"-6" apart.
4. Re; slide 53, once you have that gap in the embedment strip, what can be done to correct that? Answer – In that particular case we used a highly flexible coating but I do not recommend this as a best practice. Ensuring a proper weld and installation of the embed is far superior
5. Our experience has been that HDPE embedment strips do not make good long term water tight seals. Even if the concrete installer butt welds the embedment and does a good job minimizing honeycombing in the concrete, the difference in the coefficient of expansion and contraction of the concrete and HDPE causes cracks to occur over time. Any crack you see spanning to or through the embedment strip is a leak path. Answer – I do not disagree that this is the case with HDPE due to the extreme expansion and contraction. Most of the products the FGI represents have much less thermal expansion. Also it really depends on the location and exposure to temperature fluctuations.
6. Have you observed problems of differential thermal expansion of HDPE and concrete when using embed strips? Answer – Yes HDPE has severe thermal expansion and it can affect the concrete long term if the temperatures are not stabilized under water

7. Do adjacent pieces of embedment strip need to be pre-welded together prior to the concrete pour? (to ensure the final liner system is leak tight - if these joints are welded after the concrete cures, isn't there still a small leak point at these joints?) Answer – Correct – The seams must be welded prior to concrete pour.
8. Getting concrete into the embedment strip is hard on the vertical, but a horizontal connection is better. Is there a good way to assure that the embedment strip is filled with concrete if it's horizontal? Answer – Yes it is critical this is done with very went concrete and vibrated or tamped in very well.
9. How to choose between embedment strip or mechanical anchoring during design of a liner system? Answer – This depends on many factors. Material type, structure size and location. Engineers preference. Purpose and facility conditions and long term use. I recommend consulting with an expert to review this on each design/project.
10. Slide #53: would it be possible to just extrusion weld some material into the joint between embedment strips? Or are you saying the embedment strips need to be welded together at the time they are cast into the concrete? The timing for that would be difficult and require an extra mobilization. In the past we have specified butting the embedment strips together tightly so that they could be sealed by extrusion weld when the liner installer comes to the site. What should we do differently? Answer – No it is very critical these are welded together prior to the concrete pour as you cannot get the extrusion weld to seal at the top. The welding process does not require an extrusion weld and can easily be done by the concrete contractor.

Mechanical Attachments:

1. Batten bar needs flat washers to prevent pullout? Answer – Correct we use a flat washer under the nut
2. Do you have a detail to allow for any differential settlement between concrete and earth structures? How much settlement would be an issue for a joint failure or tear of the membrane? Answer – Depending on materials some can handle settlement better then others and some slack can be installed during the installation but ultimately eliminating the settlement through design is by far superior.
3. Slide 37/62: what live rubber would you recommend, (specs of the live rubber) Type of rubber? natural, silicone, neoprene? hardness? Answer – Yes these can be provided.
4. Should the connection details be different if the liner material is different, ie HDPE, XR-5, poly, etc? Answer -No the materials with a mechanical attachment are compatible with most liner materials.