Washington State Department of Transportation

ADSC/WSDOT Team Meeting Minutes

ADSC The International Association of Foundation Drilling

The year 2020 was an unusual year due to COVID-19 and the ensuing pandemic. Most of the meetings scheduled for the year were canceled. The following meetings were planned but not held:

02/20/2020

04/09/2020

05/21/2020

09/10/2020

Only one meeting was successfully completed for the year. The meeting in November. The notes for the November meeting are below.

-- Jim Cuthbertson

ADSC/WSDOT Joint Meeting

November 20, 2020, 8:30 A.M. – 11:30 A.M.

ADSC/WSDOT Sign-In Form

Team Members

Attended	Member	Company	Phone	E-mail
X	Allen, Tony	WSDOT	360-709-5450	allent@wsdot.wa.gov
	Armour, Tom	DBM	253-838-1402	tom.armour@dbmcontractors.com
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X	Binnig, Bill	Kiewit	425-255-2376	bill.binnig@kiewit.com
X	Brunkhorst, Jim	Pacific Found.	360-301-0771	jim@pacific-foundation.com
	Carnevale, Robert	Kulchin Found.	253-888-4284	bob@kulchin.com
	Close, Jim	Con-Tech Systems	253-381-1847	jclose@contechsystems.com
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	Dinneen, Molly			
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	Gaines, Mark	WSDOT – Bridge.	360-705-7827	gainesm@wsdot.wa.gov
X	**Glassford, Patrick**[1]	WSDOT – HQ Constr.	360-705-7828	glassfp@wsdot.wa.gov
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	Kvinsland, John	Malcolm	253-395-3300	jkvinsland@malcolmdrilling.com
	Lehman, Debbie	FHWA	360-753-9482	Debbie.Lehmann@dot.gov
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	Starcevich, John	Malcolm	253-395-3300	jstarcevich@malcolmdrilling.com
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1 Team co-chair

Guest Sign-in

Attendee	Company	Phone	E-mail
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Minnick, Jeff	WSDOT SCR PEO	509-577-1844	MinnicJ@wsdot.wa.gov
Schultz, Eric	WSDOT Bridge	360-705-7227	Schulte@wsdot.wa.gov
Ward, David	Shannon & Wilson	N/A	N/A
White, Brian	WSDOT SCR	360-577-1700	WhiteB@wsdot.wa.gov

1. Welcome/Review of Agenda

Patrick Glassford opened the meeting, and everyone introduced themselves.

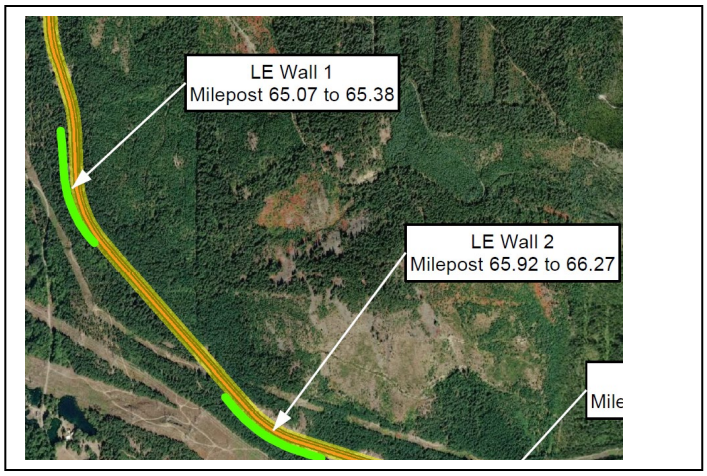
2. Approval of Minutes

This meeting we got a bit out of order and did the Project review for I-90 (Item 3) before Item 2 on the agenda, but to keep the notes consistently formatted, the notes are recorded in agenda order.

Patrick asked the group if there were any revisions needed to the November 14, 2019 meeting minutes. No revisions were suggested. Patrick will post the minutes to the internet. Patrick then asked for additional items to add to the agenda for the current meeting. Hearing no additions, the meeting moved into other project reviews.

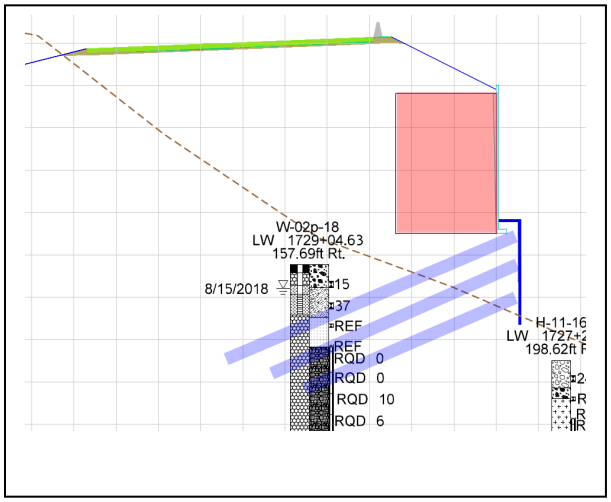
3. I-90 Cabin Creek to W Easton – Phase 3 Constructability Review Jeff Minnick

This project was presented to the group about a year ago. The project office has questions specific to two retaining walls associated with the project. April 2021 is the target advertisement date for the project, but construction is not expected to occur until summer ’21 with completion in 2025. The project is west of the Cabin Ck interchange (Easton). The two LE Walls, 1, 2 are fill walls with exposed heights that exceed 50 feet.



The subsurface conditions are characterized by colluvium, rock fill derived from the existing cuts on I-90, concrete rubble (including rebar) and bedrock. The colluvium and rock fill include boulder size material. Boulders exceeding 3 ft in diameter occur on the surface. The existing ground surface is steeply sloped at about 1.5H:1V.

The use of structural earth walls for these walls would require extensive shoring and/or temporary slopes. In order to minimize the need for shoring and/or temporary slopes, our current plan is to construct at least portions of Walls 1 and 2 by using an anchored soldier pile wall, which would support a structural earth wall. The soldier pile walls would be designed to be high enough such that the overlying structural earth walls could be constructed with minimal or no temporary cuts and/or shoring. Anticipated soldier pile wall heights are up to about 30 feet exposed height with multiple rows of tiebacks. At the tallest portion of the wall there could be 4 or 5 rows of tiebacks spaced 6 ft apart vertically. Soldier pile excavations are expected to be 36-inch in diameter. Total embedment depth will vary as there is colluvium over bedrock and a 10 ft rock socket is planned. Deeper embedment will be needed in areas where the depth to rock is greater.



An access road will be pioneered and extend along the face of wall for the entire length. The current plan is to have a 25 ft wide access road from the back of the soldier pile to the outboard slope catch. Perpendicular to the wall the bench will be nearly horizontal, but the profile along the access road centerline results in about a 15% maximum grade.

Q: For the PGAs, how would you get the top two rows of PGAs installed?
A: Lance Rasband– you can do this several ways. Drill them from the back of the slope before backfilling, or you can do it in sequence while you backfill. You may need a crane supported platform.
A: Doug Watt – asked if the wall could be designed to be backfilled to a level above the pocket and then the anchor could be installed using excavator mounted drill parked on the backfill and reaching over the top.

A: Andrew Fiske stated we are planning to build a 30 to 50 ft tall MSE wall on top of the wall, so he thought that Doug's method could be feasible, but the design would need to be checked.
A: Jim Cuthbertson pointed out that the soldier pile itself would be sticking up and might interfere with the drill. You would need something that was articulated to get the right alignment. In response to this Doug stated that he would probably install the first couple of anchors from the bench on the front side of the wall as that has the best access. To this end, Jim asked how high up can a conventional drill reach; from the bench surface to where? The consensus was about 8 ft vertical. If the pockets were laid out right you could dig down below the bench and get the first one, backfill back to bench grade to get the second, then place a bit of fill and get the third. Ryan Thody also thought that you could probably install the first two rows from the front of the wall.
A: Jim Brunkhorst raised the issue of lock off load. Large lock-off could yard the pile around with limited backfill.

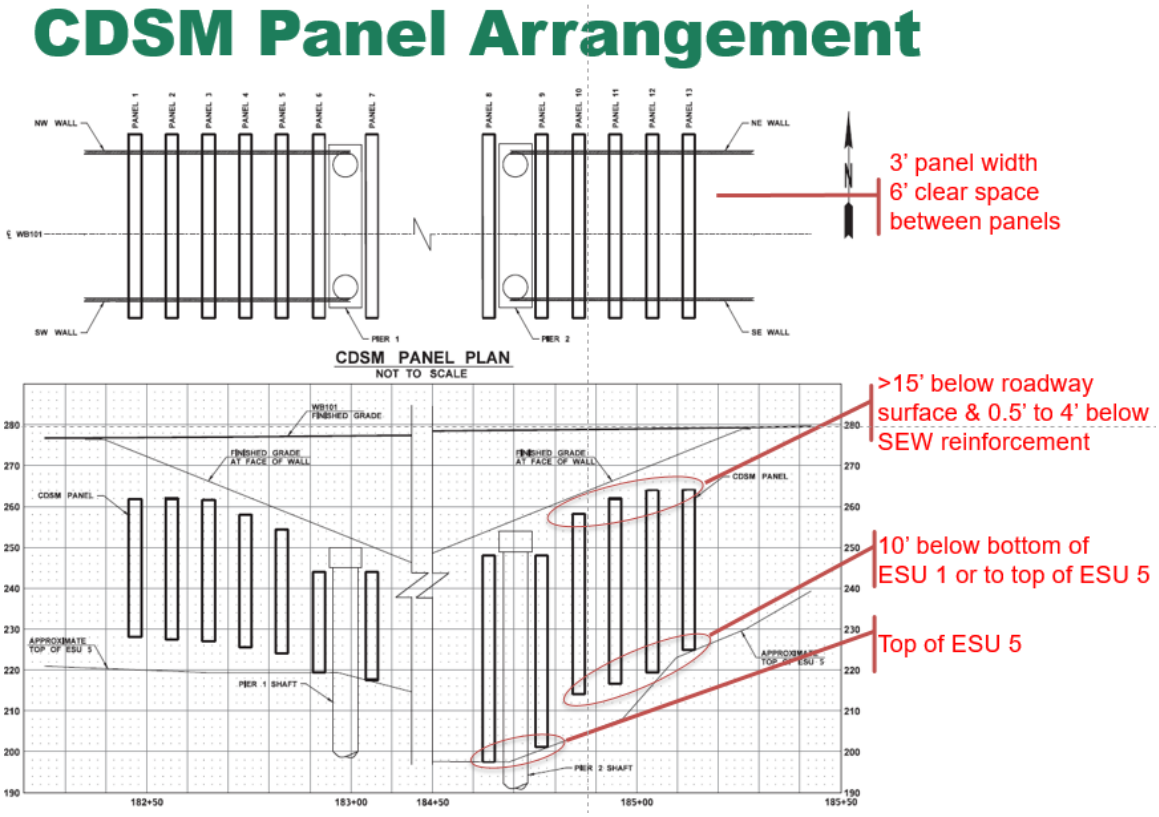
Q: Would you be able stress these PGAs from the front?
A: Andrew Byrd stated that they were thinking there would need to be multiple tensioning cycles. As more load is applied by backfill and more MSE wall is built on top, anchor tension might need to be increased incrementally to control deflection.
A: There was discussion about constructing the anchors for a fill wall. Should you install anchors first and fill around them or do you fill first then install through the fill. There are design and constructability issues with either option. Tony Allen wanted to discuss the design concept more with his staff and the project office.
A: Lance Rasband mentioned that if anchors are going to be retensioned, he prefers bar anchors rather than strand. Each wedge setting on strands nicks the strands slightly and premature failure can happen on strands when set and reset too many times, depending on loads, but strand anchors are easier to handle. Anchor lengths of 80-90 ft for the top row and 70-ish for the lower are anticipated. Bar anchors would need couplers.

Q: The profile of the working bench will be at about 14%. How steep of a profile can the contractors work from, and how steep of a profile can you traverse for access?
A: Greg Radom asked about the soils and rock conditions as that drives the size of the equipment. He also asked about moving the access bench from the front side of the soldier pile wall to the back side. The project office did not want to do this as it would greatly increase the excavation quantity or require temporary shoring.
A: Ryan Thody stated that most drills can traverse 15-degree slopes, but they like to drill on slopes no steeper than 5-degrees. (Note taker comment: I think when Ryan said degrees he may have intended percent.) They could use cribbing or something at each pile location to level the rig if the slope isn't too steep to start with. This is for both soldier pile drilling and anchors. It was mentioned that shotcreters would probably bring in scaffolding to work from, so the 15% grade would probably work for them.

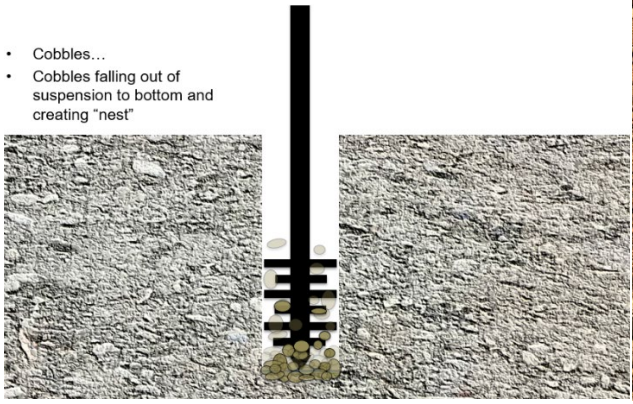
Q: Production rates
A: Jeff Minnick stated he was told maybe one soldier pile per day. The team members asked about rock strength, but that info was not readily available at the meeting. Andrew Fiske stated he could gather that info up, get it to Patrick Glassford and then Patrick could ask the production rate question for soldier piles and ground anchors of the team at a later date.
(ACTION ITEM for follow up).

4. Bagley and Siebert Creek CDSM Lessons Learned
Andrew Fiske / Monique Anderson

Contract 009516 SR-101 Bagley and Siebert Creeks-Remove Fish Barriers included cement deep soil mixing (CDSM) for ground improvement as part of the project. The CDSM was needed to improve overall stability for the new bridge. The CDSM was arranged in panels around the bridge abutments as shown in the figure below:

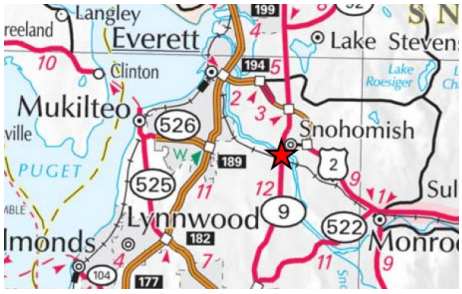


During construction, the equipment was refusing and being damaged before attaining the tip elevation of the CDSM panels. The fill and glacial deposits present at the site were expected to have some cobbles and boulders. It is theorized that as the soil is being processed the heavier cobbles are settling to the bottom of the slurry/mixed soil and creating a nest of interlocking cobbles at the bottom of the excavation, see figures and photo below. The photo shows observed spoils during soil stabilization shaft installation. In upper 30 feet, it is estimated that 4- to 8-inch cobbles comprise about 10% to 30% of ESU 1- Old fill by volume.

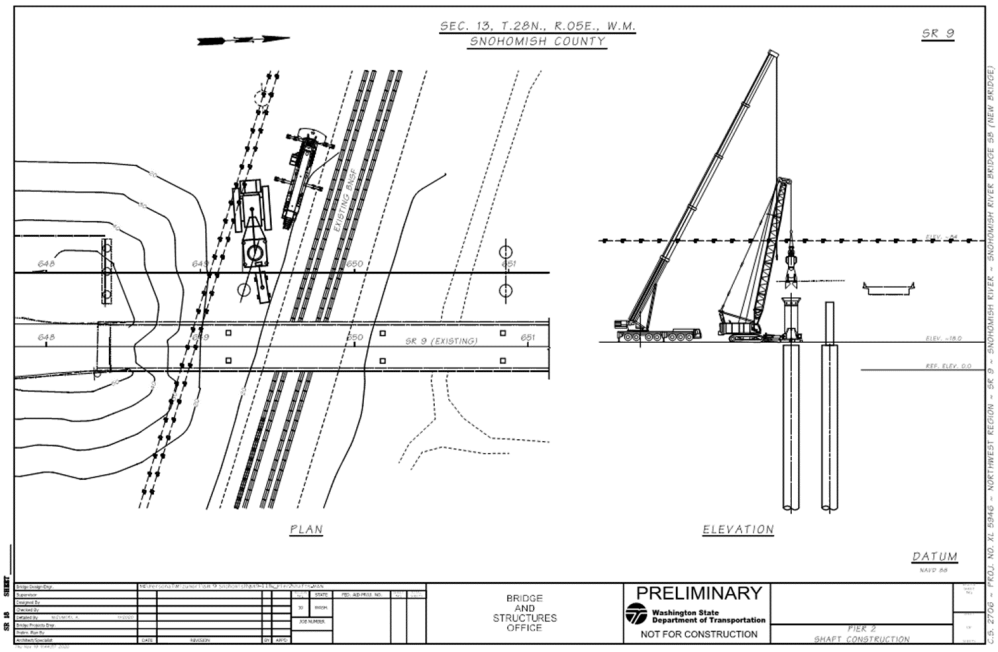


Lesson Learned – Use test pits to get a more representative sample of soils where cobbles are expected. The SPT test often completed for geotechnical exploration is biased toward the finer fraction of the soil material; material less than 1.5 inches in size.

5. Marsh Road Constructability Review
Amy Leland



Bridge and Structures is just starting design work on a project located on SR-9 near MP 9.1. There is an existing steel truss bridge over the Snohomish River and WSDOT plans to increase capacity by constructing a new parallel bridge west of the existing bridge which will remain in place. The new bridge will span both the river and some railroad lines. On the same side of the river as the R/R lines there is overhead power. The overhead power and the railroad together constrain the work area for the construction of pier 2 of the proposed bridge. Drilled shafts (8 ft diam – 200 ft length) or piles (2 ft diam – 80 ft length) are both being considered for foundation support. The figure below shows an access concept for shaft construction and the potential conflicts. The power lines are around elevation 84 feet right now and ground line is close to elevation 20 ft, so there is roughly 60+ ft of vertical clearance. There are plans to raise the power lines prior to construction. It may be possible to raise them an additional 14 ft but location will not change.



Q: Clearance needed for work?
Q: Other constraints; useful techniques?
A: Ryan Thody stated that power line clearance depends on voltage. Usually, 10 ft clear for less than 50 kv but 250 kv can be 20 ft or more clear. OSHA has requirements for clear space depending on voltage. Greg Radom stated that power companies also have their own specific requirements. You need to check with the utility.
A: Amy Leland stated there may be an opportunity to de-energize the lines, and asked if that would enable work in the 10 to 15 ft range. Lance Rasband stated that even de-energized that would be the minimum.
A: Amy Leland asked the group if they thought piles or shafts would be better based on the soil conditions and anticipated shaft lengths. Doug Watt thought that piles might be the better option based on cost. With the OH power, low clearance equipment may be needed and there could be a need to splice shaft casings, but that may be needed just because of the shaft length of 200 ft anyway. The railroad may also have constraints with working next to the track.

6. Soldier Pile Lagging Backfill Specs
Lance Rasband

Under the WSDOT standard specs there are several requirements that work well on WSDOT jobs, but contractors are having difficulty when the WSDOT specs are used by other entities.

In section 6-16.3(6)B Temporary Lagging under item number four WSDOT defines free draining materials:

> *Free-draining materials are defined as those materials that exhibit a greater permeability than the material being retained.*

In section 6-16.3(6)D Installing Lagging and Permanent Ground Anchors WSDOT states:

> *Any caving that occurs during excavation shall be backfilled with free-draining material.*

and

When and where lagging is not in full contact with the soil being retained, either the lagging shall be wedged back to create contact or the void shall be filled with a free-draining material.

Lance stated that a lot of people miss the free draining material intent and definition within the spec and when they are doing their material approvals the free-draining material verbiage often leads people to request pea gravel be used for backfill. You can't use pea gravel and work below it as it just runs out. Pea gravel can only be used to fill voids behind lagging if the voids chimney all the way to the top and you are placing the pea gravel from above with no additional work occurring below. Lance wants to be able to use native materials for the backfill. It was suggested that the Contractors maybe get together and propose some suggested changes and make a proposal. (ACTION ITEM for follow up).

7. Standard Soil Nail Anchorage Detail Revisions Regarding Washers
ADSC

Deferred to next meeting.

8. ADSC/WSDOT Joint Training – Spring 2021
Group

Should we do a virtual meeting in spring of 2021, since the 2020 version was canceled due to COVID-19? Thoughts were expressed that some of the best things are the hands on demonstrations that happen at the in-person meeting. The ADSC would be willing to do a shortened ½ day virtual conference that was more project specific oriented, but they are going to defer to WSDOT to determine if there are specific topics that are needed at this time. Patrick Glassford will discuss this internally with WSDOT, but the current tone of the conversation was more one of not doing a conference, than doing one. Spring 2021 TBD…

9. Future Topics
Group

Patrick Glassford requested new topics for discussion. Nothing specific was offered up.

Patrick asked if future meetings could be held on Friday rather than Thursday, as has been tradition. The team thought Fridays would work well. Look for future meetings to be on Friday.

10. ACTION ITEMS
a. Modification to SS 6-19.3(3)I Jim Cuthbertson

The following edits were proposed by Jim Cuthbertson

6-19.3(3)I Required Use of Slurry in Shaft Excavation

6-19.3(3)I1 Shafts Constructed in Water Bodies, Rivers, and Puget Sound

~~Shafts constructed in water bodies, rivers, and Puget Sound~~

The Contractor shall use slurry, in accordance with Section 6-19.3(4), to maintain a stable excavation during shaft excavation and concrete placement. Slurry use shall not be omitted.

6-19.3(3)I2 Uncased Shafts or Excavating Below Partial Depth Casing

~~Uncased shafts or when excavating below casing in partially cased excavations~~

The Contractor shall use slurry, in accordance with Section 6-19.3(4), to maintain a stable excavation during shaft excavation and concrete placement operations whenever the shaft excavation extends below the highest ground water level indicated in the Plans, boring logs, or Summary of Geotechnical Conditions. If water is encountered, or expected to be encountered, at an elevation~~level~~ higher than that indicated by the Contract documents, then the Contractor shall use ~~slurry~~that elevation when using slurry in accordance with Section 6-19.3(4). If perched water tables are penetrated and sealed by temporary casing, slurry levels may be maintained below the perched water elevation provided the excavation remains stable and the slurry level is maintained above any unsealed water sources in accordance with 6-19.3(4)B.

6-19.3(3)I3 Excavation Within Temporary or Permanent Casing

~~Excavation within temporary or permanent casing~~

Slurry~~, as required above~~ in accordance with Section 6-19.3(4), may be omitted while excavating within temporary or permanent shaft casing if:

a) ~~t~~The Contractor can demonstrate to the Engineer's satisfaction that bottom heave is not occurring.

b) While excavating in casing, the Contractor maintains a soil plug in the bottom of the casing sufficient to prevent bottom heave. ~~water is entering the shaft excavation at an infiltration rate of 12 inches of depth or less in 1 hour.~~

If excavation is stopped or paused, the Ceontractor shall be responsible for hole stability and the prevention of bottom heave. If the excavation extends below the casing and below the highest ground water level indicated in the Plans, boring logs, or Summary of Geotechnical Conditions, slurry shall be used. ~~If concrete is to be placed in the dry, the Contractor shall pump all accumulated water in the shaft excavation down to a 3 inch maximum depth prior to beginning concrete placement operations~~

John Tuttle had some concerns with the wording associated with perched water tables and also the wording requiring slurry levels above the water elevation outside the casing, especially in a lake or river. There are cases where surface water is isolated from groundwater, and you can have groundwater tables that are deep. If you try to keep slurry levels at the lake or stream level, you will have huge slurry losses. It is John's recommendation to strike the proposed new section 6-19.3(3)I1 Shafts Constructed in Water Bodies, Rivers, and Puget Sound. Jim Cuthbertson concurs.

b. Force Account Obstruction Removal rates and cost/time ADSC/Tom

Greg Radom will be taking this over for Tom Armour, and Greg will plan to provide an update at the next meeting.

c. Concrete Filled Steel Tube (CFST) / Casing Installation Pressure Data Lance Rasband

This action item had to do with trying to measure the skin friction resistance on steel casings that are installed by twisting or oscillating especially when cutting teeth are used on the casing with a kerf that slightly overcuts to facilitate casing installation. The idea was that with equipment readings of torque, down pressure, or even direct measurement of uplift resistance when the casing is lifted, it may be possible to estimate the friction resistance during design. It was asked if the torque measurement can be measured. The ADSC contractors requested more information. Patrick Glassford will work with Eric Schultz to pen an e-mail asking specific questions of the team. More to come…

d. Investigation into use of hollow bars for CSL testing (On hold until Dextra can present) Amy Leland

WSDOT uses 2-inch steel pipe for CSL access tubes. Hollow reinforcing bars have been used for CSL tubes in other states successfully. Use of hollow vertical bars eliminates the need for a CSL tube which is why WSDOT and the industry is interested in using hollow bars, but there are other options for CSL access tubes. One such specialty tube is produced by the Dextra Group. Patrick Glassford and Amy Leland are working with Dextra to arrange a presentation about their CSL tube system.

e. Flocculants for dropping solids being rejected Jim Cuthbertson / Pat Glassford

John Tuttle will work with Maha Abelson at the Materials Laboratory to get the commonly used flocculants on the QPL.

11. Next Meeting: February 12, 2021