

Geotechnical Manual – LRFD Webinar

June 6, 2024

1:00 PM – 3:00 PM

Questions and Responses

Note that the recording and the responses here are based on the current Geotechnical Manual – LRFD publication. These responses may be superseded in subsequent manual revisions or through design memos.

Q1 – To confirm, is SPT Testing required every 5 feet within competent bedrock if rock coring is being conducted?

Response – No, when coring begins, drilling can stop performing SPT testing.

Q2 – Is there a specific sample interval for Shelby tube samples? Interval would be at least once every 5 feet when drilling/boring through any type of clay stratigraphy.

Response – Typically this would be done between SPT test depths.

Q3 – Is there a specific sample interval for Shelby tube samples?

Response – The interval would be at least once every five feet when drilling/boring through any type of clay stratigraphy. Typically, this would be done between SPT test depths.

Q4 – For investigations that are currently ongoing and that might continue into August 2024, does the TCP methodology apply or do we have to switch to SPT testing?

Response – If drilling is already taking place or if the design contract is underway prior to August 2024, designers are not required to update to the SPT based design approach.

Q5 – Will there be additional requirements for the investigation (borings), sampling and field testing of planned temporary fill and cut retaining walls? If not, how is TXDOT expecting contractors to get quality soil design information for the design of temporary structures?

Response – The current manual does not add a change in investigation requirements for temporary structures. We are looking into this and plan to address in future revisions.

Q6 – Given the forthcoming adoption of the new TxDOT LRFD geotechnical manual in August 2024, does this signify an opportunity for geotechnical firms to reassess project scopes, particularly if additional bridge borings are deemed necessary?

Response – Projects that have design contracts or work authorizations executed before August 2024 do not need to be designed per the new geotechnical manual. Bridge Division and PEPS are working on revisions for future master contracts.

Q7 – Should discontinuity spacing be logged moving forward?

Response – Yes, if it can be observed.

Q8 – Can you clarify what data should be logged?

Response – These requirements are in charts in the new manual.

Q9 – Is the intention that the official template will become required eventually, or will we have flexibility to use our preferred or in house software to generate boring logs in a separate format so long as they meet the requirements in the manual?

Response – We acknowledge that there are different software options. We do not plan to specify software to be used. The templates are intended to provide an example for a consistent presentation on various projects.

Q10 – Are consultants responsible for using our own boring log program to develop boring logs or will TxDOT develop a new boring log program to replace the Wincore program?

Response – TxDOT does not plan to develop a new program to replace Wincore. Wincore will be phased out and we do not plan to develop a that produces LRFD design curves.

Q11 – Should boring log show length recovered for tube and SPT samples?

Response – This is recommended and preferred, but not required.

Q12 – Will CPT testing be allowed in saturated sand/soft soils in the future?

Response – TxDOT is evaluating CPT use and we include this in the future.

Q13 – What is the timetable for contractor provided designs of temporary special shoring or temporary earth retaining walls? We assume that contractor can use ASD (or LRFD) if PS&E was based on ASD, and must use LRFD if PS&E was based on LRFD. Is that right?

Response – For temporary special shoring, the design approach should match the framework used in the PS&E. For temporary earth walls and proprietary walls, contract plans (standard sheets) will specify when LRFD is required.

Q14 – Are you familiar with the work that was done for Oklahoma DOT where the TCP method was evaluated with SPT and designs based off of laboratory testing, with TCP an acceptable approach based on the research results? Will a similar approach be considered in future versions of the manual? Specifically with IGM type materials where sampling will be difficult.

Response – We are familiar with the content and well aware of the difficulty in sampling IGM. To do so, we're eager to explore promoting alternative tooling to get testable sampling or resistances based on measurement while drilling or the use of downhole pressuremeters, rather than an SPT to TCP conversion. The Appendix B in GEC-10 2010 has also been insightful for gauging resistance on SPT up to 100 blows. Research is ongoing and methods used when designing should be justified with calculations and citations.

Q15 – Do we have a change in the consistency classification based on the SPT blow counts from that of the TCP Blow counts.

Response – Yes, the charts indicate consistence based on SPT measurements and legacy TCP.

Q16 – Most of the drilling rigs right now are equipped with automatic hammer according to the old manual specs. Moving forward, is there any grace period for the drillers to modify their rigs?

Response – Automatic hammers can still provide efficiency report in accordance with ASTM D4633. Rigs will not need to be modified, and most are accustomed to switching between hammer weights and drop heights based on legacy TCP criteria and official SPT testing.

Q17 – Do geotechnical firms need to provide certification of SPT calibration.

Response – Certification of equipment would be specified in the contract. Efficiency reporting for the specific hammer systems being used is required in the Geotech reports and/or boring logs.

Q18 – If in-situ pile load tests are performed, can we use the AASHTO resistance factor for pile length determinations?

Response – AASHTO provides different resistance factors that should be used based on the capacity verification method selected. Design approaches different than those in the Geotechnical Manual must be approved during the contract negotiation.

Q19 – Is it TxDOT's preference to utilize skin/end bearing or terminate into a hard/rock layer when using drilled shafts especially when the difference between the two adds considerable lengths in some cases?

Response – Engineers will be required to evaluate soil conditions and design for each location. Approach will be dependent on site-specific conditions.

Q20 – Are you going to define point of fixity for drilled shafts as 1st Point or 2nd point of zero deflection?

Response – Basis of fixity may depend on the loading and design requirements. We generally start with the second point of zero reflection, but also refer to the methods in to GEC-10.

Q21 – Who would be responsible for disregarding the soil strength that may scour away after driving a pile? Is that on the design engineer or contractor?

Response – The engineer of record is responsible for designing for scour. Contractor will use the nominal driving resistance (R.ndr) that EOR indicates in plans, this R.ndr is calculated with the addition of the scour layer resistance.

Q22 – Is min. 10 ft of disregard depth due to scour applicable for rock also?

Response – Clarification from response in the webinar - The intention of the minimum disregard depth is to provide a threshold for local modification to ground surface/mudline and to account for any soil disturbance from drilling shafts/driving piles. Any proposed adjustments due to specific site conditions should be handled on a case-by-case basis and be approved by TxDOT.

Q23 – Do the bridge designers need to provide 3 states (service, strength and extreme event) loads to the geotechnical engineers to calculate the 3 resistances ?

Response – The loading requirements are governed by the Bridge Design Manual and AASHTO LRFD Bridge Design Specifications.

Q24 – Is it expected that the geotechnical engineer or the structural engineer seal the data from the FDN working drawing?

Response – The designer determining foundation lengths will seal the FDN sheet.

Q25 – WinCore uses an alpha value of 0.7 for the TAT preferred method in Houston District. The AASHTO Design Manual 10.8.3.5.1b uses an alpha value of 0.55 or less. Should we use the AASHTO value for the new requirement?

Response – AASHTO values should be used. Typically 0.55 or lower depending on S_u .

Q26 – 2020 versions and earlier of Bridge Design Guide indicate columns on single drilled shafts are fixed at three shaft diameters but no more than 10 ft below the top of shaft. However, the 2022 version indicates no less than 10 ft (which means 10' min) below the top of shaft. Could you please confirm it is now 3D or 10' min instead of 10' max moving forward or if that was a mistake?

Response – The newest version of the of the Bridge Design Guide is correct. Note that the fixity depth is dependent on the soil conditions and should be evaluated to determine if the assumptions listed are applicable.

Q27 – Do we need a FDN sheet / table for each bent or for each boring or what?

Response – This table is required for each Bridge. Within the sheet it allows designers to expand out 2 Abutments and any number of bents. Information should be provided for each bent.

Q28 – If a column is originally designed with multiple drilled shafts but is changed into a monoshaft due to construction related issues, would new boring holes need to be made if the existing borings are greater than 50' from the bent? If so, who would be responsible to provide the new boring?

Response – The need for an additional boring would be evaluated on a case-by-case basis depending on soil conditions and variability, proximity of boring, loading, and other factors.

Q29 – Where in the plan set is the FDN sheet(s) supposed to be located?

Response – The sheet should be included within the Foundation Layout sheet or after the Estimated Quantities sheet if on a separate sheet.

Q30 – Historically, some retaining wall suppliers only evaluate internal stability. Are retaining wall suppliers required to evaluate external stability?

Response – Wall suppliers are required to check external stability, provide calculations indicating that the requirements provided are met, and increase the length of the reinforcement, if needed, based on their calculations.

Q31 – Who is responsible for providing the bearing capacity and settlement design/analysis? Previously the wall designer was responsible for checking external stability, is this a change?

Response – See the information in Chapter 6 of the Geotechnical Manual. The workflow and the requirements for the EOR and the wall supplier has not changed.

Q32 – What does TxDOT Bridge Division consider a "perched wall" for stability purposes since passive forces are neglected in all cases per AASHTO?

Response – The specific situation should be evaluated on a case-by-case basis. Aggressive slopes (generally steeper than 4:1) adjacent to walls complicate designs, and often require additional checks. The EOR is responsible for determining that all applicable failure modes have been accounted for in the design.

Q33 – When you were showing the Safety Factors for CIP Walls but at the same time indicating they were design per LRFD method, was that implying that the combination of LRFD resistance and load factors produces roughly the same safety factors?

Response – Walls designed with both methods should generally produce similar results. Walls with steep slopes or traffic surcharge applied are likely to be slightly more conservative when using the LRFD based approach.

Q34 – If a designer uses a complex retained fill configuration say based on the active wedge, will guidance and direction be provided on how to handle that condition since force equilibrium software such as MSEW cannot handle that condition?

Response – We are working on language to add in the future.

Q35 – If we see the current PEPS Texas Cone Penetrometer (TCP) language in contracts we know will be signed after 8/1 what should we do?

Response – TxDOT is working to incorporate the new testing into the contract. Please bring this up to your TxDOT PM.