AASHTO
THE VOICE OF TRANSPORTATION
SUBCOMMITTEE ON MATERIALS

SUBCOMMITTEE ON MATERIALS

2017 Annual Meeting – Phoenix, AZ
Thursday August 10, 2017
8:00 – 10:00 AM MST

TECHNICAL SECTION 1a
Soils and Unbound Recycled Materials

I. Call to Order and Opening Remarks

II. Roll Call

FirstName	LastName	State	Email	Designation	MemberType
Charles	Babish	VA	andy.babish@vdot.virginia.gov	Chair	Voting
Bill	Schiebel	CO	bill.schiebel@state.co.us	Vice Chair	Voting
Daniel	Tobias	IL	daniel.tobias@illinois.gov	Member	Voting
Darren	Hazlett	TX	darren.hazlett@txdot.gov	Member	Voting
Donald	Streeter	NY	donald.streeter@dot.ny.gov	Member	Voting
Kaye	Davis	AL	chancellork@dot.state.al.us	Member	Voting
Paul	Hanczaryk	NJ	Paul.Hanczaryk@dot.nj.gov	Member	Voting
Robert	Lauzon	CT	robert.lauzon@ct.gov	Member	Voting
Sejal	Barot	MD	sbarot@sha.state.md.us	Member	Voting
Mladen	Gagulic	VT	mladen.gagulic@vermont.gov	Member	Voting
Darin	Tedford	NV	dtedford@dot.state.nv.us	Member	Voting
David	Horhota	FL	david.horhota@dot.state.fl.us	Member	Voting
Joe	Feller	SD	joe.feller@state.sd.us	Member	Voting
Mark	Felag	RI	mark.felag@dot.ri.gov	Member	Voting
Richard	Douds	GA	rdouds@dot.ga.gov	Member	Voting
Greg	Stellmach	OR	greg.f.stellmach@odot.state.or.us	Member	Voting
Jennifer	Pinkerton	DE	Jennifer.Pinkerton@state.de.us	Member	Voting
Ron	Horner	ND	rhorner@nd.gov	Member	Voting
Timothy	Ramirez	PA	tramirez@pa.gov	Member	Voting
James	Williams, III	MS	jwilliams@mdot.state.ms.us	Member	Voting
Becca	Lane	ON	Becca.Lane@ontario.ca	Associate Member	Voting

New member; Travis Smith – TN Dot. Email: Travis.w.smith@tn.gov
Vice Chair Bill Scheibel retiring from Colorado Dot. Tech Section in need of a new vice chair.
Ron Horner of North Dakota retired. North Dakota to name a new representative if desire to continue membership on TS 1a.
Mark Felag no longer member of TS 1a, took another position in RI Dot.

III. Approval of Technical Section Minutes

The Technical Section's midyear meeting was held January 27, 2017, beginning at 1pm and was adjourned at 1:40pm. Meeting was held in a webinar format. **See pp. 4-7** for minutes of Jan 27 Tech Section Meeting.

Action: Approve Technical Section Midyear Meeting minutes

Motion: ?

IV. Old Business

A. SOM Ballot Items

All 2016 SOM Ballot Items were addressed at the January 27, 2017 midyear Technical Section Meeting.

B. TS Ballots -

No TS Ballots were conducted.

C. Task Force Reports

No Task Forces are active, no reports at this time.

V. New Business

A. Research Proposals

1. 20-7 RPS
2. Full NCHRP RPS

Two Research Need Statements are proposed for TS1a endorsement;

See pp 8-14.

Action: Does Tech Section Committee endorse either of both RNS for full SOM consideration?

B. AASHTO Re:source/CCRL - Observations from Assessments?

C. NCHRP Issues

D. Correspondence, calls, meetings

E. Presentation by Industry/Academia

F. Proposed New Standards

G. Proposed New Task Forces

H. Standards Requiring Reconfirmation

The table below lists the standards that are due for reconfirmation in 2017;

Std.	Category	Reconfirm Date	Latest ASTM	Steward	Remarks
T 190-14	B	2017	D 2844-07	AL, RI	No Precision & Bias statement.
T 194-97(2013)	A	2017		NJ, ND	No Precision & Bias statement.
T 208-15	B	2018	D 2166-00	MS, TN	No Precision & Bias statement.
T 215-14	A	2017		RI, VT, OR	No Precision & Bias statement.
T 217-14	A	2017		MA, FHWA, PA	No Precision & Bias statement.
T220-66(2013)	A	2017		AL, MS	No Precision & Bias statement.
T 226-90(2013)	B	2017	D 2664-04	AL, CO	
T 236-08(2013)	B	2017	D 3080-04	MS, TN	No Precision & Bias statement.
T 258-81(2013)	A	2017		OK, SD	No Precision & Bias statement.
T 267-86 (2013)	A	2017		GA, VT, NJ	No Precision & Bias statement.
T 273-86(2013)	A	2017		OK, SD	No Precision & Bias statement.
T 289-91(2013)	A	2017		FL, NY	No Precision & Bias statement.
T 291-94(2013)	A	2017		FL, NY	No Precision & Bias statement.

I. SOM Ballot Items (including any ASTM changes/equivalencies)

VI. Open Discussion

VII. Adjourn

AASHTO
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2017 Midyear Meeting - Webinar
Friday January 27, 2017
1:00 – 3:00 PM EST
MINUTES
TECHNICAL SECTION 1a
Soils and Unbound Recycled Materials

I. Call to Order and Opening Remarks

Andy Babish/VA gave opening remarks.

II. Roll Call

Chair conducted roll call for members. All present required to send Tracy Barnhardt email stating their attendance with contact information. See list of attendees on page 4 of minutes.

III. Approval of Technical Section Minutes

See **attachment 1** for Tech Section Minutes from annual meeting held in Greenville, SC, Aug. 4, 2016.

Action: Approve Tech Section Minutes from Annual Meeting held Aug. 4, 2016
Motion: CO, 2nd : AL, motion passed. Minutes approved as written.

IV. Old Business

A. SOM Ballot Items

Item 1 - T 176; Section 4.9 revised to include defined process for mixing the working solution..
Affirmative = 43, Negative = 0, No vote = 8

2 states with comments for editorial consideration;

Pennsylvania Department of Transportation (Timothy L Ramirez) (tramirez@pa.gov)
In Section 4.9, 1st sentence, consider revising from "Prepare the working calcium chloride by diluting one measuring tin full (85 +/- 5 mL) of the stock calcium chloride solution to 3.8 L (1 gal) with water." to "Prepare the working calcium chloride by diluting one full measuring tin (85 +/- 5 mL) of the stock calcium chloride solution with 3.8 L (1 gal) of water."

Tech Section members discussed wording proposed by PennDOT and intent of revision balloted (WAQTC champion of revision). After discussion, proposed final wording for publication consideration was;

"Prepare the working calcium chloride solution by diluting one measuring tin full (85 +/- 5 mL) of the stock calcium chloride solution with water until it reaches a total volume of 3.8 L (1 gal)."

WAQTC members present agreed along with TS members, this wording does not change technical intent of standard and provides clarity. The intent of the revised language in Sect. 4.9 is to end up with total volume of solution equal to 1 gal.

Action: Chair to provide proposed final wording to AASHTO publications staff. PennDOT comment was not associated with a negative vote, and this wording change from what was balloted is editorial therefore no further balloting actions necessary.

Kentucky Transportation Cabinet (Allen H Myers) (allen.myers@ky.gov)

In Section 2.1, change the reference from "AASHTO T 248" to "AASHTO R 76".
In the first sentence of Section 6.2, change "T 248." to "R 76.".
We agree with New York's comment from the technical section ballot. Should a requirement exist to mix the solution prior to testing? If the solution sits untouched for an extended period, it is possible that the solution has separated and needs remixing.

Action: Chair finds proposed edit to reference R76 instead of T248 appropriate and will edit standard accordingly. TS membership agreed. Chair to provide editorial change to AASHTO publications staff for publishing.

Item 2 – T297; Concurrent ballot item to delete T 297; this is a category C standard.
Affirmative = 43, Negative = 0, No vote = 8

No comments received on the ballot item. Standard will be deleted.

B. TS Ballots – None to discuss/report on.
C. Task Force Reports – None to discuss/report on.

V. New Business

A. Research Proposals -Kaye Chancellor/AL gave an update on research needs. There are no research needs ready to be voted on in August.
   1. 20-7 RPS
   2. Full NCHRP RPS
B. AMRL/CCRL - Observations from Assessments? – Marie Knacke with AASHTO Re:source review how labs are handling oversize particle correction with T99 and T180. Tracy Barnhart read the following statement, per Maria Knake: Now that T 99 and T 180 have the oversize correction implemented into these standards, (AASHTO re:source) assessors are checking the lab on oversize corrections whenever the AASHTO proctor standards (T 99 and T 180) are being performed for an assessment. First, we are making sure that the laboratory has a guideline for when they are performing an oversize correction, and then we have them show us how they calculate and report it. This can be shown through an Excel program they use, and showing a previous report with that being done, or by having them do an oversize correction if it is appropriate for the proctor sample used to demonstrate the test during the AASHTO re:source assessment. To summarize, a laboratory must show AASHTO re:source evidence that they know how to perform the correction. They can perform it for us while we are there, or show us records of completing the correction and applying this to past test results.
C. NCHRP Issues - Any?
D. Correspondence, calls, meetings – See **attachment 2** from Craig Wilson, Arizona DOT regarding T190. Apparently there are incorrect dimensions shown on the Tamping Foot Drawing in Section 3.3. The standard stewards are AL and RI.

Action: Review inquiry from AZ dot and make appropriate corrections for 2017 balloting, or are corrections such that can be considered editorial and as such, corrected and published in next publication?
TS members agreed this was an obvious error in the standard and considered correction to be editorial. It appears that the English units were converted incorrectly (typo) however, the SI

units are correct. Andy will work with AASHTO Publications to make this correction editorially. No objections from the group. Andy said an advanced figure may be required for the standard. Chair to provide corrections to AASHTO publications staff for publishing.

E. Presentation by Industry/Academia - None
F. Proposed New Standards – Any?
G. Proposed New Task Forces – None?

VI. Open Discussion - None

VII. Adjourn - Andy summarized the action items. Meeting adjourned at 1:40pm.

List of Attendees for Jan. 27 Webinar meeting:

Name	Email Address	Agency
Andy Babish	Andy.Babish@VDOT.Virginia.gov>	VA DOT
Bill Schiebel	bill.schiebel@state.co.us>	CO DOT
Brian Egan		TN DOT
Carole Anne MacDonald	Caroleanne.Macdonald@ontario.ca>	Ministry of Transportation Ontario
Charlie Pan		NV DOT
Chris Clarke		OK DOT
Christopher Leibrock	Christopher.Leibrock@ks.gov>	KS DOT
Daniel Tobias	Daniel.Tobias@illinois.gov>	IL DOT
Darin Tedford		NV DOT
David Horhota	David.Horhota@dot.state.fl.us>	FL DOT
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Jimmy Si		TX DOT
Joe Fiello	Joe.Fiello@txdot.gov>	TX DOT
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Kenny Seward	KSEWARD@ODOT.ORG>	OK DOT
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Scott Seiter		OK DOT
Steve Heiser	Steve.Heiser@dot.ny.gov>	NY
Tracy Barnhart	tbarnhart@aashtoresource.org	AASHTO re:source
Uriah Nichols		OK DOT
Warren Lee	Warren.Lee@ontario.ca>	Ministry of Transportation Ontario

RESEARCH PROBLEM STATEMENT

Geotechnical design, construction and performance monitoring are intimately tied to the collection, interpretation and delivery of geotechnical data. Unfortunately, data is often provided in an informational format that limits operational efficiencies and its future usefulness. Examples of "informational" include reports in PDF or Excel, etc. formats that cannot be readily transferred or applied for new interpretation without manual manipulation (cut and paste). In addition, little to no metadata is conveyed to identify the type, source and reliability of the data.

Access to historic data saves money and time for agencies by reducing the amount of new data required. Time and money is also saved when operational efficiencies are optimized through automation using standardized data structure. Further, the collation of consistently formatted and comparable data across regions will improve design efforts and establish performance expectations, practical measures and aid overall asset management.

Clear definition of data structures for transfer and storage is necessary for consistent, complete data independent of interpretation.

LITERATURE SEARCH SUMMARY

In 2006, a consortium of organizations, including Ohio DOT and FHWA, initiated the Data Interchange for Geotechnical and Geoenvironmental Specialists (DIGGS) standardized schema, which was later revised as DIGGS V2.0 through Ohio DOT funding and in coordination with the Geo-Institute of ASCE. With these efforts complete, the Geo-Institute of ASCE now begins to administer an open-source data structure ready for practice. Currently, geotechnical and geologic test elements have been defined. As a result of limited resources, elements such as geoenvironmental, foundation installation and load testing have been provisionally removed from this system to expedite proof of function. Completion of the existing system and defining elements for subsequent development of the system to meet the needs of transportation agencies will require this funded effort.

RESEARCH OBJECTIVE

The research will develop industry consensus to expand the data dictionary for soil mechanics, structure installation, ground improvement, instrumentation, and potentially performance data sets based on industry needs. Further, this effort will ensure data structures are consistent with existing standards including ASTM, AASHTO testing procedures. Engaging industry interest groups will further ensure a complete and robust object structure for the benefit of transportation assets. The extent of the dictionary test features will be dependent on resources available but may include such items from:

Soil Properties: Density, moisture content and gradation to shear strength, unsaturated behavior, cyclic performance, compressibility, etc. There are approximately 45 tests included in the DIGGS Schema that require final vetting.

Structure Installation: Pile, drilled shaft installation, shallow foundation construction, grouting and ground improvement beneath structures and embankments, wall construction. Recent work on large diameter pipe piles, DTFH61-14-C-00036, reviewed and update the schema for pile load tests and demonstrates the value of data compilation and would serve as a baseline for this effort related to deep foundation load testing.

Performance: Long term management of assets will be dictated by their performance indicators. There is ongoing research to define key metrics of performance. As these indicators are defined (by others), they will be incorporated into the same data structure so that inter related evaluation of an asset can consider the full lifecycle of the structure and its components.

The deliverable for this work would be the online data dictionary. Although the goal will be to have a robust dictionary defined, the open source system would allow future expansion if required.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: $200k

Research Period: 24 months.

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Availability of usable data is critical to our ability to make future interpretations, manage existing features or assets, and accelerate future project delivery. Efficient collection, transfer, storage and retrieval of data for design, construction and asset management will save substantial time and money.

Implementation simply requires the data standardized structure to be used as standard practice, and can be achieved through requirements within guidance manuals and standards developed by FHWA and AASHTO, respectively. Maintenance and updating these data structures as required would be managed by the Geo-Institute of ASCE and vetted as needed by AASHTO subcommittees for adoption.

PERSON(S) DEVELOPING THE PROBLEM

Christopher Merklin, P.E., Ohio Department of Transportation, Email: chris.merklin@dot.ohio.gov

Mr. Bradley Keelor, Director, ASCE Geo-Institute, bkeelor@asce.org

Mr. Allen Cadden, Schnabel Engineering, acadden@schnabel-eng.com

PROBLEM MONITOR

Mohammed Mulla, AFP30 Chair, Email: mmulla@ncdot.gov

Cosponsoring Committees and Endorsements:

AFP30, Soil and Rock Properties,

AFS30, Foundations of Bridges and Other Structures

AFP10 (2), Geotechnical Asset Management

AFP20 Geotechnical Site Characterization

Ohio DOT

Missouri DOT

Louisiana DOTD

Louisiana Transportation Research Center

North Carolina DOT

New Hampshire DOT

Colorado DOT

I. Research Problem Statement

Data at foundation load test sites can be used to verify and optimize the Geotechnical design of foundations in the projects they are used in. In addition, if complete and high-quality data at load test sites are obtained and compiled in databases, they can be used in the future by: a) designers to improve the geotechnical design for production foundations and, more important, b) by researchers in the reliability calibration to develop more accurate and economical foundation geotechnical design methods. Reliability calibration is the best option to develop resistance factors for the geotechnical design methods of foundation and thus for implementation of LRFD. High-quality national, regional, and local deep foundation load tests are still needed in the USA to perform reliability calibration of foundation geotechnical design methods. The contents of these databases are results of load tests, subsurface investigation, construction and quality control (QC) methods, and the conditions employed to obtain these results (e.g., types of: foundations, foundation soils, and construction methods).

As geotechnical practice moved towards LRFD, vast majority of the current LRFD foundation geotechnical design methods were developed based on past experience and judgement. There are only a very small number of reliability-based resistance factors for foundations adopted by AASHTO or State DOTs due to the lack of quality and complete foundation load test databases. The current highway engineering practices emphasize the use of load test results for individual projects, not for future reliability calibration. This could lead to two main problems with the load test data obtained in these projects: a) data is not complete or of good quality (accuracy) for use in the reliability calibration; and b) not reported or complied for future use. There are variations in the type of data collected at load test sites and the procedures followed for obtaining these data by various State DOTs. There are still issues with the quality of the reported data at load test sites (e.g., clarity, accuracy and completeness), even in some developed load test databases.

Literature Search Summary

Toward developing quality foundation load test databases, the FHWA published in a 2015 TRB paper recommendations to develop and share quality foundation load test databases (Abu-Hejleh et al., 2015), and recently (January 2017) released version 2 of its Deep Foundation Load Test Database, DFLTD, (Petek et al., 2017). The DFLTD v2 includes an updated framework and 150 new load test data for the large size dimeter open end driven piles. The database is relational where the records can be queried in numerous ways to include foundation type and size, subsurface soil information, and location. The DFLTD v.2 can be used by Federal and State

agencies, universities, consultants and contractors, design engineers and planners, and research and development professionals.

In addition, several State DOTs and researchers have developed and are now developing their own foundation load test databases (e.g., Florida, Iowa, Louisiana, and Illinois)

Even so, significant work is still needed to develop high-quality national and local databases of deep foundation load tests that include a complete and adequate number of high-quality and complete records of data at load test sites that cover all common foundation design and construction conditions encountered in the United States. The local databases would also allow for reliability calibration of local design methods not covered in AASHTO LRFD.

II. Research Objectives

The proposed research study will benefit from existing work described above toward the achieving the following objectives:

- Develop/finalize a national protocol to obtain and report quality/complete/consistent data at new load test sites, and to identify and compile existing quality load test data that were not reported in the load test databases.
- Develop/finalize the framework for a quality foundation load test database to store the data collected at load test sites and provide the information needed by designers and researchers for the two applications discussed above. This database should be available online, in line with the developed national protocol, flexible so that is can be easily updated, changed, and expanded, and have appealing and user-friendly interface.
- Develop a national quality database for deep foundation load tests using available data. It should include the reported quality and complete load test data, for example in the existing load test databases, like DFLTD, v2 (review these databases), and the available quality load test data that are not documented.
- Develop recommendations to help State DOTs develop their foundation load test databases using the 3 products described above.
- Develop guidance and examples for applications and limitations of foundation load tests databases.
- Develop recommendations for sharing, updating, and maintaining of the national and local foundation load test databases.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

$300,000 over a period of 3 years.

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

This research study will help move the geotechnical design of deep foundations to true reliability-based design, which is the best option for LRFD implementation since it will lead to

development of more accurate and economical foundation geotechnical methods. These advantages will increase the confidence in design methods for foundations and reduce significantly the cost for construction of foundations. Reliability calibration requires development of quality foundation load test databases. Although, there have been some noble efforts in the development of such databases, there is still urgent need to develop a better and complete national foundation load test database and a national protocol to obtain and report data at load test sites. It is a crucial need at this time since the vast majority of the current LRFD foundation geotechnical design methods are developed based on past experience and judgement, not reliability calibration.

Implementation of the results of this research study can be immediate. State DOTs, consultants, and researchers would have access to use the data in the national database. The study recommendations should be discussed and implemented through collaboration between national and state transportation agencies (AASHOT, FHWA, State DOTs, ASCE, DFI, ADSC, and PDCA).This collaboration can happen in conferences, like TRB, and led by AASHTO and/or FHWA. One of the outcomes of this collaboration is to how to maintain and update the national database for foundation load test databases The State DOTs may need to sponsor research studies to benefits from the work performed in this study and implement it to develop their foundation load test databases.

PERSON(S) DEVELOPING THE PROBLEM

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Jennifer E. Nicks, PhD, PE, FHWA, Department of Transportation, Email: jennifer.nicks@dot.gov

PROBLEM MONITOR

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