GI Soil Improvement Technical Committee Meeting
3:00 pm to 5:00 pm (PST), February 27, 2024, Room 19
Meeting Minutes

I. Introductions
   i. Self-introductions.
   ii. Committee Officers
      a. Secretary & webmaster = Dr. Jie Huang
      b. Award committee = Dr. Jie Huang
      c. Technical conference paper chair = Dr. Aaron Gallant
      d. Liaison with ISSMGE TC211 Committee = Dr. Vernon Schaefer
      e. Past chair = Dr. José Clemente
      f. Vice chair = Mr. Chris Woods
      g. Chair = Dr. Armin Stuedlein

II. Committee succession
   i. *Committee leadership succession has taken place effective this meeting. Will be looking for an industry member to take on the role of the Awards subcommittee to rotate into the secretary role in the future.*

III. Approval of 2023 committee meeting **minutes**.
   i. *Motion by Tony Marinucci to approve, seconded by Aaron Gallant. Motion approved.*

IV. Update from the G-I Board – Dr. Jie Han or member from G-I Board
   i. *Jie offered thanks to José for the successful term as committee chair.*
   ii. *Four priorities set up by current G-I board for moving forward. Innovation, workforce development, service, and international involvement.*
   iii. *Need to attract students to technical committees to improve the transition from student to industry.*
   iv. *First GI President's Award being presented at this GeoCongress, received by Professor Emeritus Robert (Bob) D. Holtz, University of Washington.*
   v. *Working for more transparency as an organization – nomination organizing committee is being formed.*
   vi. *Board appreciates the effort that the Soil Improvement committee awards committee has put into the process.*

V. Update from the G-I Technical Council Committee – Mr. Derrick Dasenbrock (not present – update provided by Jose Clemente).
   i. *Matt Evans will become the TCC Chair in October.*
   ii. *Starting in 2024, special projects will be submitted to and ranked by the TCC prior to awards being made.*
   iii. *Web conferences to be held the first week of December again, proposal for the event due in June.*
   iv. *Call for abstracts for 2025 GeoFrontiers has been extended again to March 15, 2024. This conference will serve as the G-I GeoCongress for 2025.*
   v. *TCC considers committee annual reports to be exceptionally important. Our committee has successfully submitted them every year. Reportedly all but two committees did so successfully last year – the SIC has been very good at completing the task.*
   vi. *Guidance document for committee membership to be forthcoming this year. The idea is to address inactive members. Working to develop an annual recommittal mechanism, similar to what is done by DFI.*
   vii. *Special projects – now three categories, DIGGS, GTT, and Committee Initiatives.*
   viii. *Committee of the year went to the Risk Management Committee.*
   ix. *Committees are to submit charter renewal statements. More information is forthcoming from the TCC.*
   x. *Committees will be asked to participate in the INNC Innovation Committee Award.*

xi. *Committee liaison should be cc'd on correspondence from the leadership team to the committee in general. Current Liaison is Scott Anderson.*

VI. Updates from the G-I – Ms. Krystina Scott
  i. *Krystina was unable to join our committee meeting – no update in this area.*

VII. G-I IDEA and GTT – Mr. Jeffrey Greenwald
  i. *Information for new technology to be added to GTT is sent to Jeff, who then works with the webmaster to integrate the updates/new technologies into the GTT Selection tool and the website.*
  ii. *Should be a special project coming from this committee.*
  iii. *IDEA available for all; funded by those firms who request the technology evaluation. This program was previously called the HITECH program.*

VIII. GeoTechTools – Dr. Vernon Schaefer
  i. *Dr. Schaefer not present. Topic discussed in various sections of the meeting.*
  ii. *What is the process for getting finalized documents from word templates to the website, coded properly? Confirmed that the correct process is to provide finalized documents to Jeff Greenwald who will coordinate with the ASCE webmaster.*
  iii. *Has GTT been refocused to reflect the greater GI? What is the greater plan for GTT in the future? Need to have separate visioning meeting regarding the future of GTT; should involve additional committees. Does this need to be a Board Level committee? Armin to follow up with Board members to begin developing a path forward.*
  iv. *Rigid inclusions have still yet to be added to the GTT site. Much work has been done on rigid inclusions in the DFI Ground Improvement Committee; this is an opportunity for cross-pollination between the DFI Ground Improvement Committee and the G-I Soil Improvement Committee. Armin will discuss this potential special topic with DFI Ground Improvement Committee Chair Tim Siegel and will identify specific members of both committees to work on the special project proposal to add this technology to the GTT.*
  v. *There's an opportunity to pursue updates of existing specifications that currently reside on GTT; for example, the specifications for deep soil mixing were identified by Juan Baez as being out-dated. This could be submitted as special project proposal. Armin will work with members of the SIC and the DFI Deep Soil Mixing Committee to identify potential contributors to a special project proposal to update the specifications on GTT.*

IX. Past Project update (Chris Woods)
  i. "Solidifying" Bio-mediated Soil Improvement methods in GeoTech Tools - Dr. Leon van Paassen (in cooperation with the Soil Properties and Modeling Committee)
    i. Literature review done, funding extended, hoping for this summer to have the initial documents to Dr. Schaefer for this review.
  ii. Addition of Ground Freezing Ground Improvement Technology to GeoTechTools – Dr. Prabir Kolay
    i. *Multiple levels of review completed, awaiting finalized documents from team to get posted to GTT and close out the project. Should be completed in the next few weeks.*
  iii. Updating Dynamic Compaction in GeoTechTools – Mr. Chris Woods Updating Dynamic Compaction in GeoTechTools – Mr. Chris Woods
    i. *Draft documents close to completion for the initial review by Dr. Schaefer. Should be out for review within the next few weeks.*

X. On-going Project Update
  i. Addition of Case Studies for "PVD and Fill Preloading" and "Excavation and Replacement" Technologies on GeoTechTools – Mr. Liang Chow
    i. *Project kickoff meeting held last week; goal is for the case studies to be completed this summer.*

XI. Ideas for New Projects in 2024-2025-**GeotechTools**, DIGGS, and committee-initiated projects. The **Roadmap for Updating GTT**, prepared by Dr. Thomas Taylor can be used to identify existing GTT technologies that need to be updated or merged. Ideas for new technologies to be added are welcome.

XII. ISSMGE TC211 Committee - Dr. Vernon Schaefer

i. *No update – Dr. Schaefer unable to attend.*

XIII. FHWA Update – Mr. Silas Nichols

i. *Working through process for a specification for ground improvement selection. Project is NCHRP 10-121; Allen Cadden is the principal investigator.*

XIV. DFI Update – Mr. Matt Glisson

i. *Articles from the Ground Improvement Committee have been recently published in DFI Journal.*
ii. *Rigid inclusion summit forthcoming.*
iii. *DFI Mid-year committee meeting week to be held April 22 to 26, 2024.*
iv. *Four committee project awards forthcoming. RFP for coming year out by end of March.*
v. *Abstract deadline for Student and Young Professor Paper Competitions at DFI 49 in October extended to March 15.*
vi. *ASCE Foundation Standard Committee continues work with coordination from members of the Ground Improvement committee.*
vii. *Information slides as provided by DFI are provided as Attachment A.*

XV. Award Nominations – Dr. Jie Huang

i. *Jie not present, but call will be forthcoming to obtain a new Award Subcommittee Chair and new members of the committee. Please consider volunteering for this satisfying service role.*
ii. *Committee recognized past committee Chair Professor Kyle Rollins on winning the Seed Medal and delivering the 2024 Seed Lecture.*

XVI. Committee **web site** – Mr. Chris Woods G-I Speaker Program, Web Conference – Dr. Armin Stuedlein

i. *Website is status quo, minutes kept in place on the website, along with award winner for various ground improvement related awards.*
ii. *Another successful Ground Improvement session during the 2023 Web Conference week; see Attachment B for this past year's lineup.*
iii. *For this coming year, call for presentations to be coming in June/July timeframe – could there be a GTT session?*

XVII. GeoCongress 2024/2025 and IFCEE 2024 Update – Dr. Aaron Gallant

i. *Special session during this conference on Soft Soils. Two additional ground improvement sessions during the conference. All have been well attended.*
ii. *Jim Gingery held a short course at this GeoCongress; this short course was the best attended with approximately 40 participants.*
iii. *IFCEE 2024 – Special Session on Rigid Inclusions.*
iv. *Ideas for a special session for GeoFrontiers 2025 are welcome.*

XVIII. Upcoming GI Events

i. **IFCEE 2024**, Dallas, TX, May 7-10, 2024 – GTT session with DFI (Mary Nodine, FHWA)
ii. **34th Central PA Geotechnical Conference**, Hershey, PA, October 30-November 1, 2024
iii. **Geo-Frontiers 2025**, Louisville, KY, March 2-5, 2025

XIX. Upcoming International Events

i. XVIII European Conference on Soil Mechanics and Geotechnical Engineering, Lisbon, Portugal, August 26 to 30, 2024. Includes *Workshop on Recent Advances in Rigid Inclusions* run by TC 211 Ground Improvement

ii. XVII Pan-American Conference on Soil Mechanics and Geotechnical Engineering, La Serena, Chile, November 12 – 17, 2024

iii. 5th International Conference on Transportation Geotechnics (Australian Geomechanics Society and ISSMGE Technical Committees TC202, TC 211, TC307), Sydney, Australia, November 20 – 22, 2024

XX. Announcements

i. *No new announcements.*

XXI. Other or New Business

i. *Young members? What about young member involvement? Can we develop a "this is how it works series" or document for way the GI works? There may be hesitancy on the part of younger members to get involved or attend committee meetings if they're not sure how things actually work. One simple suggestion is to add a note to the committee meeting schedule on the conference program welcoming everybody, including students,*

ii. *What about FHWA documents that need specs/changes? How can these be updated or revised? Perhaps a special project can be proposed, specifically with respect to Deep Soil Mixing. What about DFI – can we use the DFI Guide Spec to add to GTT to supplement the FHWA specifications that are there? Or, can review and comment on specs be provided to the FHWA for implementation into the existing specs?*

XXII. *Meeting Adjourned by Armin Stuedlein at 5pm PST.*

The meeting attendance list is included as Attachment C.

Attachments: Attachment A – DFI Update Slides
Attachment B – December 2023 Web Conference Ground Improvement Proposal
Attachment C – Attendance List

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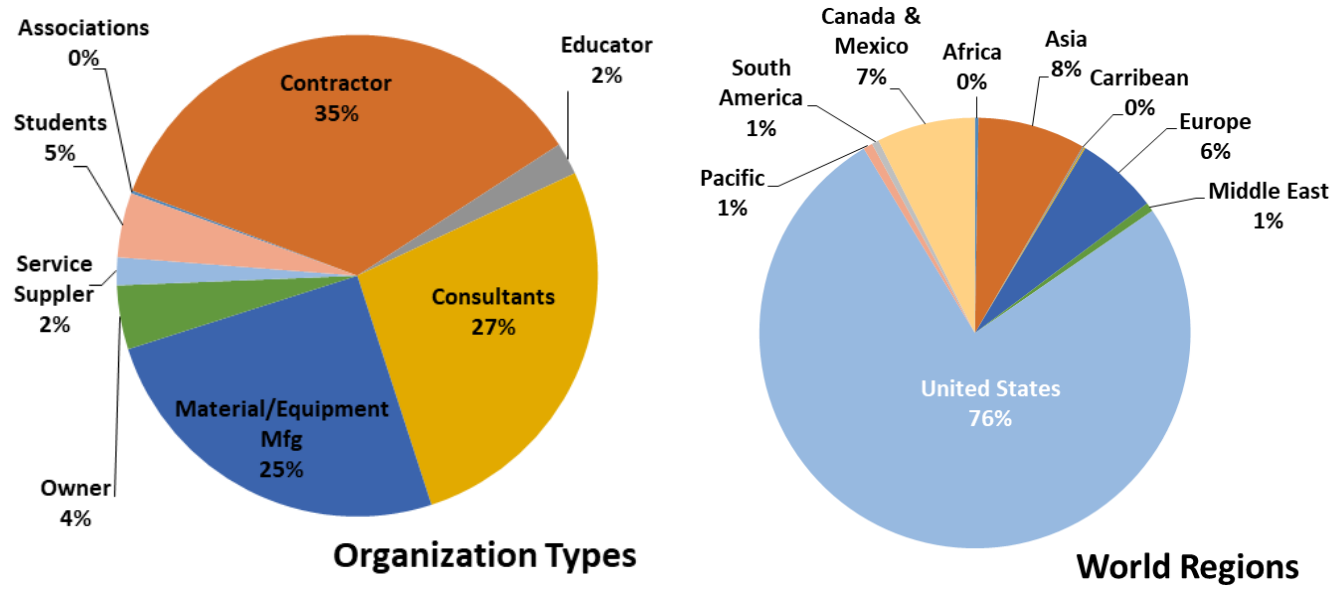
TECHNICAL ACTIVITIES UPDATE – FEBRUARY 2024

DFI President: Gianfranco DiCicco, GD Consulting, gdcons2015@gmail.com
DFI Executive Director: Theresa Engler, tengler@dfi.org
DFI Director of Technical Activities: Matthew R. Glisson, P.E., mglisson@dfi.org

DFI INFO: DFI website at www.dfi.org, nearly 4,000 members in about 60 countries.



DFI COMMUNITIES ACTIVITIES

- Over 600 active members involved in: 29 DFI Technical Committees (3 new! see below), 2 working groups (risk and working platforms) with multiple North American associations, 5 EFFC-DFI task groups, Geo-Coalition and U.S. Levee Safety Coalition.
    - New Student Engagement Committee, coordinating new University Ambassador program and more.
    - Foundation Reuse Committee (formerly task force under Subsurface Characterization Committee.
    - DFI of India Helical Pile Technology Implementation Committee.
- Hosting Geo-Industry Technology Users Groups: Cone Penetration Testing (CPT), Measurement While Drilling (MWD), and Geophysics.
- Midyear Committee Week (April 22-26) – online meetings of all DFI committees and they are open to everyone in the industry. See schedule and register to attend meetings of committees you are not already a member of.
- Webinars offered the first Wednesday at 2 p.m. ET and the second Tuesday at 11 a.m. ET of every month.
    - 90 minutes for presentation and questions.
    - Free to all with no PDH certificate or $70 with a PDH certificate.
- Recent publications: primers on Geotechnical Baseline Reports (GBRs), case histories on foundation reuse.
- Publications in coming year: consensus publication on GBRs, guidance publication on foundations for electric power transmission structures, guidance specification for data management on grouting projects, EFFC/DFI guides on carbon reduction and circular economy, and more.
- Visit Communities webpage and check out *Deep Foundations Magazine* for more updates.

DFI TRAVELING LECTURER

- 2023-2024 lecturer is Jesus Gomez, Ph.D., P.E., BC.GE, one of America's leading authorities on the construction and design of deep foundations, particularly micropiles.
- Series runs September 1 to August 31 of the following year with nominations accepted continuously.
- Next lecturer will be announced in May or June. Visit Traveling Lecturer webpage to learn more.

DFI COMMITTEE PROJECT FUND

- Over $1.4 million awarded for research and other committee projects since 2012.
- Committee Project Fund webpage summarizes current and completed projects and provides links to publications.
- 2024 funds just awarded to four projects submitted by Anchored Earth Retention, Auger Cast-in-Place & Drilled Piles, Drilled Shaft and Micropile Committees. More details coming soon.
- Proposals invited for DFI committees' consideration by September 1; DFI committees submit on December 1.

DFI PUBLICATIONS

- *Deep Foundations Magazine*: published six times per year, digital edition available to all online, DFI members receive print copies on request.
- *DFI Journal*: published two times a year. Now have a Scopus impact factor. Special issue on Ground Improvement in 2023. Submit your article at www.editorialmanager.com/dfi.
- DFI Publications Store: offers a wide variety of technical resources, many free for download. Recent conference proceedings include presentation recordings and the ability to earn PDHs.
- DFI Podcasts: Broadcasting Common Ground New series *Interviews with the Industry* launches on April 25, 2024. Past series available for viewing/listening: *Morgan's Mentors* (Season 2), *Interview with a Trailblazer, Deep Dive, Game Day (live at DFI Annual Conference), Rumble* and *Interview with a Survivor)*.

UPCOMING EVENTS

DFI's 49th Annual Conference is a themed conference on Water-Resiliency-Infrastructure with a dedicated parallel track focusing on water related topics. (Seepage Control Groundwater, Surface Water, Wastewater, Water Erosion…)

March 6, 2024	Deeper Into Data Webinar	Online Webinar
March 12, 2024	!mpact Webinar	Online Webinar
April 11, 2024	Successes and Failures: What Did We Learn? (DFI-EU & DGF)	Copenhagen, Denmark
April 22-26, 2024	Midyear Committee Week	Virtual Meetings
May 7-10, 2024	IFCEE 2024	Dallas, TX
May 28-30, 2024	Conference on Foundation Decarbonization and Re-Use	Amsterdam, Netherlands
June 12-14, 2024	SuperPile 2024	San Fransisco, CA
July 2024 Date TBD	DFI Educational Trust PA Golf Outing	Pittsburgh, PA
August 6-8, 2024	S3: Slopes, Slides and Stabilization	Aurora, CO
August 12, 2024	DFI Educational Trust/NJ ACE Mentor Program Golf Outing	Sparta, NJ
September 6, 2024	DFI Educational Trust CA Golf Outing	Dublin, CA
September 19-21, 2024	DFI India 13th Annual Conference on Deep Foundation Technologies for Infrastructure Development in India	Panaji, Goa, India
October 7-10, 2024	DFI 49th Annual Conference on Deep Foundations (DFI49)	Aurora, CO
November 14, 2024	DFI Educational Trust 17th Annual Gala Fundraising Dinner	Corona, NY

DFI STUDENT ACTIVITIES

- Free Student Memberships: apply online here.
- Annual Student and Young Professor Paper Competitions, abstract deadline extended to March 15, 2024.
- DFI49 will include university student program with mentoring/networking session(s) and site visit, plus free High School/Vocational School half-day admission that includes overview of the industry, exhibit hall tour and meet/greet with industry leaders.

DFI EDUCATIONAL TRUST – www.trust.dfi.org/

- 2024 Scholarship and Women in Deep Foundations Committee professional development grants application period opens April 1, 2024.
- Nearly $2 million scholarships awarded since inception to >450 students attending 74 universities.

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Web Conferences - Session Proposal

Proposed Technical Session Title: Ground Improvement for Liquefaction Mitigation

1. Technical session brief description:

   This session will provide attendees with immediately-implementable tools and recent findings on soil improvement for liquefaction mitigation. Topics include use of the cone penetration test and interpretation of test results for assessing improvement to densified deposits, analytical models for predicting post-liquefaction settlement in granular column-improved ground, performance of deep soil mixing in shaking tests of physical models, implementation of microbes to strengthen liquefiable soils, and standardization of soil freezing design practices. Based on much positive feedback, we propose to organize the session to match that of the previous Soil Improvement WebConference Sessions, which consisted of five talks and a concluding panel session where audience members can interact with the speakers.

2. Learning Outcomes (bullets)

   Upon completion of this course, you will be able to:
   - *Identify existing and novel ground improvements for liquefaction mitigation and ground stabilization.*
   - *Deploy new analytical techniques and interpretation methods for cost-effective assessment of ground improvement alternatives.*

3. Benefits for Participants: (bullets)

   - *Provide clients creative solutions to complex subsurface challenges in seismic environments.*
   - *Assess and select available types of equipment and techniques for liquefiable soils.*
   - *Stay abreast of recent trends in liquefaction mitigation research and practice.*

4. Assessment of Learning Outcomes:

   The target audience includes geotechnical engineers and specialty contractors who work in seismic regions, ranging from South Carolina and the Eastern seaboard, the Mississippi Embayment, the West coast and Alaska, and Puerto Rico and Hawaii. Achievement of the learning objectives will be assessed through a post-webinar test consisting of four questions per lecture.

5. Who Should Attend?

   Owners and operators of civil infrastructure, consultants, public agency staff, specialty contractors.

6. Outline (Session Presentations)

   a. *Introduction and Webinar Agenda*

   b. *Talk #1: Mitigation of Earthquake-induced Soil Liquefaction Using Bio-cementation Soil Improvement*

   c. *Talk #2: Time Effect of CPT-Based Evaluations for Liquefaction Mitigation by Vibro Densification*

   d. *Talk #3: Modeling Vertical Reinforcing Effects of Columnar Ground Improvement for Post-Liquefaction Settlement Mitigation*

   e. *Talk #4: Evaluating the Effectiveness of Soil-Cement Columns for Liquefaction Mitigation in Liquefiable Sand*

   f. *Talk #5: Ground Freezing Standardization for Ground Improvement*

   g. *Interactive Panel Session Q & A*

7. Length of Webinar

   120 minutes: 20 minutes/lecture including introduction; 20 minute panel session

8. Presentation title and abstracts

   a. ***Introduction of Webinar Agenda (Armin Stuedlein, Oregon State University)***

   b. ***Talk #1: Mitigation of Earthquake-induced Soil Liquefaction Using Bio-cementation Soil Improvement (Presented by Mike G. Gomez, PhD)***

      Bio-mediated soil improvement technologies leverage the capabilities of soil microorganisms to catalyze biological and chemical reactions in the geotechnical subsurface to generate a diverse range of products that can be used to improve the engineering behavior of soils. Microbially induced calcite precipitation (MICP), or biocementation, is arguably the most mature and well-researched bio-mediated soil improvement technology to-date. The process uses microbial urea hydrolysis to enable to precipitation of calcium carbonate minerals on soil particle surfaces and contacts with resulting improvements in soil shear strength and shear stiffness with minor reductions in soil hydraulic conductivity and porosity. The process has received significant attention as an earthquake-induced liquefaction mitigation technique; however, critical gaps have remained in our understanding of how liquefaction behaviors may shift as a function of applied loading magnitudes and cementation levels. This presentation will provide a brief introduction to biocementation soil improvement, highlight advances with respect to large-scale practical deployment of the technology, and share insights from recent laboratory experiments characterizing the liquefaction behaviors of bio-cemented loose sands. Presented outcomes are expected to improve our understanding of the liquefaction triggering and post-triggering behaviors of bio-cemented soils, the metrics by which these behaviors can be effectively characterized, and the specific mechanisms responsible for behavioral enhancements, ultimately furthering our understanding of how the technology may be employed for liquefaction mitigation purposes.

c. ***Talk #2: Time Effect of CPT-Based Evaluations for Liquefaction Mitigation by Vibro Densification (Presented by one the following: Adam Price, PhD, P.E.; Ryan Nagle, Tim Siegel, P.E., and Lisheng Shao, PhD, P.E., G.E.)***

Vibro stone column treatment is a popular and cost-effective ground improvement method for soil liquefaction mitigations. To evaluate the liquefaction mitigation effectiveness, CPT tests are typically performed after the vibro stone column treatment. Post improvement liquefaction analysis is routinely undertaken in general accordance with the NCEER 1997 procedure (Youd et. al., 2001) or Boulanger and Idriss method (2014). During the installation of stone column, the vibrator generates cyclic shear in liquefiable sands, creating densification and building up excess pore water pressure. The excess pore water pressure dissipates slowly after the treatment, especially in the sand and clay layers interbedded soil profile. The authors performed extensive CPT, SPT, and soil sampling for a vibro-stone column project in San Francisco Bay Area. Five rounds of CPT tests were performed: prior to vibro-densification and one week, one month, 3 months, and 6 months after treatment at the same locations to evaluate the increase in cone tip resistance as a function of the time following vibro-densification. In situ soil samples in the potentially liquefiable soil were collected and tested for particle size distribution tests, Atterberg Limits tests, and nature moisture contents. The Ic values and fine contents of the soil were also compared before and after the ground improvement. The authors observed that the CPT tip resistance gradually increased in a slow pace and the calculated liquefaction induced settlement reduced as a function of the post-treatment duration. This paper presents the site geotechnical investigations, design and construction of vibro stone columns, time series of post improvement CPTs, and liquefaction evaluations.

d. ***Talk #3: Modeling Vertical Reinforcing Effects of Columnar Ground Improvement for Post-Liquefaction Settlement Mitigation (Presented by Jim Gingery, PhD, P.E., G.E.)***

Contemporary design criteria for ground improvement supporting structures frequently specify a maximum post-liquefaction reconsolidation settlement value. Several methods are available and widely used for calculating post-liquefaction settlement, but they have been developed to represent free field conditions in the absence of ground improvement elements. Centrifuge and full-scale field tests have shown that arrays of dense gravel columns reinforce the ground and reduce post-liquefaction settlements relative to free field values. This presentation introduces a constitutive model that captures the development of post-liquefaction volumetric deformations with porewater pressure dissipation and its implementation in a finite difference numerical model. When combined with dense gravel columnar reinforcement the model can estimate post-liquefaction settlements consistent with centrifuge and field tests. The model has the advantage over more simplified approaches that it more rigorously captures many of the physical processes including porewater pressure dissipation, gradual regain of soil stiffness and strength, downdrag and stress redistribution. Practical applications of the model are presented to illustrate the effect of columnar reinforcement on post-liquefaction settlements.

e. ***Talk #4: Evaluating the Effectiveness of Soil-Cement Columns for Liquefaction Mitigation in Liquefiable Sand (Presented by Mohammad Khosravi, PhD)***

A series of centrifuge experiments was conducted to investigate the reinforcing mechanisms of soil-cement (SC) columns in liquefiable sand. Crack detector sensors

were used to identify the internal failure modes of SC columns under different loading conditions, including embankment loading and liquefaction-induced lateral spreading. The centrifuge experiments included models with level ground improved with SC columns and centrifuge tests of an embankment resting on liquefiable ground improved by SC columns with different flexural/shear strength. The models were subjected to earthquake base motions of varying intensities to observe acceleration, pore pressure, lateral displacement, and settlement responses. It was found that the shear reinforcement mechanisms of columns were not effective in reducing cyclic stress ratios in the treated soil. The results of the experiments suggested that during and after cracking of the SC columns, shear and tilting failure were the prominent failure mechanisms. Increasing the flexural/shear capacity of SC columns resulted in a reduction in the potential for earthquake-induced liquefaction and associated damage. It was observed that if the soil-cement columns remained intact, they would provide a means for supporting overlying structures even after liquefaction was triggered in the soil.

f. Talk #5: Ground Freezing Standardization for Ground Improvement (Presented by Joseph Sopko, PhD, P.E.)

Artificial Ground Freezing (AGF) has been used for temporary support of excavations since the late 1800s. It has routinely been used on specialized projects to provide groundwater control and/or temporary earth support for subsurface structures. The design ana analysis approaches to projects have been predominantly the choice of the ground freezing subcontractor. Recent steps have been taken to standardize the approach to the design of frozen earth structures to ensure continuity in the industry and provide approaches to verify safe and practical designs. This presentation highlights the required site investigation, laboratory testing, structural and thermal design as well as requirements for guide specifications for both shafts and tunnels.

g. Interactive Panel Session Q & A (Moderated by Armin Stuedlein)

9. Instructor(s) bio

a. Mike G. Gomez, PhD

Mike Gomez is an Assistant Professor in the department of Civil and Environmental Engineering at the University of Washington. His research focuses on leveraging natural chemical and biological processes in soils to develop sustainable bio-mediated geotechnical ground improvement technologies. In particular, Mike's research has focused on the strengthening of loose and weak granular soils through a bio-mediated calcium carbonate precipitation process known as Microbially Induced Calcite Precipitation (MICP). Mike's additional research interests include advanced geotechnical laboratory testing, reactive transport modeling, clay surface chemistry, applied microbiology, and soil biogeochemistry, among other topics. Mike received a National Science Foundation (NSF) Faculty Early Career Development Program (CAREER) Award in 2020 and currently serves on the editorial board for Biogeotechnics, Canadian Geotechnical Journal, and Scientific Reports, among other honors.

b. ***Adam Price, PhD, P.E.; Ryan Nagle, Tim Siegel, P.E., and Lisheng Shao, PhD, P.E., G.E.***

Presenter to be determined. Bio will be prepared upon session approval.

c. ***Jim Gingery, PhD, P.E., G.E.***

Dr. Gingery is a Chief Engineer in Keller North America's (formerly Hayward Baker) Western U.S. business unit. He has over twenty-five years of experience in geotechnical and earthquake engineering for water, energy, transportation, industrial/commercial and residential projects. At Keller he leads a team providing ground improvement and geostructural engineering for design-build projects across the Western U.S. and beyond. Dr. Gingery holds an M.S. in geotechnical engineering from U.C. Berkeley and a Ph.D. in geotechnical earthquake engineering from U.C. San Diego. He is a license professional engineer in multiple states. In 2015 he was awarded the Shamsher Prakash Prize for Excellence in the Practice of Geotechnical Engineering.

d. ***Mohammad Khosravi, PhD***

Dr. Mohammad Khosravi is an Assistant Professor at Montana State University and serves as the Director of MSU's Bio-Geotechnical Laboratory (BIG LAB). He obtained his B.Sc. in Civil Engineering from Sharif University of Technology in 2003 and completed his Ph.D. in Civil Engineering from Virginia Tech. His research interests encompass three primary areas: 1) geotechnical earthquake engineering, including topics such as liquefaction, ground improvement, seismic performance of earth dams and levees, and seismic soil-pile-structure interaction; 2) biomediated geotechnics for sustainable infrastructure; and 3) energy geo-systems, with a focus on bridge structural health and performance efficiency. Dr. Khosravi is an active member of the civil engineering society and currently serves as the Chair of the Natural Hazards Engineering Research Infrastructure (NHERI)'s User Forum (UF) Committee.

e. ***Joseph Sopko, PhD, P.E.***

Dr. Sopko is the Director of Groundfreezing for Keller North America and has over 40 years of experience in geotechnical engineering that have been devoted almost entirely to ground freezing and groundwater control. He received his B.S, M.S. and Ph.D. in Civil Engineering from Michigan State University in East Lansing, Michigan. His doctoral research was based on developing new methods for the design of frozen earth structures. He has been responsible for the design, construction and operation for ground freezing projects worldwide for both the civil construction and mining industry. He is retired from the U.S. Air Force where he served as a civil engineering officer in the Air National Guard and was activated for both Operation Desert Shield and Operation Enduring Freedom in Afghanistan.

10. Instructor(s) contact information

a. ***Mike G. Gomez, PhD***

mggomez@uw.edu
(206) 543-7614

b. ***Adam Price, PhD, P.E.; Ryan Nagle, Tim Siegel, P.E., and Lisheng Shao, PhD, P.E., G.E.***

Submitter: Lisheng Shao
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c. ***Jim Gingery, PhD, P.E., G.E.***

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d. ***Mohammad Khosravi, PhD***

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e. ***Joseph Sopko, PhD, P.E.***

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Attachment C – Attendance List

José Clemente (Past Chair)
Armin Stuedlein (Chair)
Chris Woods (Vice Chair)
Silas Nichols
Aaron Gallant
Leon Van Paassen
Brian Metcalfe
Hossein Bahmyari
Kyle Rollins
Jim Colling
Tanner Blackburn
Billy Camp
Matt Glisson
Juan Baez
Lisheng Shao
David Miller
Allen Bowers
Sam Warren
Marty Taube
Antonio Marinucci
Jim Gingery
Allen Cadden
Andres Melo
Theresa Loux
Lyle Simonton
Pavan Akula
Buddhima Indraratna
Chulmin Jung
Fathey Elsaid
Sihyun Kim
Kurt Amidon
Richard Lamb
Scott Anderson
Thomas Taylor
Tim Siegel