U.S. Department of Transportation
Federal Highway Administration

RESEARCH ADVANCES AND IMPLEMENTATION EFFORTS AT FHWA

Presented to the Southeast Geotechnical Engineering Conference
11/19/2024

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4TH ANNUAL KHAMIS HARAMY AWARDS

Presentations for Practical and Innovative Engineering in DOTs and FHWA Federal Lands Divsions

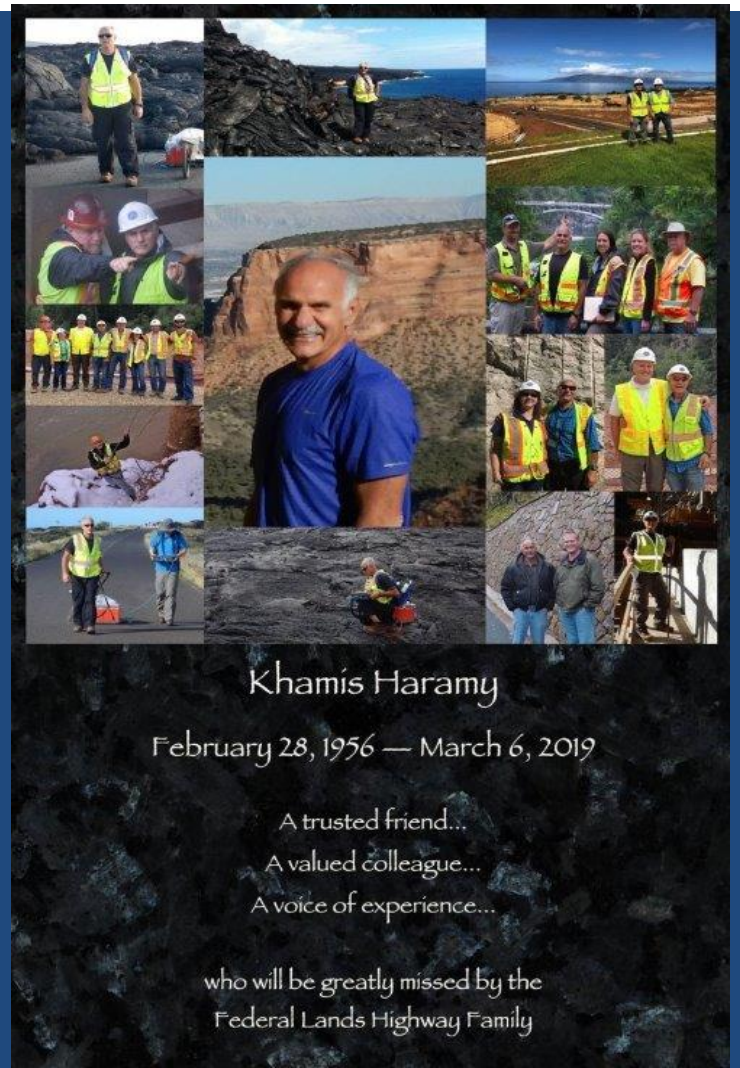
Charlotte NC, 2022

Los Angeles CA, 2023

Dallas TX, 2024

REGIONAL GEOTECHNICAL CONFERENCE PRESENTATION AWARDS

- Celebration of more than 50 years of regional DOT conferences for sharing technology and practice
- Great interest in DOT practice in the international geotechnical community
- Awardees are selected by their peer groups and receive:
  - Full registration to annual international conference (2025 – Geotechnical Frontiers, Louisville KY)
  - Travel to conference funded by the Federal Highway Administrationi
- Presentation purpose is to summarize winning presentation in conference session (18 – 20 minute presentation)



FHWA GEOTECHNICAL PROGRAM

- Broad program with both research and program roadmaps
- Reflects trends and opportunities influencing and impacting the discipline
- Priorities identified through annual Geotechnical Spending Plan
- Roadmap is informed through feedback from State DOTs, FHWA Division offices, industry, and academia

GEOTECHNICAL FOCUS AREAS

- Innovations in Geotechnical Design and Construction Methods
- Advanced Site Characterization
- Geotechnical Asset and Performance Management
- Geotechnics of Scour
- Geotechnical Aspects of Pavement




ACTIVE FHWA EFFORTS

- Evaluation of LRFD Geotechnical Limit States for Structural Foundations
- Identification and Evaluation of Metrics Controlling Tremie Concrete Performance
- Evolution of A-GaME: Geotechnical Site Characterization
- Geotechnical Asset Management
- Geotechnical Data Management
- Next Scour

TRANSPORTATION RESILIENCE - GEOTECHNICAL

Goal is to protect transportation assets

- Assess potential for disruption to transportation systems
- Prevent/accommodate damage
- Management of stressors (e.g., climate, geotechnical hazards)

Research and development approach

- Assess geotechnical hazards as stressors to prioritize those most likely to impact the system
- Management of transportation assets under the impact of stressors (adaptation)
- Management and mitigation of stressors that support adaptation

GEOTECHNICAL REPORTING

- Communication of geotechnical information is changing
  - Alternative contracting methods
  - Digital delivery
- Agencies need to provide geotechnical information that allows contractors to bid in a consistent, informed manner
  - Provide interpretation
  - Communicate risk
  - Address constructability
- Benefits
  - Reduce claims and disputes
  - Reduce contingencies in bid - lower overall price

NATIONAL GEOTECHNICAL EXPERIMENTATION SITE: TAMU

- Decommissioning fully characterized clay and sand test sites
- FHWA is scoping research efforts to address:
  - Gaps in characterizing an aggressive environment for corrosion
  - Tremie concrete performance
  - Site investigation tools and advances in site characterization

Source: Jean-Louis Briaus

IMPROVED LIQUEFACTION HAZARD ASSESSMENTS

- Awarded on a broad agency announcement (BAA) to SWRI – Next Generation Liquefaction (NGL) project
- Initial work to produce probabilistic models for liquefaction susceptibility
- Goal of improved predictive capabilities
- Numerous additional tasks possibly awarded in future

PROGRAM DEVELOPMENTS AND NHI GEOTECHNICAL TRAINING

NHI has consistently been our most important communication and technical assistance mechanism. Currently evolving program to:

- Increase methods and opportunities for accessing and delivering training
- Provide improved technical assistance vehicles
- Provide better consistency in training materials and delivery

CURRENT NHI ACTIVITIES

Web-Based Training

- GEC-2/NHI 132036 – Classification and Selection of Earth Retaining Structures
- NHI 132107 – Geohazards, Extreme Weather Events, and Climate Change Resilience
- NHI 132043 – Design and Construction of Reinforced Soil Slopes (Supplemental Content)

Blackboard Content Development:

- Multi-media Case Histories supporting:
  - NHI 132021 – Driven Piles
  - NHI 132014 – Drilled Shafts

CURRENT NHI ACTIVITIES

Implementation Packages:

- NHI 132101 – Data Management in Geotechnical Engineering
- NHI 132103 – Geotechnical Aspects of Transportation Asset Managements

ILT Course Development:

- GEC-16/NHI 132078 – Micropile Design and Construction (Working Title)
- GEC-3/NHI 132094 – Seismic Analysis and Design of Geotechnical Features and Structure Foundations

E-Book Development (Implementation Training):

- Identification and Evaluation of Critical Design Parameters for Geotechnical Applications

THANK YOU!