

TRIENNIAL STRATEGIC PLAN
TRB Committee AFS30
Foundation of Bridges and Other Structures
Mark Morvant, P.E., Chairman
Evaluation Period: February 1, 2003 to January 31, 2006

PART 1: Committee Name and Scope

Committee Name *	Foundations of Bridges and Other Structures
- Date(s) reviewed	January 24, 2006
- No. of members participating	20
- Change, if proposed **	N/A
Committee Scope *	This committee is concerned with the local and global behavior, stability, and interaction of structural foundations, and their supporting materials, for permanent and temporary transportation structures (bridges, retaining walls, box culverts, buildings, overhead signs, and other transportation structures).
- Date(s) reviewed	January 24, 2006
- No. of members participating	20
- Change, if proposed **	N/A

* Show current

** Show proposed, or Not Applicable

PART 2: Performance Evaluation and Future Goals

To begin, reiterate the committee's future goals **from the previous Triennial Self-Evaluation (TSE) report:**

Using the results of the membership wide survey, the following future goals for A2K03 have been identified.

1. The committee will continue to serve the industry by maintaining diversity in the committee membership, seeking participation with other technical associations, by continued discussion of industry needs, by fostering research and by offering transfer of technology.
2. The Committee's fundamental future goal for A2K03 will continue to be advancing knowledge concerning the nature and performance of foundation related systems by defining research needs, encourage research in those areas, and evaluate research activities and providing a forum for the dissemination of this information to practitioners in the transportation industry.

3. The specific focus of the committee will be:

- i. Auger Cast In Place Piles (ACIP)
- ii. Foundation Design Methods based on Cone Penetrometer Test (CPT) Data
- iii. Load Resistance Factored Design (LRFD) of Foundations
- iv. Advanced Real Time Monitoring of Instrumentation and Installation of Geo-Structures
- v. Implementation and Improvement of the Proposed New Seismic Design Code relative to Geo-Structures
- vi. New Technologies for Foundation/Underground Construction
- vii. Standardization of Geotechnical Exploration of Design Build Projects
- viii. In cooperation with A2C08 establish a subcommittee to address seismic concerns related to foundations

CATEGORY I: TECHNOLOGY TRANSFER

Year	2004	2005	2006
Number of Members in Attendance at Annual Meeting	15	13	20
Number of Visitors in Attendance at Annual Meeting	69	37	48
Number of Sessions * Sponsored/Cosponsored	8	6	4
Number of Presentations ** at Annual Committee Meeting	4	5	5
Number of Papers Reviewed	20	17	14
Number of Papers Presented in Podium Sessions	14	9	4
Number of Papers Presented in Poster Sessions	0	0	3
Number of Papers Published from Podium Sessions	5	5	2
Number of Papers Published from Poster Sessions	0	0	2
Number of Members in Attendance at Mid-Year Meeting	N/A	N/A	N/A
Number of Visitors in Attendance at Mid-Year Meeting	N/A	N/A	N/A
Number of Presentations *** at Mid-Year Committee Meeting	N/A	N/A	N/A
Number of Circulars/State-of-the-Art/etc Published #	0	0	1
Number of TRB Workshops/Specialty Conferences Sponsored/Cosponsored ##	0	1	1
Number of Workshops/Specialty Conferences Cosponsored with Other Organizations ###	0	0	0

* Give Session Title(s), and name of co-sponsoring committee(s) if it applies:

**TRB Annual Meeting Sessions
2004**

- Recent Experiences and Advancements in US and Abroad on the Use of Auger Cast-in-Place Piles: Sessions I & II
- Modeling of Bridge and Foundation Response to Lateral Loading
- Practical Applications of Load Resistance Factor Design for Foundation and Earth Retaining System Design and Construction (AFS30 lead with AFF50 co-sponsorship)
- Advances in Real Time Geo-Instrumentation: Sessions I & II (AFS30 lead with AFS20 co-sponsorship)

- Intelligent Compaction Systems (ASF10 lead with AFS30 co-sponsorship)
- Condition Assessment of Buried Metal Tensioned Elements (AFP40 lead with AFS30 co-sponsorship)

2005

- Geotechnical Database Management Systems, Sessions I & II
- Verification of Foundation Design Methodology with Full-Scale Field Tests, Sessions I & II
- Design of Structures and Foundations for Vessel Collision Loading Conditions, Part 1: Analysis, Design and Strengthening Procedures (AFS30 lead with AFF10 co-sponsorship)
- Design of Structures and Foundations for Vessel Collision Loading Conditions, Part 2, Quantifying Collision Loads, and Soil-Structure Response (AFS30 lead with AFF10 co-sponsorship)

2006

- Performance Evaluations of Soil Structures
- Analytical and Experimental Modeling of Foundation Elements (Poster Session)
- Effective Stress Seismic Site Response Analysis for Liquefiable Ground (AFF50 lead with AFS30 co-sponsorship)

** Give Title(s), Presenter(s), and Year(s) for Annual Meeting Presentations:

Annual Meeting Presentations

2004

- “A Summary Report on Pile Driving Fish Kill Issues and Mitigation”, by Sara Hardyniec. Highlighted Woodrow Wilson Bridge Project, the Artery in Boston and Projects in California.
- “State-of-the-Practice Report on Non-Destructive Testing of Drilled Shafts” by Brian Liebich, Caltrans Senior Engineer and Technical Advisory Panel member, and Sarah Skeen. The report provided a summary of the different methods and the results a comprehensive survey of state DOTs.
- Overview of NCHRP 24-17 "LRFD for Deep Foundations" and NCHRP 21-08 "Innovative Load Testing Systems." Presented by Dr Samuel G Paikowsky
- Update on Soil Nail Launcher Technology, presented by Bob Barrett.

2005

- Update on CHRP 12-66 “AASHTO LRFD Specifications for Serviceability in the Design of Bridge Foundations”, NCHRP Report 507, presented by Dr Samuel G. Paikowsky.
- Update by Mike Adams of FHWA of test program to develop new guidelines for design and construction of geosynthetic reinforced walls and abutments.
- Bob Barrett presented many examples of RSS slopes to illustrate their

successful use and questioned why the system is not used more. He also provided an update on Soil Nail Launcher Technology used for landslide repairs.

- Presentation of project photos and data from several projects showing results from lateral load tests of drilled shafts in State of Ohio by Rick Engel.
- Measurement and evaluation of settlement at bridge approaches by Dr. Zhongie Zhang.

2006

- Research Funding Support by Jim Withiam
- LRFD Calibration Overview by Andrzej Nowak.
- Performance Based Specifications by Dan Brown and Silas Nichols.
- Synthesis Report on Rock Socket Drilled Shafts by John Turner
- Micropile Dynamic Testing by Frank Rausche

Give Title(s):

- **E-Circular E-C079:** *Calibration to determine Load and Resistance Factors for Geotechnical and Structural Design* (September 2005)
 - Tony Allen, Andrzej Nowak, Richard Bathurst

Give Title(s) and Name(s) of co-sponsoring TRB committee(s):

Workshops 2005

Proposed Changes to AASHTO Load and Resistance Factor Design Structural Foundation Specifications (AFS30 lead with AFF10 co-sponsorship)

2006

Use of Cone Penetration Test for Foundation Analysis and Design (AFS30 lead with AFP30 co-sponsorship)

Give Title(s) and Name(s) of co-sponsoring organization(s):

Based on above information evaluate how well the committee has met the Future Goals from the previous TSE report:

AFS30 committee has done an exceptional job in the area of technology transfer. The majority of the goals from the previous TSE report have been met or exceeded through numerous sessions, several workshops and publication of a circular. The specific list of accomplishments directly addressing goals is listed below.

1. Auger Cast In Place Piles (ACIP) – two sessions in held in 2004
2. LRFD of Foundations -2004 session, 2005 workshop & 2005 e-circular

3. Advanced Real Time Monitoring of Instrumentation and Installation of Geo-Structures – two sessions held in 2004
4. In cooperation with A2C08 establish a subcommittee to address seismic concerns related to foundations – est. 2005
5. Foundation Design Methods based on CPT Data – 2006 workshop at annual meeting

Membership Make-up

	North West US*	South West US*	Central US*	North East US*	South East US*	Federal Government
2004-05	1	6	4	5	7	1
2006	7	5	6	4	5	2

	State Government	Local Government	Academia	Consultant	Industry	Other
2004-05	11	0	7	6	0	0
2006	11	0	7	8	0	0

	Women	Non-US & - Canada	Emeritus	Young
2004-05	1	2	1	0
2006	1	1	1	1

* **North West US** = AK, ID, MT, ND, OR, SD, WA, WY; **South West US** = AZ, CA, CO, HI, NM, NV, OK, TX, UT; **Central US** = IL, IN, IA, KS, MI, MN, MO, NE, OH, WI; **North East US** = CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, DC, PR; **South East US** = AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV;

Liaison Membership

We have several AFS30 members that also members of other technical committees within TRB and other organizations. This overlapping of membership allows this committee to keep abreast of priority topics of interest of other committees and organizations as well as develop partnerships for promoting research needs and technology transfer events. On such recent example included the development of the e-circular E-CO79 which was initiated from a need identified by AASHTO T-15 and developed in association with TRB General Structures Committee.

Committee / Society / Organization	Names of Liaison Members
AASHTO T-15 Foundations/Subcommittee on Bridges	Tony Allen
USUCGER /OMAE / ISOPE / Geo-Institute of ASCE	Dr. Sangchul Bang
AFS10 /AFP60 /AASHTO /ASCE Geo-Institute/ DFI / ADSC	James J. Brennan

ASTM / NAGS / ASCE Geo - Institute	Dr. James G. Collin
AFP40 / ASCE Geo-Institute	Dr. Kenneth L. Fishman
ASCE Codes & Standards Pile Foundations / DFI / ACIP, Micropile, Drill Shaft, Seismic / ACI 543-Concrete Piles	Rudolf P. Frizzi
NCHRP	Dr. Daehyeon Kim
AFP30 / NCHRP 12-55	Darin L. Sjoblom
AFS1- / TPF-5(111) / DFI Conference / Geo-Synthetics 2007 Biennial Conference	Corey Bobba

CATEGORY II: RESEARCH NEEDS

Year	2004	2005	2006
Total No. of RNS Posted on TRB Homepage	2	2	3
No. of New RNS included in item above *	0	1	3
No. of RNS Submitted for Funding**	0	1	3
No. of Synthesis Topics Submitted***	0	1	0

Please Note That Rows and Boxes Below Expand As You Enter the Information

<p>Research Needs Statements posted on TRB homepage 2003/2004</p> <ul style="list-style-type: none"> • Innovative Technology and Procedures for Capacity of Open End Cylinder Piles • Reevaluation of Permanent Load Factors for Load and Resistance Factor Design <p style="text-align: center;">2005</p> <ul style="list-style-type: none"> • Innovative Technology and Procedures for Capacity of Open End Cylinder Piles • Calibration of AASHTO LRFD Specifications Considering Loads Transferred to Bridge Foundations <p style="text-align: center;">2006</p> <p>Research needs statements developed at January meeting to be posted on TRB website in 2006 and submitted for funding</p> <ul style="list-style-type: none"> • Performance base design of foundation elements and earth structures for extreme event loadings - sponsor: California DOT • Full scale lateral load tests on rock-socket drilled shafts to aid in developing p-y curves for lateral design – sponsor: Oregon DOT

- Development of Pile Set-up and relaxation for use in Deep Foundation Design - sponsor - Louisiana DOTD

** Give Title(s) **and if funded, give name of funding organization(s):**

**Research Needs Statements submitted to AASHTO for funding
2005**

- Calibration of AASHTO LRFD Specifications Considering Loads Transferred to Bridge Foundations (Submitted to NCHRP by Kansas DOT - funding decision pending)

*** Give titles of Synthesis topics (by year):

**Synthesis Topic Submitted
2005**

Cone Penetration Test Design Methodologies and Practices **-Funded by NCHRP**
(Supported by Louisiana DOTD, Minnesota DOT, Missouri DOT, North Carolina DOT, and Oregon DOT)

Based on above information evaluate how well the committee has met the Future Goals from the previous TSE report:

AFS30 has done a good job in the area of research needs. Many accomplishments have been made in the topic areas established in the previous TSE report. While not directly part of the committee activity, many of the committee members (past and present) have been involved in many of the advances made through research, publication, and implementation. Their involvements in these efforts have been included in meeting discussions and sharing of information. While the committee's past focus before 2005 has been primarily on technology transfer. This past year activities has shown an improvement is effort over previous years including following through with research needs statements and synthesis requests submitted for funding. One particular accomplishment of this effort was the successful funding from NCHRP of the committee's synthesis study request on *Cone Penetrometer Testing – State of Practice*. As noted below in future goals, more effort will be made in the development of new RNS's and seeking support of funding.

CATEGORY III: FUTURE GOALS

Future Committee Goals:

1. The Committee's fundamental future goal for AFS30 will continue to be advancing knowledge concerning the nature and performance of foundation related systems by defining research needs, encouraging research in those areas, evaluating research activities, and providing a forum for the dissemination of this information to practitioners in the transportation industry.

2. The committee will continue to serve the industry by seeking partnerships with other technical associations to determine industry needs, foster research, and offer transfer of technology events. Specifically, the committee will also assess potential for cosponsoring conferences, workshops and training events with other engineering organizations such as AASHTO, DFI, ASCE, COE, etc. The committee will also actively seek support for research by presenting AFS30 research priorities to other organizations.
3. The specific focus of the committee will be:
 - a) LRFD practical implementation, state experience, data collection.
 - b) Optimization of driven pile foundations (soil set-up, high capacity piles, etc.).
 - c) Foundation Systems and ground improvement methods that enhance accelerated construction (CIP piles, micropiles, deep soil stabilization, etc.).
 - d) Field testing and design methodology of shafts in rock sockets.
 - e) Performance based design for extreme events.
 - f) Guidelines for assessing different site conditions.
 - g) Mitigation of defects within deep foundations.
 - h) Evaluation of foundations of Existing Structures (corrosion, unknown Foundations, re-use).
 - i) Research Needs Statements: Ranking of New Research Needs Statements Topics for 2007: Committee members were surveyed to rank RNS topics. The results are as follows:
 - i. Performance base design of foundation elements and earth structures for extreme event loadings
 - ii. Full scale lateral load tests on rock-socket drilled shafts to aid in developing p-y curves for lateral design
 - iii. Development of Pile Set-up and relaxation for use in Deep Foundation Design
3. Development of Circulars: A committee survey was conducted to determine possible topics for development of TRB circulars. The following topics were proposed:
 - a) DOT implementation of LRFD specifications
 - b) Rapid construction techniques for foundations
 - c) QA/QC for deep foundationsThe committee will consider these proposed topics at upcoming meetings to determine priority, need and strategy for development of meaningful circulars.