FUTURE NEEDS ASSESSMENT

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(1) Japanese Delegates

1. Assessment of Soil and Rock Properties

   None

2. Aspects of Construction

   Continuing development of overburden drilling systems, especially in 200 to 300mm range.

3. Aspects of Verification

   Manuals required for QA/QC; materials; load testing

4. Design and Performance

   - Static and dynamic numerical simulations required to judge the suitability of micropiles (single, groups, networks) in seismic conditions.
   - Assessment needed of appropriateness of micropiles for ground improvement (static and dynamic)
   - Investigate movement concerns, for vertically and laterally loaded groups and networks with various inclinations (use beam/spring model for seismic cases).

5. National Standards and Research Programs

   - Study on seismic retrofit by micropiles (JAMP)
   - PWRI study on performance aspects
   - Pile load test program (PWRI - 3/1998)
   - Design and construction manual (PWRI)
   - Pilot construction program
   - National standard (Japanese Road Authority)

6. International Cooperation

   - Very keen to continue via JAMP, FHWA, etc.
   - Propose annual workshop

FUTURE NEEDS ASSESSMENT

(2) European Delegates

1. Assessment of Soil and Rock Properties

   Focus on in situ testing to isolate a few useful indices relating to construction; performance; and some measure of the potential for composite action/interaction.

2. Aspects of Construction

   Utilize current FHWA reports and encourage contractors to practice the emerging technologies.

3. Aspects of Verification

   - Selectively compile standards on material properties.
   - Devise simple load tests on production piles

4. Design and Performance

   - Given that single pile performance is already well understood, group and network studies are now of the highest importance.
   - Horizontal displacement of vertically-loaded piles under seismically-induced lateral forces.
   - Assessment of performance with flexible or stiff elements (also in tension?)

5. National Standards and Research Programs

   - Eurocodes already underway; TC288 (Execution, end 1998); W98 (end 1999); TC250 (5.7 Geotechnical Design).
   - FOREVER (France, end 1999)
   - Finland
   - Germany (Cyclic tests at University of Munich)

6. International Cooperation

   - International Micropile Working Group fully supported (Possibility of next meeting in Germany).

FUTURE NEEDS ASSESSMENT

(3) U.S. Delegates

1. Assessment of Soil and Rock Properties

   Improve data base of soil performance via instrumentation and monitoring

2. Aspects of Construction

   Continue to update current State of Practice via (contractor driven) innovations.

3. Aspects of Verification

   - Develop pile performance database (TC-17).
   - Real time monitoring of drilling and grouting parameters to reduce cost, increase knowledge and reduce reliance on static load tests.
   - Investigate all non-destructive testing methods (e.g., statnamic).

4. Design and Performance

   - Instrument full scale structures (FHWA/DOT).
   - Study CASE 2 options (FHWA/State/Consultants).
   - Study seismic response/interaction with groups/networks.

5. National Standards and Research Programs

   - Goal is national standard under AASHTO (execution ± design), after "shakedown" of FHWA Implementation Manual.
   - Continue FHWA Research (ECO).
   - Continue DFI initiatives.

6. International Cooperation

   - Via International Micropile Workshop
   - TRB session Micropiles (D.C. 1/99 through A2KO3)