AN EDUCATION IN MICROPILES: THE EXPANSION OF THE MARKET IN NORTH AMERICA

ISM 2006

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Scope

- Influence of Various Groups
  1. Specialty Contractors and Suppliers
  2. Federal Government
  3. State Government
  4. Universities
  5. Professional Engineering Societies
  6. IWM/ISM
  7. Trade Organizations
- Summary
- U.S. Model: influence versus market size

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1. Contribution of Specialty Contractors

- First to introduce technology
  - Fondedile '70's
  - Others '80's onwards
- Very active, in order to develop commercial "edge"
  - Design/Build
  - Alternative Foundation systems as Prebid/Postbid Alternatives
- Need more than 2 contractors to give the technology "credibility" in the market
- It's a big country!
  - therefore progress slow generally (and expensive for contractors)
  - requires opening of new "satellite" offices, e.g., Nicholson in Washington 1989 to make major leap
- Danger of "oversell"
- Encouraged participation by suppliers and manufacturers
- Danger of confusing market with plethora of "service mark" names for the product
- Efforts continue, but much comparable effort/resource now devoted to supporting ADSC/DFI, especially in case of equipment and materials suppliers

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2. Contribution of Federal Government (FHWA)

- Funding of 1993-1997 State of Practice crucial
  - increased awareness of micropiles
  - gave uniformity/generic classifications
  - acted as "magnet" for other countries thus encouraging international technical exchange (e.g., Japan, Finland, France)
  - Created nucleus of ISM
- Funding of "Design and Construction Guidelines, Implementation Manual" (2000)
  - cooperative effort between FHWA, contractors, and several state DOT's
  - "practitioner oriented"
  - presented sample plans and specifications (owner controlled and contractor design/build)
- Funding (via ADSC to Geosystems and Schnabel Engineering) of FHWA Short Course (2002-2003)
  - Reference Manual (Implementation Manual)
  - Participant's Manual
  - Instructor's Manual
  - Student Exercises
  - Refined following "Walkthrough" for FHWA (November, 2002) and "Pilot" for WASHDOT June 2003

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- Funding of FHWA/NHI Short Course (2004-Present)
  - Based on previously developed materials and updated by GeoSyntec and DBM (via Ryan Berg & Associates and ADSC)
  - Two-day short course for 30 DOT staff (and invited consultants),
  - So far New York, Colorado, Rhode Island, Michigan, Nevada, California, Pennsylvania
  - Chapter Subjects
    1. Introduction
    2. Classification
    3. Applications
    4. Construction Techniques and Materials
    5. Design: Structural Foundations
    6. Design: Slope Stabilization
    7. Load Testing
    8. Construction Inspection/QC
    9. Contracting Methods
    10. Cost Estimating

    [11. R&D]

    Also contains detailed Slope Stability Calculations; guide construction specification; and sample problems.

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3. Contribution of State Governments

- Slow and irregular usage, except for Massachusetts, New York, California, Washington
- Often "bad experience" due to early contractual/technical difficulties leading to "nervousness" about future use
- Contribution by certain states to "Pooled Fund" Research in early 2000's. Limited results made available to date
- Specific regional response to "nature's wake-up calls," e.g., earthquakes, karst has led to rapid growth of local markets, e.g., San Francisco-Oakland, Los Angeles, Illinois, Eastern Pennsylvania

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4. Contribution of Universities

- Very little on teaching side (lack of teaching materials and subject knowledge)
- Restricted research opportunities, limited by funding (e.g., MICROFOR), encouraged by ADSC (Brown, Loehr)
- Excellent international liaison by Polytechnic University of Brooklyn (FOREVER)
- Increasing number of "overview" and technical papers using published data from practitioners (e.g., Cornell)
- Organization of Ground Engineering Short Courses, including reference to micropiles (e.g., Colorado School of Mines, University of Wisconsin)

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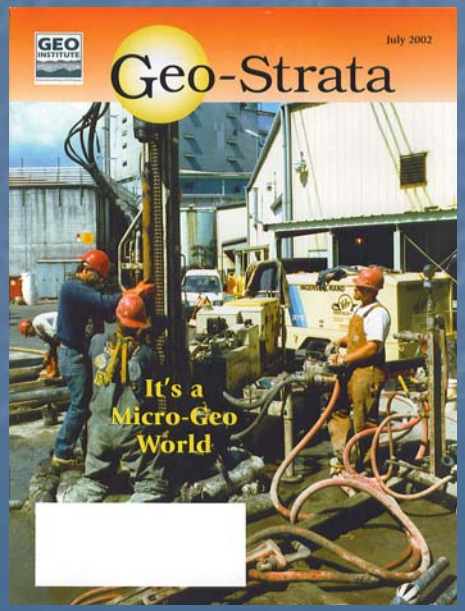
5. Contribution of Professional Engineering Societies

- Limited to ASCE
- National events may (co)sponsor workshops or sessions involving micropiles
- Regional events (for PDHS, CEU's) will often feature presentation on micropiles and have been valuable educational opportunities for contractors and suppliers
- Displays/exhibitions of equipment, materials
- No "Micropile" Committee per se
- Magazines/Publications will often publish papers or articles, e.g., GeoStrata
- Encourage consultants to participate



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6. Contribution of IWM/ISM

- Created focus and attention on micropiles and raised profile
- Gateway to international expertise and experience of direct relevance
- Atmosphere of reduced "commercialism" by contractors, suppliers and manufacturers for mutual benefit (reduced proprietary trends)
- Provided invaluable work products e.g., Proceedings of ISM
- Provided clear "research needs" advice
- Encouraged friendships and collaboration between specialists in all segments (broken down barriers)
- Helped to stimulate new regional markets (e.g., Toronto, Canada)
- Micropile database

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7. Contribution of Trade Organizations

ADSC

- First Committee meeting in 2000, held quarterly thereafter
- First seminar in 2000, held twice per year (alternating with DFI), average 80 attendees
- Sponsor Research/Training
  - in association with FHWA
  - from internal funds (IAF)
- Conferences/Exhibition, e.g., Orlando 2004, GeoCubed 2005
- Faculty Workshop – "teach the teachers"
- Influence FHWA documents, e.g., Implementation Manual, NHI
- Influence Codes of Practice (e.g., AASHTO, UBC , Chicago and California Building Codes
- Sponsor and mentor to IWM/ISM
- Publish papers/articles/ads in magazine
- Organization of AMPIS (every 18 months)
- Provide micropile documents and papers for downloading
- Facilitated exchange between contractors, consultants and suppliers

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DFI

- First Committee meeting in Boston, 1994
- Liaised with FHWA to facilitate first IWM in Seattle, 1997
- Agreed to form Joint Micropile Committee with ADSC in 2002
- Organize own or joint seminars (e.g., Chicago 2003) or conferences (New Orleans 2003)
- Organize sessions at International Conferences (bi-annually)
- Publish papers and articles in magazines (quarterly)
- Developed and published "Guide to Specification Writing" for Micropiles: largely for Private Sector (about 2000)

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Summary of Influence

GROUP	POSITIVES	NEGATIVES
1. Specialty Contractors and Suppliers	• Hungry, active, innovative since 1970's • Fundamental influence from onset	• Over-commercial, confusing
2. Federal Government	• Driven by need • Funding source • Long-term vision	• First serious intervention only in 1993
3. State Government	• "Grass root" teaching opportunity at individual DOT's	• States Pooled Fund Study output • Slow and irregular start.
4. Universities	• Local excellent national and international liaison • Strong "retrospective" papers • Organization of Short Courses	• Little teaching, restricted research
5. Professional Engineering Societies	• Strong local/regional education • Publications/conferences • Avenue for consultants ("Pointy Heads")	• No dedicated committee • Cannot issue "guidelines"
6. IWM/ISM	• Access to national and international knowledge • Increased collaboration, reduced "commercialism" • Research guidelines • Information source	• Funding/growth: "chicken and egg" • Relevance/mission?
7. Trade Organizations	• Strong, active and driven, since 1990's • Well led and relevant • Platform for knowledge distribution • Research funding • All business segments	• Protectionism/commercialism • Levels of commitment needed by participants

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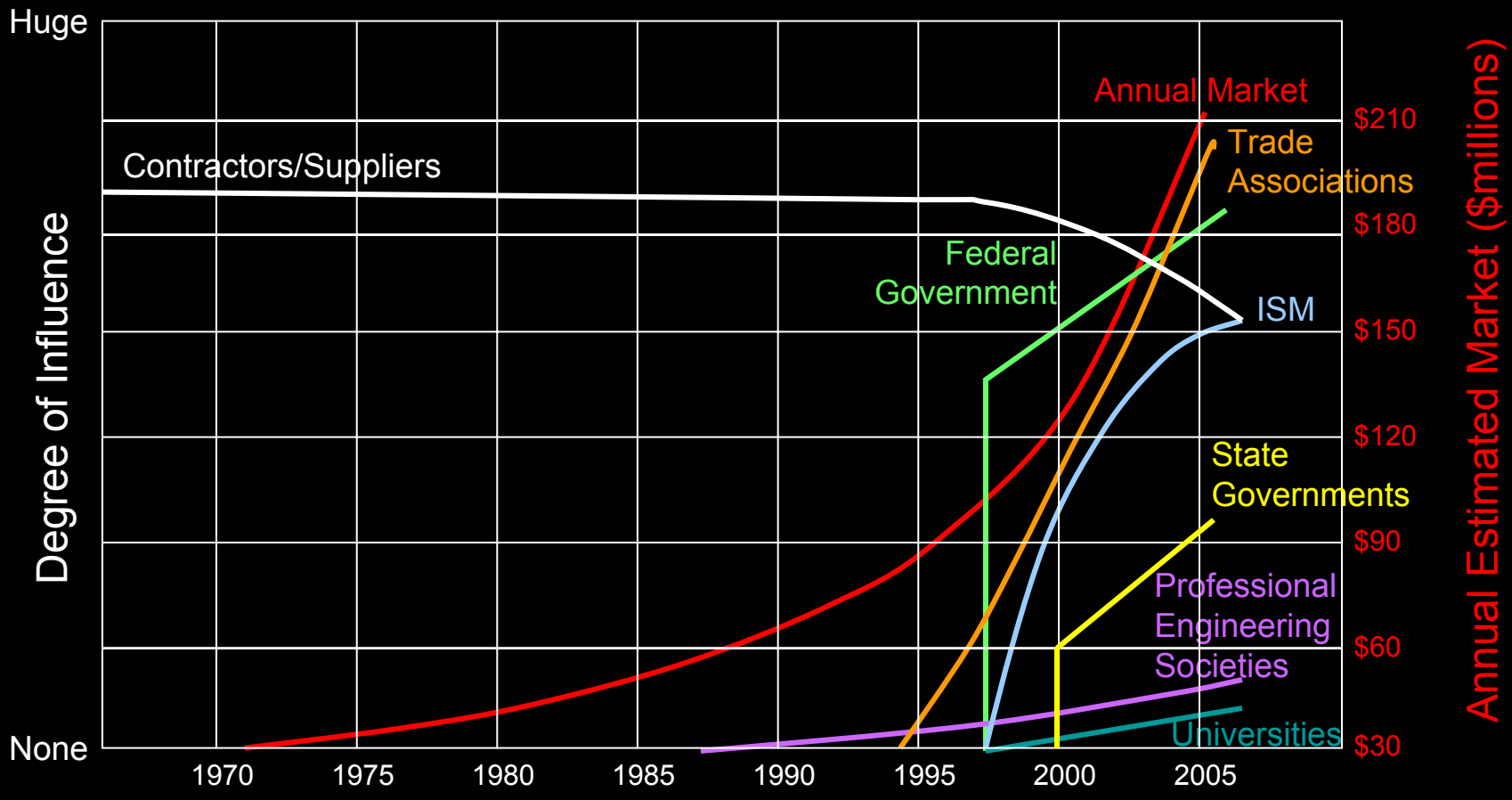
Huge
None
Degree of Influence
Contractors/Suppliers
Annual Market
Trade Associations
Federal Government
ISM
State Governments
Professional Engineering Societies
Universities
1970
1975
1980
1985
1990
1995
2000
2005
$210
$180
$150
$120
$90
$60
$30
Annual Estimated Market ($millions)

The U.S. Model

The Challenge

It would be of great value to ISM and its members to have a similar model developed for each country active in micropiles.

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