

## SEPTEMBER 2005 MEETING

Wednesday, September 23, 2005

### TECHNICAL PROGRAM

#### **Paper No. FPA-SC-08 Presentation, "Guidelines for the Specification of Precast Concrete Segmented Piles For Foundation Underpinning"**

**Speaker:** Mr. Karl Breckon, P.E. with BEC Engineering, FPA Board Member, FPA-SC-08 Subcommittee Chair. Mr. Breckon graduated from Iowa State University with a B.S. in Construction Engineering in 1980 and worked for 14 years building major refinery, chemical, manufacturing, petrochemical, and bridge and road works projects all over the world. In 2002 Mr. Breckon started BEC Engineering with a partner to service the foundation repair and foundation construction industry, including consulting for residential and light industrial projects. He is Texas licensed professional engineer and a member of the Texas Society of Professional Engineers, American Society of Civil Engineers, the National Society of Professional Engineers, and currently serves as a board member of the Foundation Performance Association.

### PRESENTATION SUMMARY

To an audience of about 40, Mr. Breckon presented his subcommittee's paper entitled, "Guidelines for the Specification of Precast Concrete Segmented Piles for Foundation Underpinning," which successfully completed FPA Peer Review in July 2005.

Mr. Breckon discussed the scope of the guideline, which addresses design, manufacturing, and installation recommendations of pre-cast concrete segmented piles, commonly used for foundation underpinning of existing residential and other low-rise structures. The guideline addresses both interconnected and non-interconnected systems. He defined this type of repair element as a driven displacement pile that relies primarily on skin friction and which is commonly designed to resist downward movement (i.e., settlement or subsidence, not heave) only.



Mr. Breckon said the document was intended to help an owner ensure that repair contractors hired to raise their foundation meet certain minimum recommended standards, including:

- they should follow the 15 ASTM standards listed
- they should employ a licensed professional engineer to design the pile layout
- they should maintain maximum pile spacings of 6 - 8 ft depending on the building height
- they should make certain submittals to the owner, such as initial and final elevation surveys, pile-driving records, engineered design drawings, safety program, material test certificates, QA/QC documents, and evidence of their experience.
- they should use precast segments meeting certain tolerances for diameter, length, concentricity, hole locations, end-bearing surface flatness, and end-bearing surface cants.

Minimum warranty guidelines presented in the paper include:

- 10-year warranty period from substantial completion
- Warrant to protect against downward movement only
- Warrant repairs of landscaping and architectural finish damages if repairs of those damages were included in the original contract

Minimum material requirements given in the paper include:

- 28-day compressive strength of 5000 psi for the concrete
- Grade 60 steel if deformed bars are used for interconnection
- Galvanized 7-wire cable if cable is used for interconnection
- Minimum 1/8" thick shims, but they need not necessarily be steel

37 recommended installation steps were given in the paper, including:

- Perform an under-slab plumbing leak test before and after lifting
- Provide groundwater and surface water control
- Sever builder's piers after driving the piles, but before lifting the foundation
- Drive one pile at a time unless they are more than 25 ft apart
- No pre-drilling allowed (unless approved by the engineer)
- Remove or abandon piles that meet refusal prior to the engineer's minimum-specified depth, where refusal is defined as the point where the foundation elements at the pile are lifted 0.25" - 0.5" above it pre-piled elevation.
- Perform a final elevation survey within 12 ft of piles
- Restore landscaping

To download Mr. Breckon's slide presentation, [click here](#).

To download the subcommittee's document no. FPA-SC-08-0, [click here](#).

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