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September 15, 2009

Mr. Michael O'Reardon, Regional Manager
ICC Evaluation Service, Inc.
Birmingham Regional Office
900 Montclair Road, Suite A
Birmingham, AL 35213

Dear Mr. O'Reardon:

RE: AC49 Proposed Revisions to the Acceptance Criteria for Molded Plastic Footing Pads, Subject AC49-1009-R1 (MO/BG)

I am writing in response to your September 1, 2009 letter in which you requested input and testimony from the NFBA and other interested parties to clarify the following concern:

"Design procedures for post frame building systems for uplift and lateral loads for the molded plastic footings that do not have a positive connection to the post. Since the definition proposed in Section 1.4.3 implies that all loads will be transferred to the foundation by the posts, it is unclear how a complete load path for lateral and uplift loads is accomplished, since the subject footing pads are evaluated for vertical download capacity only."

ASAE/ANSI EP 486.1 (2000), Shallow Post Foundation Design, is a reference standard in the 2006 IBC (page 558, IBC 2006). This engineering practice documents clearly how the embedded post transfers the lateral loads to the soil independent of the footer pad (Figures 2 through 6, EP 486.1). The same engineering practice also documents how the embedded post with an attached concrete collar, or attached preservative treated wood cleats, near the bottom of the post develops the required uplift resistance independent of the footer pad (Figures 9 and 10, EP 486.1). Thus, the primary function of the molded plastic footer pad is to resist the downward vertical loads. The lateral loads are resisted directly by the soil embedment above the footer pad. The vertical uplift loads are resisted by the mass of the cone of soil directly above the concrete collar or preservative treated wood cleats attached to the post.

I trust that this explanation resolves your concerns. If you have questions or require further information, please contact me at hmanbeck@psu.edu or at 814-933-2269.

Sincerely,

Harvey B. Manbeck

Harvey B. Manbeck, P.E.
Technical Director

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September 17, 2009
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Mr. Michael O'Reardon, Regional Manager
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Birmingham, AL 35213

SUBJECT: Response to Proposed Revisions to the Acceptance Criteria for Molded Plastic Footing Pads, Subject AC49-1009-R1 (MO/BG)

Dear Mr. O'Reardon:

Regarding Proposed Revision 2b:

The settlement of an individual footer, which is assessed in the Acceptance Criteria, and the amount of settlement a structure can tolerate are two fundamentally different parameters. When considering an overall structure it is not the total settlement that is of importance but the *differential* settlement. As a result, large settlements in a structure can usually be tolerated if they are similar in magnitude at all parts of a foundation (Donald W. Taylor, *Fundamentals of Soils Mechanics,* Wiley, 1967, p 606).

The bearing capacity of soil is the average contact stress between a foundation and the soil which will cause shear failure in the soil. Allowable bearing stress is the bearing capacity divided by a factor of safety. Sometimes, on soft soils, large settlements may occur under loaded foundations without actual shear failure occurring; in such cases, the allowable bearing stress is determined with regard to a maximum allowable settlement, which is set at ¾-inch in the case of the Acceptance Criteria.

On the issue of total settlement verses differential settlement, Samuel E. French writes in *Design of Shallow Foundations,* ASCE Press, 1999, p 207:

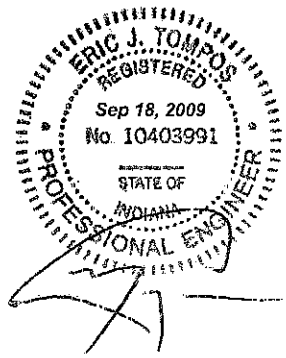
> ...The structural analysis is therefore concerned only with differential settlements, not with total settlements. In a group of footings, if the settlement of the footing that settles most is limited to 1", the differential settlement between any two footings in the group can be expected to be somewhat less than 1", say a maximum of ¾". ...There are hundreds of combinations of differential settlements that might occur in a routine structure. If however, the differential settlements are less than about ¾", the change in total stress in any of the structural members due to any reasonable combination of loads can be expected to be less than about 15% of the total. For this amount, a separate analysis for potential differential settlements is not usually considered to be necessary and is rarely performed in practice.

Extending French's example to the Acceptance Criteria settlement limit of ¾-inch, a structure utilizing such foundation elements would have less than ¾-inch differential settlement. And, as suggested by French, the resulting change in stress would be of a magnitude *not* requiring consideration by the designer.

Experience has shown that timber frame structures, especially post-frame structures, are more tolerant of differential settlements than more rigid types of construction, such as masonry. There is a wealth of anecdotal evidence relating incidents of a bearing post being removed either by accident or ignorance and the structure bridging the defect until repairs could be made.

In conclusion, it is my judgment that the proposed testing limit is a prudent and conservative test criteria which will keep *differential* settlements within tolerable limits.

Regards,



Eric Tompos, S.E , P E.
Vice President
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