Technical Bulletin

FROM SPEIGHT, MARSHALL & FRANCIS, P.C.

Structural Engineers
August 1997
Bulletin No. III

On a regular basis, we plan to distribute these informational leaflets about crucial - but often ambiguous - structural engineering topics. With the knowledge of our featured subjects, our goal is to help our clients improve their profitability while reducing their liability. We suggest distributing a copy of our technical bulletins throughout your office and keeping them on hand for quick reference.

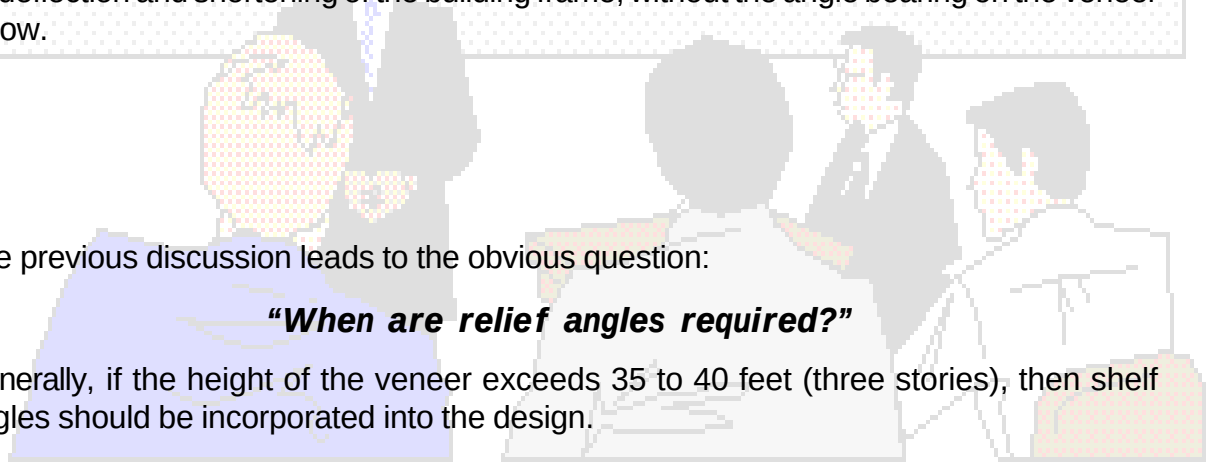
MASONRY RELIEF ANGLES

Introduction:

Recently we were asked our opinion on the need to provide for vertical expansion of brick in a multistory building. The need for vertical control joints to account for horizontal expansion of clay masonry products is generally well understood. However, the need to provide horizontal joints to account for *vertical expansion of clay masonry* is considerably less understood.

Discussion:

As discussed in our previous "Technical Bulletins," clay brick expands vertically as well as horizontally. Continuous steel relief angles are used at the roof and floors of taller structures to account for the vertical expansion. These shelf angles are connected to and are supported by the floor and/or roof structure. Shelf angles must be installed with a "soft joint" between the bottom of the angle and the top course of masonry below. This allows for differential expansion and contraction of the veneer and the structure to occur, as well as deflection and shortening of the building frame, without the angle bearing on the veneer below.



The previous discussion leads to the obvious question:

"When are relief angles required?"

Generally, if the height of the veneer exceeds 35 to 40 feet (three stories), then shelf angles should be incorporated into the design.

SPEIGHT MARSHALL & FRANCIS, P.C.

Architectural aspects:

There are several architectural issues that must be addressed when relief angles are incorporated. Some are as follows:

1. Flashing and weepholes must be installed to collect moisture and direct it to the outside. The Brick Institute of America (BIA) has published recommendations regarding these issues and we highly recommend that they be followed.
2. Visually the uses of relief angles require special detailing to account for the increase in the width of the horizontal joint. This effect can be "softened" by using bands of contrasting colored units, recessed or projecting courses, or belt courses of special shaped units.

Conclusions:

Failure to incorporate veneer relief angles to account for vertical expansion can cause significant problems. Leaks and cracks in windows and roofs can result from uncontrolled vertical expansion of veneer. Veneer relief angles are important items that must be addressed at the beginning of a project, since they do impact the aesthetics of the building.

It is imperative that your Structural Consultant assist in determining the need and locations of relief angles. We highly recommend that you become familiar with the BIA recommendations regarding this subject.

Please keep in mind that the items discussed in this issue of our "Technical Bulletin" represent a small part of this topic.

Call us! *We are available to conduct group seminars for your firm on any subject presented in our "Technical Bulletins." Use our expertise to your firm's advantage!*

O **SPEIGHT, MARSHALL & FRANCIS, P.C.**
2000 General Booth Boulevard, Suite 205
Virginia Beach, Virginia 23454

F **(757) 427-1020**
fax: (757) 427-5919

e mail: smandf@exis.net