



## Design Tips

Technical Bulletin #34

### SEISMIC CONSIDERATIONS

Seismic and wind load are the principal live loads which are considered in designing masonry walls. Seismic loads may be a major, minor or inconsiderable factor in wall design, depending on the geographical location of the structure. Seismic zones, ranging in severity of effects to be considered, from a low of 0 to a high of 4, are delineated on maps in all major building codes. All buildings in seismic zones 1 through 4 must be designed in accordance with the appropriate code provisions.

Cast Stone elements are usually set in place in or on the structure as trim or veneer and as such, they do not normally add to or detract from the seismic resistance of the structure. The two critical design considerations with Cast Stone use in seismic areas are:

1. Use an anchoring system which will ensure that the Cast Stone remains an integral part of the wall. (Refer to pages C21, C25, C27, C35, & C41 of the CSI Technical Manual.)
2. Use an anchor and jointing design which allows a maximum of racking of the structure without stressing the Cast Stone units. (Refer to page C21 of the CSI Technical Manual.) With all stone to unit masonry joints caulked with elastomeric sealant over backer rod.

When Cast Stone is used as a structural lintels or as a complete ashlar veneer system anchored to the structure, design should be in accordance with local building codes, ACI 318 and ACI 533. (Refer to pages C37, C39, & C41 of the CSI Technical Manual.)

References on masonry design for seismic forces include the National Building Codes and:

1. Reinforced Masonry Engineering Handbook by James E. Amrhein, 4th edition 1988, published by Masonry Institute of America (ISBN 0-94-116-05-07) pages 31, 42, 44, 46, 61 and 188.
2. Masonry Structures - Behavior and Design by Drysdale, Hamid and Baker, 1994 published by Prentice Hall (ISBN 0-13-562-26) pages 76, 677, 688 and 728.
3. Reinforced Masonry Design by Scheider and Dickey, 1987 published by Prentice Hall (ISBN 0-13-771776-1 04) page 459.
4. National Concrete Masonry Association Tek Notes No. 109, 1979 and No. 109A, 1989.

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