

U.S. Fire Administration / National Fire Academy

# Coffee Break Training

## Topic: Building Danger Signs

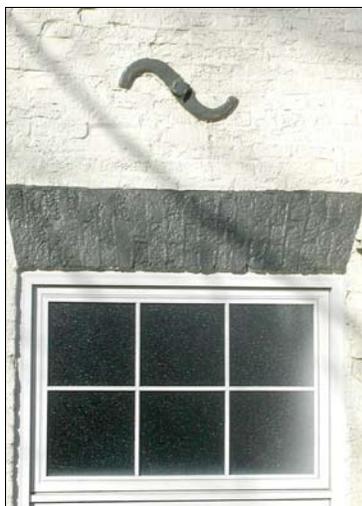
**Learning objective:** The student shall be able to identify one means of structural reinforcement in masonry construction.

The “S”-shaped anchor above the window’s brick lintel is an indicator that every fire fighter should know about potential structural problems in this building.

The sculpted iron is the anchor of a tie rod that runs through the exterior masonry wall, and attaches either to a beam or to a similar anchor on the outside of the opposite wall. The tie rod configuration is designed to “cinch” the exterior walls toward the center and provide stiffening.

This bracing technique is common in old, unreinforced masonry buildings. The anchors may consist of ornamental-like stars, circles, diamonds, squares or some other shape that transfers the tensile stresses from the tie rods to the wall surface through which they are run.

The iron rod or cold-drawn steel cable that pulls the exterior walls toward alignment may be exposed to the room in which they are run. In that case, a room and contents fire could heat the steel to its yield point where it will begin to fail. Depending upon the steel’s composition, the yield point could be as low as 800 °F to 1,300 °F (427 °C to 704 °C).



Firefighters conducting preincident planning or sizing up an active incident should pay particular attention to these ornaments. They are a critical indicator that the exterior walls—and the entire building—may not be structurally sound and could collapse when stressed.

Likewise, where possible, inspectors should look at the connections inside and out to verify that the braces are still attached to the structural member or opposite wall as they were intended. Damaged, loose, missing, or other compromised tie rods and their anchors should be reported to the property owner and the building official for followup repairs. In some instances, a structural engineer’s assessment and report may be necessary to evaluate the building’s integrity.

For additional information, refer to *Brannigan’s Building Construction for the Fire Service*, Fourth Edition, published by the National Fire Protection Association.