6.3 Architectural Components

6.3.6 Canopies, Marquees, and Signs

6.3.6.1 Canopies, Marquees, and Signs

Cantilevered appendages of any type may pose a significant falling hazard when located above an entrance or along a sidewalk or street.

Provisions

BUILDING CODE PROVISIONS

ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures* (ASCE, 2010) classifies canopies, marquees, and signs as "Appendages and Ornamentations." Both the anchorage of the component and the structure of the component itself must be designed for gravity, wind, and seismic loads. Special consideration of the vertical response of components that cantilever from the structure is necessary. ASCE/SEI 7-10 specifies a vertical force component that is applied concurrently with the lateral design force for design.

RETROFIT STANDARD PROVISIONS

ASCE/SEI 41-06, *Seismic Rehabilitation of Existing Buildings* (ASCE, 2007) classifies canopies, marquees, and signs as force-controlled. Compliance with the requirements of the standard is required for all performance levels in areas of high, moderate, and low seismicity. Free-standing marquees are subject to the requirements of ASCE/SEI 41-06. Canvas or fabric covered projections are not subject to the rehabilitation requirements. If the performance level is Hazards Reduced and the component is located in areas of public occupancy or egress, it must meet the Life Safety performance level.

Typical Causes of Damage

- Unbraced cantilevered items may bounce or swing; connection hardware may be undersized or corroded; items may collapse and fall.

DAMAGE EXAMPLES

Figure 6.3.6.1-1 Failure of commercial sign in the 1979 Imperial Valley, California earthquake (Photo courtesy of Robert Reitherman).

Figure 6.3.6.1-2 Reinforced concrete appendage dangling from connection on one side; impact damaged the curtain wall and created a serious hazard above the entrance of the Corte de Apelaciones de Talca in the 2010 magnitude-8.8 Chile Earthquake (Photo courtesy of Eduardo Fierro, BFP Engineers).

Seismic Mitigation Considerations

- Anchorage detail shown is for a cantilevered canopy, sign, or marquee that is oriented horizontally; the vertical braces protect the item from vertical accelerations and prevent bouncing.
- Seismic protection of building appendages requires a reliable connection from the appendage to structural framing members. Heavy canopies, marquees, or signs may require installation of supplemental framing to deliver seismic demands to primary structural framing elements.

MITIGATION DETAILS

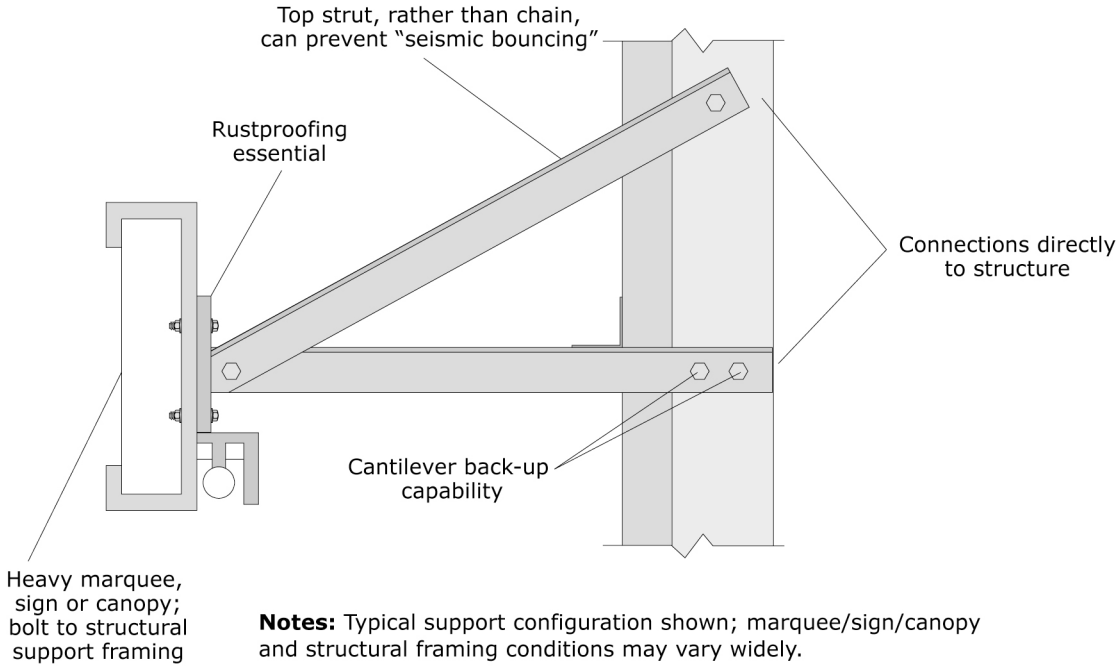

Figure 6.3.6.1-3 Canopy, marquee, or sign support (ER).