6.3 ARCHITECTURAL COMPONENTS

6.3.1 EXTERIOR WALL COMPONENTS

6.3.1.1 ADHERED VENEER

Adhered veneers are typically thin materials such as tile, masonry, stone, terra cotta, ceramic tile or stucco that are attached to a backing substrate using an adhesive. These may pose a significant falling hazard.

TYPICAL CAUSES OF DAMAGE

- Adhered veneers are generally deformation sensitive and may crack or become dislodged due to deformation of the backing substrate. Adhered veneers placed directly over shear walls or structural elements that are designed to undergo large deformations may be particularly vulnerable.
- Poorly adhered veneer may come loose due to direct acceleration. This may be a particular problem where the adhesive bond has deteriorated due to water intrusion or degradation of the backing substrate.

Damage Examples

Figure 6.3.1.1-1 Failure of adhered masonry veneer at the Atascadero City Hall in the 2003 magnitude-6.5 San Simeon Earthquake (Photo courtesy of Mike Mahoney, FEMA).

Figure 6.3.1.1-2 Close-up of failed adhered veneer. (Photo courtesy of Eduardo Fierro, BFP Engineers).

Figure 6.3.1.1-3 Cracked and spalled adhered veneer reveals incipient structural damage to concrete piers in Viña del Mar following the 2010 magnitude-8.8 Chile Earthquake. In this case, the areas of structural and nonstructural damage coincide; the adhered veneer remained intact over portions of the shear wall that did not deform significantly (Photo courtesy of Santiago Pujol, Purdue University).

Figure 6.3.1.1-4 Failed adhered veneer fallen from parapet in Santiago following the 2010 magnitude-8.8 Chile Earthquake. (Photos courtesy of Antonio Iruretagoyena, Rubén Boroscheck & Associates)

SEISMIC MITIGATION CONSIDERATIONS

- Repair any cracked or loose veneer; repair any damage or deterioration of the backing substrate.
- Remove adhered veneer above exits or pedestrian walkways, especially larger units if they are mounted above 10 feet.
- Design a structural canopy to resist the weight and impact of falling veneer; particularly above exits or walkways.
- Restrict pedestrian access below the veneer by providing a barrier or wide landscaping strip.
- Provide positive connections to attach the veneer to the structure; see Figure 6.3.1.2-5, in the Anchored Veneer example or Figure 6.3.3.1-3 in the Interior Veneer example.

Mitigation Examples

Figure 6.3.1.1-5 Landscaping strip restricts pedestrian access adjacent to adhered veneer façade. Larger units used within lower 6 feet; smaller units used above (Photo courtesy of Cynthia Perry, BFP Engineers).

MITIGATION DETAILS

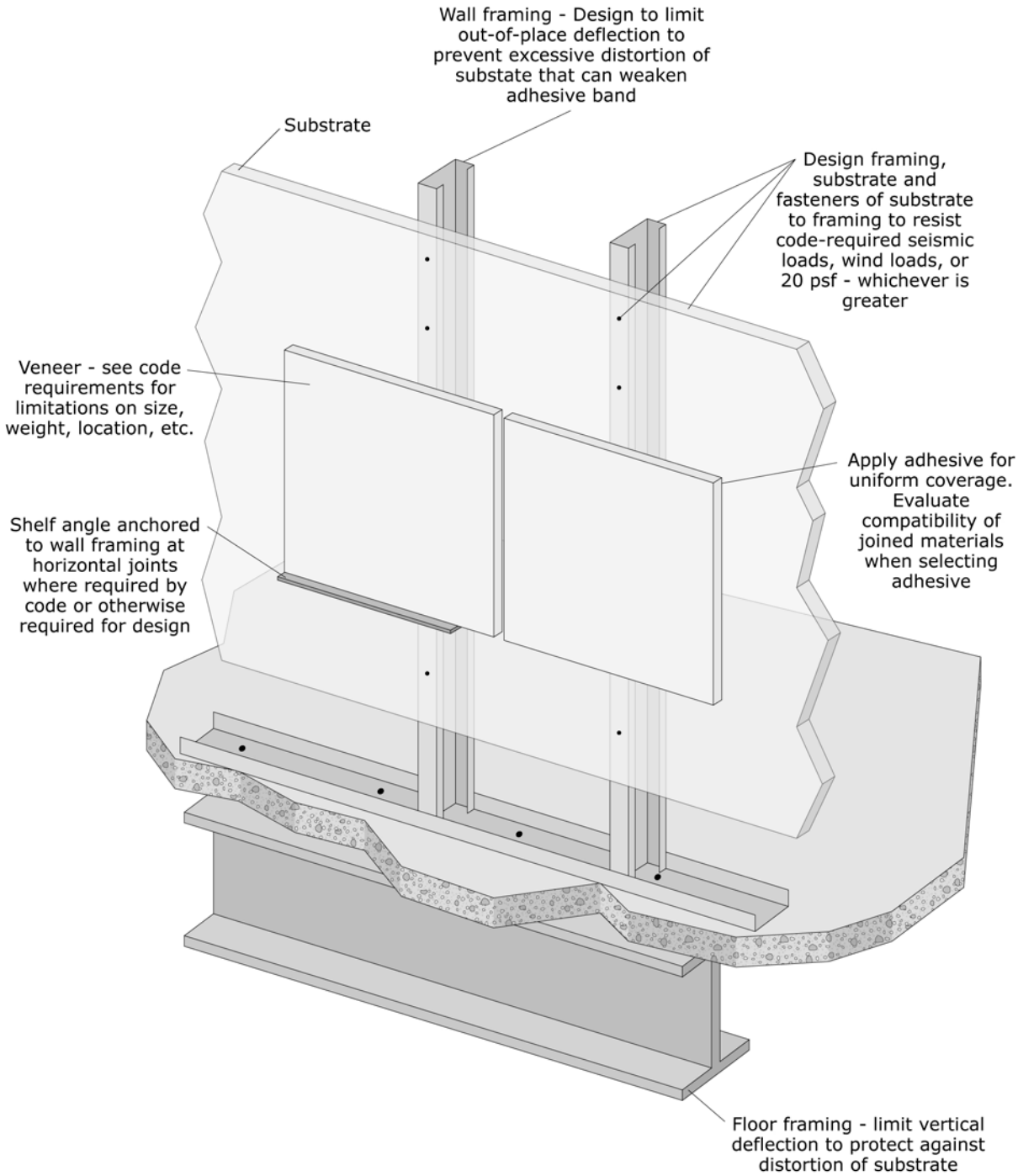

Figure 6.3.1.1-6 Adhered veneer (ER).