designated seismic equipment itself may pose a significant hazard. For active designated seismic equipment, failure of structural integrity or loss of function are to be avoided.

Examples of active designated seismic equipment include mechanical (HVAC and refrigration) or electrical (power supply distribution) equipment, medical equipment, fire pump equipment, and uninterruptible power supplies for hospitals.

Evaluating post-earthquake operational performance for active equipment by analysis generally involves sophisticated modeling with experimental validation and may not be reliable. Therefore, the use of analysis for active or energized components is not permitted unless a comparison can be made to components that have been otherwise deemed as rugged. As an example, a transformer is energized but contains components that can be shown to remain linearly elastic and are inherently rugged. On the other hand, switch equipment that contains fragile components is similarly energized but not inherently rugged, and therefore cannot be certified solely by analysis. For complex components, testing or experience may therefore be the only practical way to ensure that the equipment will be operable following a design earthquake. Past earthquake experience has shown that most active equipment is inherently rugged. Therefore, evaluation of experience data together with analysis of anchorage is adequate to demonstrate compliance of active equipment such as pumps, compressors, and electric motors. In other cases, such as for motor control centers and switching equipment, shake table testing may be required.

As a rule of thumb, active mechanical and electrical equipment to be considered under Section 13.2.2 can be limited to equipment that contains an electric motor greater than 10 hp or heat transfer capacity greater than 200 MBH. Components with lesser motor hp and thermal exchange capacity are generally considered to be small active components and are deemed rugged. Exceptions to this rule may be appropriate for specific cases, such as elevator motors that have higher horsepower but have been shown by experience to be rugged. Analysis is still required to ensure the structural integrity of the nonactive components. For example, a 15-ton condenser would require analysis of the load path between the condenser fan and coil to the building structure attachment.

C13.3.2 Seismic Relative Displacements

The design of some nonstructural components that span vertically in the structure can be complicated when supports for the element do not occur at horizontal diaphragms. The language in Section 13.3.2 was previously amended to clarify that story drift must be accommodated in the elements that will actually distort. For example, a glazing system supported by precast concrete spandrels must be designed to accommodate the full story drift, even though the height of the glazing system is only a fraction of the floor-to-floor height. This condition arises because the precast spandrels will behave as rigid bodies relative to the glazing system and therefore all the drift must be accommodated by anchorage of the glazing unit, the joint between the precast spandrel and the glazing unit, or some combination of the two.

C13.4.2.3 Post-Installed Anchors in Concrete and Masonry

Post-installed anchors in concrete and masonry should be qualified for seismic loading through appropriate testing. The requisite tests for expansion and undercut anchors in concrete are given in the ACI standard ACI 355.2, *Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary*. Testing and assessment procedures based on the ACI standard that address expansion, undercut, screw and adhesive anchors are incorporated in ICC-ES acceptance criteria AC193, *Acceptance Criteria for Mechanical Anchors in Concrete Elements* and AC308, *Acceptance Criteria for Post-installed Adhesive Anchors in Concrete Elements*. For post-installed anchors in masonry, seismic prequalification procedures are contained in ICC-ES acceptance criteria AC01, *Acceptance Criteria for Expansion Anchors in Masonry Elements* AC58, *Acceptance Criteria for Adhesive Anchors in Masonry Elements* and AC106, *Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements*.

C13.4.6 Friction Clips

The term *friction clip* is defined in Section 11.2 in a general way to encompass C-type beam clamps, as well as cold-formed metal channel (strut) connections. Friction clips are suitable to resist seismic forces provided they are properly designed and installed, but under no circumstances should they be relied upon to resist sustained gravity loads. C-type clamps must be provided with restraining straps, as shown in Fig. C13-1.

C13.5.6.2.2 Seismic Design Categories D through F Typical splay wire lateral bracing allows for some movement before it effectively restrains the ceiling.