

The Seismic Code Requirements for New Equipment Systems in Existing Buildings



New Equipment components are non-structural elements in a building which can apply new or altered forces to the structural system during a seismic event. Studies of past earthquakes have shown failures of nonstructural components during an event may result in injuries or fatalities, cause costly property damage to buildings and their contents; and force the closure of residential, medical, manufacturing facilities, businesses, and government offices until appropriate repairs are completed.¹ This paper will discuss New Equipment Systems and their relationships to Existing Building Structures, New Additions and Change in Occupancy.

Existing building commissioning (EBC) is a quality-focused process for attaining the current facility requirements (CFR) of an existing facility and its systems and assemblies. The process focuses on planning; investigating, implementing, verifying and documenting that the facility's systems and assemblies are operated and maintained to meet the current requirements. This process ensures that the system enhancements are properly maintained for the remaining life of the building. An existing building commission's effort should include updating or developing the owner's facility requirements, documenting existing systems, surveying the facility to identify operational inefficiencies, quantifying and prioritizing the inefficiencies found to determine how to optimize equipment and operation, and then verify with ongoing measurements that the Existing building commission process produces its desired effect.²

New additions and modifications made to existing structures must comply with current local Building code requirements. They become effective when property owners who alter or add to an existing building adhere to the regional code. As a result, requirements for permits have

become a common practice. As part of the permit application process, building plans are subject to review for compliance with current codes for that jurisdiction. Generally, building codes are not retroactive except to correct an imminent hazard.³

The applicability of codes and/or specific requirements may become subject to amendments as specified by the governing authority for each regional area.

Municipalities may limit building code application to fire safety, disabled access or structural integrity. Some may apply an economic practicality test and finally other districts may exempt buildings for special use or structures that possess historical and architectural significance. Although such statutes address existing conditions, they do not criminalize or seek to punish past conduct. These requirements are put in place to prohibit maintenance on or prolong the life of unsafe HVAC systems which may create unsafe conditions to the public.⁴

Alterations and additions to an existing building must usually comply with all new requirements applicable to the scope of work as related to the intended use of the building as defined by the adopted building code. Alterations and repairs should be such that the existing building's new equipment conforms to the provisions of the IBC and does not reduce the performance below that of the existing building or structure prior to alteration. (Section 101.2 Scope, International Existing Building Code 303.1). Minor additions of new equipment and alterations to existing mechanical systems may be installed in accordance with current building code and may be observed at the time of installation, by the building official. Additions, alterations or repairs shall not cause an existing system to become unsafe, or create unhealthy or overloaded conditions.⁵

Not all existing buildings are exempt from new system requirements, especially those considered essential to achieve life safety or any general welfare objectives of the adopted building code region.

Contingencies apply to buildings and facilities designated as historic structures that undergo alterations or change of occupancy, unless technically unalterable. When compliance with the requirements for new equipment threaten or destroy the historic significance of the building or facility, as determined by the applicable governing authority, the alterations requirements for that element may be omitted.⁶

A Change in Occupancy Category usually changes the applicability of code requirements and will subject the building to review by the building official for compliance with the current

Applicable codes. No change will be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancy or in a different group of occupancies, unless the building is made to comply with the requirements of the IBC code for such division or group of occupancy.

Subject to the approval of the building official, the use or occupancy of existing buildings may be permitted to be changed and the building may be allowed to be occupied for purposes of other groups without conforming to all the requirements of the building code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the original use.⁷

Mechanical systems that are part of any building or structure undergoing a change in use or occupancy, as defined in the Building Code, will comply with the requirements of this building code so that the structure will have a new use or new occupancy status.⁸

Any additions, alterations, renovations or repairs to mechanical installations should conform to the Mechanical Code of the buildings jurisdiction without requiring the existing installation to comply with all of the requirements of the current code. The changes or repairs must not cause an existing installation to become unsafe, hazardous or overloaded.⁹

When building owners adhere to the jurisdictional building code set forth by the governing body, the outcome can only be positive. Fatalities, property damage and repair costs will be drastically reduced in the event of a significant seismic event.

References:

¹ [FEMA E-74 Reducing the Risks of Nonstructural Earthquake Damage Chapter 2 Behavior of Non-structural Components Section 2.4 Importance of Non-Structural Damage Page 2-12 last modified 2012.](#)

² [ASHRAE 2015 Handbook HVAC Applications HVAC Commissioning Chapter 43.13. Section 3.3 Existing buildings.](#)

³ [2012 International Building Code, International Code Council, Country Club Hills, IL, 2011 Chapter 34 Existing Buildings and Structures Section 3403.1 Page 569.](#)

Note: Action to remove Chapter 34, Existing Structures from IBC 2015 was taken during the 2012 code development process. The provisions of this chapter can be found in the International Existing Building Code, Section 101.4.7.

⁴ [FEMA E-74 Reducing the Risks of Nonstructural Earthquake Damage Chapter 4 Non-Structural Risk Reduction for Existing Buildings Chapter 4 Section 4.0 and 4.1 Damage Page 4-1 last modified 2012.](#)

⁵ [Seattle Washington Existing Building Code, Revised 4/13/16 following portion of the 215 International Building Code Published by the International Code Council Chapter 1 Section 101.4 Page 2.](#)

⁶ [2012 International Building Code, International Code Council, Country Club Hills, IL, 2011 Chapter 34 Historic buildings Section 3411.9 Page 575](#)

⁷ [2012 International Building Code, International Code Council, Country Club Hills, IL, 2011 Chapter 34 Existing Buildings and Structures Section 3408 Page 572.](#)

⁸ [California Mechanical Code Effective 6/19/2008 Revised 3/03/2014 Section 102.3 Changes in Building Occupancy](#)

⁹ [California Mechanical Code Effective 6/19/2008 Revised 3/03/2014 Section 102.1 Additions, Alterations or Repairs](#)

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The association office is located at 994 Old Eagle School Road, Suite 1019, Wayne, PA 19087-1866 and can be reached at 610-971-4850 or info@viscma.com.

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