

# Using the IEBC to Help Safely Revitalize Existing Building Stock

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A philosophical debate has lingered since the first publication of model codes for existing buildings in the 1970s. If the model building code for new construction is intended, as stated in the 2006 *International Building Code* (IBC), for example, to establish “minimum requirements to safeguard the public health, safety and general welfare” (Section 101.3), how can application of a code for existing buildings provide a lower level of safety and still be considered acceptable? Conversely, if the lower levels of safety required for existing buildings are acceptable, why not apply the same standards to new buildings?

This debate has become more heated in recent years due to the increasing trends towards urban renewal and the revitalization of old town centers, as well as the surge of interest in “green” building. In order to better understand the sometimes complex issues involved in addressing the special needs of existing buildings, we may take a closer look at some of the current barriers to rehabilitation and how the *International Existing Building Code* (IEBC) addresses them.

## Barriers to Rehabilitation

There are many cases in which the traditional approach towards existing buildings has created barriers to effective rehabilitation. This is an important concern because investment in rehabilitation of the housing sector constitutes about 2 percent of U.S. economic activity.<sup>1</sup>

Some of these barriers are inherent in the nature of the activity. For example, building rehabilitation typically does not start from scratch and so must often take into consideration a structure’s unique features, leading to more intensive management and administrative demands, resulting in higher costs. Other challenges can include development and construction barriers that arise due to hidden problems, as well as the typical requirement that any areas of existing buildings which are to undergo a change of occupancy comply with all of the applicable provisions for new buildings (with some flexibility granted to the building official).<sup>2</sup> Of course, inflexible or inconsistent code administration can also create a barrier to the rehabilitation of existing buildings.

These factors point towards a need for special provisions for existing buildings—ideally, all collected in a dedicated

document within a context sometimes termed a “smart code.” The IEBC is just such a code, incorporating best practices and measures to remove rehabilitation barriers while maintaining acceptable levels of safety.<sup>3</sup>

## Using the IEBC to Maintain or Improve Safety

Founded on principles intended to encourage the safe use and reuse of existing buildings, the IEBC addresses administrative barriers to rehabilitation head-on by offering alternative approaches when repair, alteration, addition or building relocation projects are proposed, or when a change of occupancy is taking place. Note that existing buildings not subject to construction activity, relocation or change of occupancy must still comply with the provisions of the *International Fire Code* (IFC) and *International Property Maintenance Code* (IPMC), as applicable (refer to 2006 IEBC Section 101.2, Scope, and Section 101.3, Intent).

Three distinct methods of compliance are available in the 2006 IEBC.

- **Prescriptive Compliance Method.** This is the traditional approach of the model codes to existing buildings. Chapter 34 of the 2006 IBC collects the core provisions.
- **Work Area Compliance Method.** This method incorporates the concepts of proportionality of improvements depending upon the type and extent of work taking place. The more extensive the construction project, the more safety improvements may be triggered. The approach is based on the concepts and approaches of the U.S. Department of Housing and Urban Development’s *Nationally Applicable Recommended Rehabilitation Provisions*. Other codes that influenced this method are the *New Jersey Rehabilitation Subcode* and the legacy *Uniform Code for Building Conservation*.
- **Performance Compliance Method.** This is a numerical method of evaluating and assigning a safety score to existing buildings proposed to undergo construction activity. The first model code to incorporate this approach, also known as the “fire risk index system,” was the 1987 edition of the legacy *National Building Code*. This method does not apply to buildings with Group H or

Group I occupancies, and does not provide an evaluation of a building's structural system.

Whichever method is employed, the IEBC does not allow the reduction of the level of safety for any system or feature in existing buildings (note that IEBC Section 601.2 allows the reduction of safety or sanitation in alterations only if the portion altered conforms to the requirements of the IBC). Accordingly, buildings undergoing any type of construction activity or change of occupancy will almost always have improved safety levels.

The Relative Hazard Classification tables given in IEBC Chapter 9 are tools for consistently evaluating changes of occupancy and determining if hazard levels will increase, decrease or remain about the same. Based upon this determination, the code then offers provisions for meeting the level and extent of needed safety upgrades. Special occupancies where specific hazards are present must comply with the code provisions for new construction. Examples include motor vehicle related occupancies, special amusement buildings and buildings containing hazardous materials.

While still founded on the retrofit provisions of the legacy model codes, the seismic provisions of the 2006 IEBC have been updated to be both clearer and more up to date. In particular, Appendix A, "Guidelines for the Seismic Retrofit of Existing Buildings," provides specific methods for the seismic strengthening of unreinforced masonry bearing wall buildings, concrete and masonry buildings with flexible diaphragms, wood framed buildings with open or weak front walls, and other such buildings of concern during seismic events. These methods have a long track record of safety and are either fully or in revised versions incorporated into the new *California Building Code*.

## Critical Safety Issues

The I-Codes manage critical safety issues in the same way for existing buildings as for new construction. IBC Section 115 requires that unsafe conditions be corrected in all existing buildings, regardless of which code they were built under, and the IFC contains some mandatory retroactive provisions. For example, IFC Section 907.3 provides retroactive fire alarm requirements for various occupancies. Thus, the fire alarm requirements for an existing Group E occupancy educational building more than 1,000 square feet in area or having an occupant load of 50 or more are the same as for a newly constructed Group E occupancy.

Some jurisdictions adopt more comprehensive retroactive code provisions based on local needs and conditions. For example, the City of New York requires building owners to file a report on or before July 1, 2019, regarding required fire sprinkler installation in buildings 100 feet or more in height (Local Law 26/04, Section 27-228.5), and the *California Building Code* requires some level of seismic retrofit

for certain building types and some state-owned buildings (Section 102 and Section 3401.1.1).

What the IEBC focuses on are safety features that should be upgraded when rehabilitation, renovation or change of occupancy is proposed. Issues addressed include structural safety, interior finish surfaces, means of egress, fire protection systems, enclosure of vertical openings, plumbing, mechanical, electrical and accessibility. Further, there are situations under the Work Area Compliance Method whereby an element in another part of a building may need to be upgraded. Known as "supplemental" requirements, they are generally triggered when more than 50 percent of a story undergoes alterations and include important occupant safety elements such as unenclosed vertical openings and fire sprinkler requirements.

## Application Examples

1. Two-story institutional living building (Group I-1) changing occupancy to a motel (Group R-1). The building is not equipped with an automatic sprinkler system. Assuming that no construction will be needed, will installation of an automatic sprinkler system be required?
  - Prescriptive Compliance Method: Depends upon the building official's analysis and interpretation.
  - Work Area Compliance Method: Yes.
  - Performance Compliance Method: A numerical analysis of the building must be performed to determine the answer.
2. Two-story single-family house (Group R-3) being converted to an office (Group B). An exterior side wall has numerous windows and is located within 2 feet of the property line with the neighbor. Will the change of occupancy require the removal of the windows and creation of a solid exterior wall of 1-hour fire-resistance-rated construction?
  - Prescriptive Compliance Method: Generally, yes—although the building official may not mandate it if he or she determines that the new occupancy is less hazardous.
  - Work Area Compliance method: No.
  - Performance Compliance Method: A numerical analysis of the building must be performed to determine the answer.
3. An alteration project to remove all interior nonbearing walls and develop a completely new floor layout is proposed on the second floor of a three-story office building. Within the work area, there are two open stairways connecting all three floors. Will the two open stairways be required to be enclosed?
  - Prescriptive Compliance Method: No—the stairways themselves are not being altered and are therefore not required to be enclosed.
  - Work Area Compliance method: Generally, yes—a 30-minute enclosure would typically be required

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(although certain exceptions may allow the fire rating to be reduced).

- Performance Compliance Method: A numerical analysis of the building must be performed to determine the answer.

### Conclusion

Adoption of the IEBC allows jurisdictions to address the most important barriers to building rehabilitation: inflexibility and inconsistency. Rehabilitation projects are often more complex than new building construction, and with the IBC, IFC and IPMC already addressing unsafe situations, the compliance methods offered by the IEBC do not subject occupants to additional exposure to hazards while encouraging the use and reuse of existing buildings. This approach is therefore in line with environmental conservation strategies, economic growth opportunities and a safe built environment. ♦

### References

1. *Building Department Administration*. 3rd Edition. International Code Council, 2007. p. 526.
2. *ibid.* pp. 529–532.
3. For a more comprehensive discussion of barriers, rehabilitation best practices and the impact of building construction on the environment, refer to *Building Department Administration* chapters 19, 20 and 21.