

CODES AND STANDARDS

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Current Code and Repair of Damaged Buildings

Are Upgrades Required?

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When done rationally, maintaining and repairing existing buildings represents an efficient use of resources that should be promoted. Also, reusing and repairing existing construction becomes increasingly important as sustainability becomes a higher priority (SEI 2013).

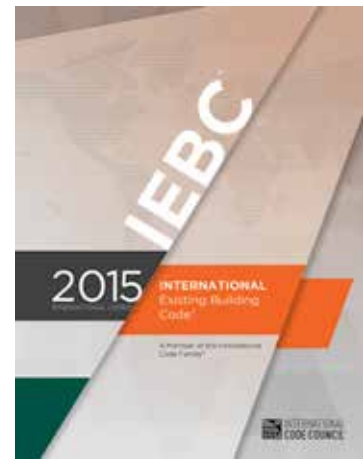
Model building codes change over time, with hundreds of changes every few years. Given such revisions, existing buildings would either require frequent modifications or need to be treated differently. Fortunately, lawful existing building conditions are typically “grandfathered,” which means they can be used without modification.

Various incidents such as fires, accidents, and storms cause damage to buildings that often requires repair to maintain conformance with applicable requirements. When damage occurs, the minimum *required* scope of work must be determined in many cases. Can the building be maintained as it was? What upgrades, if any, must be added to the repairs?

Answers to these and similar questions can be found within the code provisions that govern repair of existing buildings. The intent of code repair provisions can be better appreciated by studying their evolution.

The 50% Rule & Upgrade the Entire Building

The very first model codes in the U.S., the *Uniform Building Code* (UBC 1927), *Southern Standard Building Code* (SBC 1946), and *Basic Building Code of the Building Officials Conference of America* (BOCA 1950), contained specific provisions applicable to existing buildings. These stated what was required to be done depending on the type of work performed (i.e., repair, alteration, and change in use) and its cost. For repairs, if the anticipated cost exceeded 50 percent of the building’s value before the damage, then all aspects of the entire building, not just portions affected by damage, needed to be upgraded to meet new construction requirements. Some of these earlier codes included an additional 25 percent repair cost threshold. When the anticipated cost of repair was between 25 and 50 percent of the building’s pre-damage value, then unaffected portions of the building did not have to be upgraded to meet new construction rules. If the cost of the proposed work was less than 25 percent, then in-kind repair was typically allowed. The three model codes maintained these cost-of-repair based upgrade triggers until the late 1970s. At that time, these percent-rule upgrade triggers were deemed an obstacle to the re-use of existing buildings (Mattera, 2006) and so were largely eliminated.



Upgrade Only What Was Affected

After removal of the general percent-rule triggers, and starting with the 1979 UBC, 1981 BOCA, and 1982 SBC, the extent to which new construction provisions were triggered by repair work was no longer dependent on cost. Instead, the intent was to leave undamaged, unaffected elements alone, and apply new construction rules only to elements of the construction that were affected by the damaging event. This *upgrade only what was affected* philosophy was promulgated by each of the model codes until they were consolidated into the *International Building Code* (IBC) in 2000.

Current Code – Repair with No Upgrades?

Starting with the 2015 versions of IBC, matters governing the repair of existing buildings are addressed almost exclusively by the *International Existing Building Code* (IEBC). The IEBC has three optional approaches to repair, per Section 101.3: “...to provide flexibility to permit the use of alternative approaches to achieve compliance with minimum requirements...” The applicant is required to select one of three compliance methods, which are termed: Prescriptive, Work Area, and Performance.

However, not all alternatives may be available in all circumstances. The Performance Compliance Method is detailed in IEBC Chapter 14. It is the most lenient compliance alternative in that it merely requires repairs to be consistent with pre-damaged construction. It contains no requirements associated with particular building code provisions, regardless of the extent of the damage. According to the associated commentary, it was written in this fashion to accommodate treatment of buildings that cannot be associated with any particular code, and yet were considered suitable for occupancy and use before the subject damage. This situation occurs when a building

pre-dates the jurisdiction's adoption of codes and there is no documentation as to what standards were used in its construction. The *Applicability* section of Chapter 14 (1401.2) provides a "prior to" date that defines what structures can be evaluated using its provisions. This section recommends that the date in question "coincide with the effective date of building codes within the jurisdiction." There is a recommendation that the Performance Compliance Method only apply to buildings constructed before there were any identifiable code provisions being enforced. This makes sense since buildings constructed after codes were put into effect have defined provisions as benchmarks, while buildings that pre-date code enforcement typically do not.

In spite of the recommendation to limit application of the Performance Compliance Method to buildings that pre-date code enforcement, some jurisdictions make it effective to a much broader category of buildings, even all existing buildings. In such cases, it is certainly appropriate to use the Performance Compliance Method, which usually comprises the minimum requirements for repairs. Consider the following excerpt from Chapter 14: "An *existing building* or portion thereof that does not comply with the requirements of this code for new construction shall not

be altered or repaired in such a manner that results in the building being less safe or sanitary than such building is currently." [2015 IEBC, Section 1401.2.4]

The only stated requirement for a repair is that the repaired condition be no less safe or sanitary than it was before the damage being addressed occurred. This is based on the entirely rational premise that, as long as the building was considered safe to use before the damage, restoration to the pre-damage state should be sufficient for continued use.

The Prescriptive and Work Area compliance methods also allow like-kind repair of damage, with certain exceptions. For example, the Work Area Compliance Method, in Section 601.2 states, "The work shall not make the building less conforming than it was before the repair was undertaken." The method then has separate sections outlining requirements for Building Elements and Materials, Fire Protection, Means of Egress, Accessibility, Structural, Electrical, Mechanical, and Plumbing. With the exception of Building Elements and Materials, Structural, Electrical and Plumbing, each of these specific sections repeats the general requirement that the repair shall not make the building less conforming than it was before the repair was undertaken. The

Building Elements and Materials, Structural, Electrical and Plumbing sections also indicate when pre-damage conditions can be recreated or when like materials can be utilized, but also describe situations in which repair to something other than the pre-damage state is required.

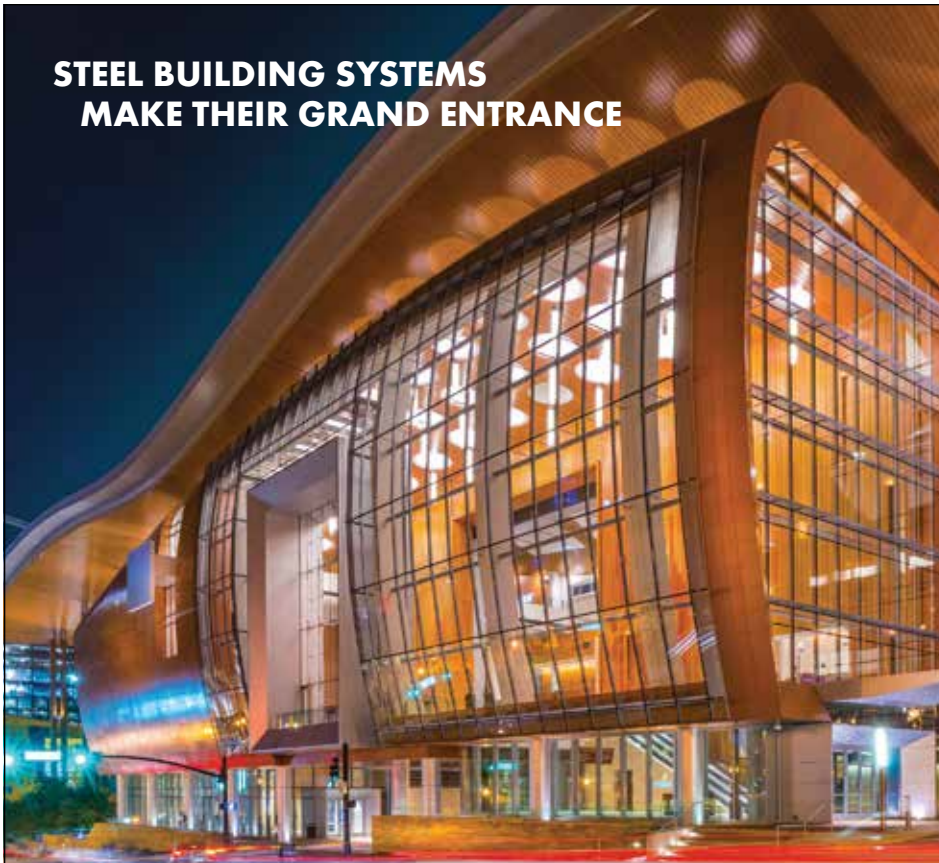
Each of the IEBC compliance methods has provisions that *dangerous* (2015 IEBC Sections 401.3 and 606.1) or *unsafe* (2015 IEBC Section 1401.3.1) conditions be abated. So if the damage was related to a hazardous or unsafe condition, as defined in 2015 IEBC Section 202, then in-kind repair that would restore such a condition would clearly not be allowed.

Substantial Structural Damage

Starting with the first IEBC (in 2003), the concept of Substantial Structural Damage (SSD) was introduced as a means for defining when structural repair to something other than the pre-damage condition might be required. In the 2015 IEBC, SSD is defined in Section 202 and is used in the repair provisions by both the Prescriptive (Section 404) and Work Area (Section 606) compliance methods. The SSD threshold is used, in part, as follows: "For damage less than substantial structural damage, the

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damaged elements shall be permitted to be restored to their pre-damage condition.” (2015 IEBC, Section 606.2.1; and similar in Section 404.4)

If damage greater than SSD has occurred, then an evaluation is triggered. The outcome of the assessment determines the required scope of the structural-related repairs. If the evaluation establishes compliance of the pre-damage building with the associated criteria, then repairs are allowed to restore the building to its pre-damage state. If the evaluation does not establish compliance of the pre-damage building with the associated criteria, structural-related repairs to something other than the pre-damage state are usually, but not always, required. An important aspect of the SSD provision is to recognize that if such upgrades are necessary as a result of the evaluation, the extent of the upgrades are limited to the *structural-related* work and do not alter the previously discussed scope of the provisions within the IEBC that address the other aspects of the building (i.e., fire protection, means of egress, etc.)

Flood Hazard Areas and the Redacted Percent Rule

Although the historic general and wide-reaching percent-rule cost thresholds are not in the IEBC, a limited version is still present within all three IEBC compliance methods when addressing damage to buildings located in identified flood hazard areas. When a building, damaged by any means, is located in what Section 202 of the 2015 IEBC defines as a “flood hazard area,” and the cost of restoring it to the pre-damage state exceeds 50 percent of the market value of the pre-damaged building, then all aspects pertaining to flood design for the building shall be brought into compliance with requirements for new construction. Similar to the limitations of the SSD upgrades, eclipsing the 50 percent threshold of the flood provisions does not require other non-flood design aspects of the building to be brought into compliance with new construction provisions.

Too Much Damage to Qualify as “Repair”?

Sometimes people reach the wrong conclusion that replacing damaged materials is

not a “repair” but rather new construction or an alteration, or that too much damage has occurred to use the repair provisions. This interpretation is incorrect because it is contrary to the code provisions themselves. The 2015 IBC and 2015 IEBC definition of repair in their respective Section 202 is, “The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.” Repair work then, by definition, reconstructs, renews (i.e., restores), or otherwise maintains what was previously there.

Within the 2015 IEBC, Section 502 states that repairs “...include the...replacement of damaged materials, elements, equipment or fixtures...” There is no limitation that correcting damage (repair) pertains only to a certain amount of damage. In fact, both the Prescriptive and Work area compliance methods contain provisions to repair buildings that have sustained *substantial* damage, such as SSD. A description is offered by NCSEA (2014) that is: “essentially, if the work only ‘fixes’ what was previously there, then it is classified [in building codes] as ‘repair’ work.”

Meeting Current Code

Meeting current code in the context of repairing an existing building means to meet the code provisions that control such work. Upgrades to improve aspects of buildings beyond the explicit requirements of the applicable code provisions that apply to the *repair of existing buildings* (e.g., the 2015 IEBC discussed above) may be recommended, prudent, or a good idea – but are not *required* in order to repair and maintain

buildings. For excellent reasons, the concept of grandfathering has been applied to the repair of damaged buildings since the inception of building code provisions dealing with repair, and continues today. This practice is based on the reasonable and rational notion that the “victim” of an unfortunate event should not have to bear substantial costs to provide a better structure than what would have existed had the event not occurred.

The code provisions for repair of buildings have evolved since their beginning almost 90 years ago. There are now fewer upgrades required. For example, for approximately 50 years (from 1927 to the late 1970s) when repairs in excess of fifty (50) percent of the pre-damage value of a building were made to any building within any period of twelve months, the entire building was then required to be made to conform to *all requirements* for new buildings. In the 2015 IEBC, repair that does not make the building less conforming than it was before the damage occurred, is, with few exceptions, allowed for nearly all aspects. The significant repair-related upgrade requirements are now limited in the 2015 IEBC as follows:

- A 50 percent repair cost threshold, which only pertains to flood hazard areas and only triggers upgrade for flood design features.
- If SSD occurs, at most, upgrades are limited to specific structural aspects.■

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