

This public policy guidance on the California Building Code was prepared by David Bonowitz, a Bay Area structural engineer, at the request of the Association of Bay Area Governments.

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This memo summarizes current building code provisions regarding seismic upgrades triggered by repair projects. Of course there are details, special cases, and local amendments that are not addressed in this brief summary.

Issue

When does the building code allow a damaged building to be repaired to its pre-damage condition, and when does the code require seismic upgrade in addition to repair?

Background

California's current building codes adopt and modify so-called "model codes" for statewide use. Three different model codes, and the state versions of them, address the repair-based upgrade issue. The state's adoption and modification of model building codes is complex. For simplicity, this memo addresses only the main code, Chapter 34 of the 2010 *California Building Code* (CBC), which is based on the 2009 *International Building Code* (IBC). Local jurisdictions may amend the CBC (within tight limits), but such amendment is rare. Large jurisdictions like San Francisco and Los Angeles, however, have histories of developing their own codes, so they often amend the CBC to maintain previous local provisions. This memo does not address local amendments.

The basic provision: CBC Section 3405

2010 CBC Chapter 34 includes provisions that trigger seismic evaluation and, if necessary, seismic upgrade where certain damage thresholds have been reached. The 2010 CBC is the first to include such provisions (except for special classes of buildings; see below), because repair-based upgrade requirements were added to the IBC only in 2009.

Chapter 34 defines the term "Substantial Structural Damage" (SSD) in terms of the structural capacity lost due to damage, regardless of cause (earthquake, fire, automobile collision, etc.). Section 3405 then makes these allowances and requirements:

- If the building has SSD to its lateral system, the structure (with assumed repairs) is seismically evaluated using reduced loads (somewhat less than those required for new construction). If the building passes the evaluation, it may be repaired to its pre-damage condition. If it fails the evaluation, it must be upgraded, again using the reduced loads.
- If the building has SSD to its gravity system *caused by wind or earthquake*, then it is treated as if it sustained SSD to its lateral system.
- If the building does not meet either of the previous two conditions, it may be repaired to its pre-damage condition without upgrade.

Special building classes

The basic provision applies to most privately owned buildings and most city- or county-owned public buildings. Some buildings are regulated at the state level, however. These include:

- For state-owned buildings (including UC and CSU campuses), the basic provision above is replaced by special provisions in Sections 3417–3423, which revise the trigger in two ways:

- The triggering damage level is much lower for state-owned buildings than for buildings covered in Section 3405, so state-owned buildings get triggered sooner.
 - An additional trigger based on repair cost applies: If the repair cost would exceed 25 percent of the replacement cost, an evaluation and potential retrofit is triggered.
- For residential buildings, the Department of Housing and Community Development (HCD) interprets existing state law to prohibit any triggered upgrades. HCD did not make specific modifications to Section 3405 in the 2010 CBC, but they have proposed to omit upgrade triggers in the coming 2013 CBC.
- For K-12 schools and community college facilities regulated by the Division of the State Architect (DSA), Sections 3417–3423 again apply instead of Section 3405, with triggers defined in the California Administrative Code.
- Healthcare facilities regulated by OSHPD are subject to special provisions in Chapter 34A (which happen to be similar to those in the basic provisions of Chapter 34).