Earthquake-safe Buildings

Article 20. Importance of Checks during the Construction of Buildings

Article 19 outlined the need for an independent check of design calculations, plans and specifications before applying for a building permit, and definitely before commencing construction. A check gives the client confidence that local codes and standards have been followed and therefore the building is more likely to be earthquake-safe.

The next challenge is to arrange checks during construction. Like any of us, builders make accidental mistakes. Some also choose not to follow plans and specifications. They might omit reinforcing bars, bend them incorrectly, use too little cement in concrete or use poor quality bricks or blocks (Figure 1). Without checks, even a newly constructed building can be unsafe in earthquakes. There are many examples of very poor and unsafe construction (Figure 2). However, if a builder does follow the plans and specifications, a building is expected to remain safe during an earthquake for which it was designed.

Figure 1. A reinforcing bar is being tested to check it is up to standard.

Figure 2. The reinforcement of this column does not comply in numerous ways with the local codes and standards. During a moderate to large earthquake, it will be seriously damaged.

Your Building Department might have some requirements for quality assurance during construction. If so, follow those. If not, request that the civil engineer who designed the building supervise or observe its construction. Usually this will mean visiting the site regularly and especially before important activities are undertaken (Figure 3). For example, the reinforcing steel in columns should be checked before formwork hides the reinforcing bars and concrete is placed. Ask your engineer what he or she recommends in order that at the end of the project a statement can be signed to the effect that construction followed the plans and specifications.

Figure 3. An engineer needs to regularly visit construction sites like this to ensure construction is in accordance with the plans and specifications.

Some people may try to save money by not having any construction quality assurance. In these cases, mistakes and unauthorized changes are not detected. Details that are vital for earthquake safety might be built wrongly or even not built at all. Why put yourself and others at risk during an earthquake due to poor construction? It's not worth it!

About this article series:

This is a series of articles about earthquakes, their effects on buildings, and how to ensure that buildings are safe against earthquakes. They are intended for potential owners of new houses and larger buildings and others involved in the building industry. The articles are written by Andrew Charleson and colleagues from the World Housing Encyclopedia (http://www.world-housing.net/) which is sponsored by the Earthquake Engineering Research Institute (https://www.eeri.org/) and the International Association of Earthquake Engineering (http://www.iaee.or.jp/).