Earthquake destruction: corruption on the fault line

James Lewis[1]

Earthquakes don't kill people; collapsing buildings do. While earthquakes may not be preventable, it is possible to prevent the disasters they cause. In the past 15 years, there have been more than 400 recorded earthquakes in 75 countries rendering almost 9 million people homeless, injuring 584,000 and causing 156,000 deaths.[2] Many of these deaths were the result of buildings that folded in on themselves because concrete was diluted, steel bars were excised, or otherwise substandard building practices were employed. It is difficult to evaluate the extent to which corruption might have played a role. However, the accompanying examples from Italy and Turkey illustrate that the marriage of corrupt contractors and corrupt building inspectors and other public officials resulted in ignored building codes, lax enforcement and the absence of on-site inspection, which is deadly when it occurs in earthquake-prone areas.

The building process

Building construction involves a process of physical covering. Starting in the ground with foundations, it proceeds with the superstructure of walls, columns, floors, staircases and roofing. Each stage is concealed, from foundations under the ground, steel reinforcement before concrete is poured, to the last coat of paint. Mistakes and omissions (accidental or intentional) have to be identified and rectified within each stage. Pressures on builders to complete on time, increased by financial incentives and impeded by late deliveries and weather, create circumstances in which temptations are rife for expediency and shortcuts.

Areas at risk of being hit by an earthquake or other natural disaster present construction firms and engineers with an additional level of complexity. Reinforced concrete is relatively cheap and a convenient, though rigid, construction material, whereas timber is more flexible but requires skills and materials not always locally available and is inappropriate for larger buildings. Flexibility responds to earthquake motion where rigidity does not. Concrete can be used in earthquake-resistant constructions, but needs to be of high quality and applied using a vibration machine to ensure that it penetrates throughout necessarily complex steel reinforcement. Vibrators require on-site generators or mains electric power, which imply additional costs. Controlled concrete is best achieved by specialist and centrally inspected off-site suppliers; less easily inspected on-site mixing is subject to expediency, substitution and omission.

Engineered buildings design in an additional 'earthquake factor' for earthquake resistance, the degree of which is a matter for regulation or professional analysis. But the factor can be exceeded by actual earthquakes of greater magnitude. Even inspected buildings can fail; older and decayed buildings can collapse.

Problems with oversight

Most countries, regardless of their stage of development, have moderate-to-good building and safety codes. Many could be improved: in India, for instance, where an earthquake in Gujarat in 2001 killed 20,000, codes required inspectors to inspect plans but not the buildings themselves during the building process. In most cases, though, the main problem is implementation of codes. A proper enforcement system needs trained engineers, rules and regulations, and periodic inspection. Corruption adds to this problem when building permits are obtained through bribes and political favours, or inspectors are paid to turn a blind eye to design or building practices that deviate from the code specification.

Financial resources and trained personnel are needed to be able to inspect the work of contractors. Public officials employed to inspect building codes and grant permits are rarely well paid in any country, and there is almost always the problem of understaffing. Where the rate of housing growth is rapid, such as in Turkey, 'it is a daunting task to carry out proper building inspections even assuming the necessary political and ethical will', according to Alpaslan Özerdem, an expert in disaster management.[3] He suggests another approach would be to increase public awareness and make potential house buyers become the inspectors: 'if people showed as much interest in earthquake safety … as they show in the type of tiles, doors and taps … building contractors would stick to the rules and regulations'.

The state's role in the construction of dangerous buildings is not limited to failure to ensure proper inspections. Acts and omissions by states can actually contribute to the extent of disasters, especially when this occurs in a context where corruption is prevalent throughout government services. Research into the catastrophic 1999 Kocaeli earthquake in Turkey identified 'organisational deviance' in the pursuit of risk-laden policies, corruption tolerated or tacitly encouraged to serve organisational goals, failure to develop regulation in the construction industry, encouraging or forcing land settlements in hazardous zones, post-disaster cover-up and concealment of evidence, and promotion of policies directly contributing to corrupt practice in the construction industry.[4]

Agencies such as UNESCO and UN-Habitat have helped push for codes for earthquake-resistant construction, and international demands for improved construction are repeated after every earthquake. The *UN Chronicle* recently carried a plea by experts working in the field for 'the enforcing of internationally accepted standards of safety for schools and hospitals everywhere in the world'. To mitigate the impact of earthquakes by reducing the risk of corruption:

- legislation and enforcement should be tightened, and adequate, trained and empowered inspections should be made of construction projects both during the design and the building stage
- controls over building construction by local governments should be evaluated and redefined
- participation in earthquake insurance should be encouraged and made to be a vehicle for requiring independent certification of conformity with construction codes
- training, licensing and regulation of engineers and architects should include training in earthquake-resistant construction
- standardised design of government buildings should be re-examined with a view to more stringent applications
- strict restrictions should be placed on overcrowding and upper-storey extension of existing buildings and on maintenance of old, damaged and poorly maintained buildings
- access to controlled provision and supply of (off-site) ready-mixed concrete should be facilitated.[5]

The media and civil society have an important role to play in pushing for an improved construction system in earthquake-prone areas:

- citizens need to be encouraged to hear a second opinion on safety if they have any doubts about the work of contractors

- citizens should be trained to spot the most egregious departures from building codes
- local NGOs should provide second opinions and act as watchdogs, possibly with the help of voluntary pools of engineers from local universities or chambers of engineers.

Notes

1. James Lewis is an architect, consultant and writer on environmental hazards, and a visiting fellow in development studies at the University of Bath (Britain).
2. EM-DAT (2004) OFDA/CRED International Disaster Database: Université Catholique de Louvain, Brussels, Belgium, www.em-dat.net
3. Alpaslan Özerdem, 'Tiles, Taps and Earthquake-Proofing: Lessons for Disaster Management in Turkey' in *Environment and Urbanisation*, October 1999.
4. Green, al-Husseini and Curry, 'Disaster Prevention and the 1999 Turkish Earthquakes', http://online.northumbria.ac.uk/geography_research/radix/turkey-bingol5.htm
5. Ben Wisner and James Lewis, 'Exchange: Why do Schools and Hospitals Collapse in Earthquakes?', UN Chronicle Volume XL No. 3, 2003, www.un.org/Pubs/chronicle/2003/issue3/0303p49.asp