

Legislation Changes Following Earthquake Disasters

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Synonyms

[Disaster legislation](#); [Legislation changes post-disaster](#)

Introduction

Most disasters are followed by legislative changes, emergency legislation, and new disaster legislative measures. Some of the changes are a reaction to the need to build back safer and to be seen to be facilitating a better future environment. For instance, the Royal Commission into the Canterbury Earthquakes in New Zealand recommended changes to the Building Act, a rewrite of building codes and building standards. Other disasters, such as the Wenchuan earthquake in China, Black Saturday bushfires in Australia, and Hurricane Katrina and Northridge earthquake both in the USA, had all occasioned changes in legislative requirements for reconstruction and code changes for buildings. The impact of legislative changes tends to slow recovery, but often they facilitate in building a better, more resilient, post-disaster environment. In this entry, the focus will be on the common post-disaster legislative changes encountered for reconstruction, such as those affecting building acts and building codes. Examples and effects of the changes are discussed using a variety of cases from earthquakes and other disasters. This entry provides an account of the ways in which legislation changes post-disaster can help and/or hinder reconstruction programs.

Legislation Challenges Post-disaster

The organization and coordination of recovery is usually complex because a wide range of activities occur simultaneously after a significant disaster. There is an equally wide range of needs that would have to be met, some of which may be conflicting and adds to the complexity of post-disaster recovery. Experiences from past disaster recovery arrangements show a struggle to meet recovery needs and changes to the legislative, and regulatory recovery environments seem common place. Several contributory factors account for the success or otherwise of disaster management goals and objectives, irrespective of whether they are in legislation or in recovery management plans. These include:

- Pre-disaster trends and levels of preparedness which are linked to vulnerability
- The extent of damage resulting from the disaster
- Availability and accessibility to the required resources for both response and recovery
- The prevailing political will and governmental interests in disaster management activities

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In terms of legislation and regulation, there is often little provision in legislation to facilitate large-scale reconstruction programs. Prior to the Canterbury Earthquakes in New Zealand, Feast (1995) had identified several issues in relation to planning and construction legislation that could impede reconstruction of Wellington, following a major earthquake. Feast's study suggested that much of the legislation (in particular the Resource Management Act (RMA) and the Building Act (BA) that existed during the period was neither drafted to cope with an emergency situation nor developed to operate under the conditions that would prevail in the aftermath of a severe seismic event. Specifically commenting on the RMA, Feast had explained that its consultation procedure could prevent meeting the reconstruction requirements of a devastated city within a reasonable time period (Feast 1995). Decades after in 2012 (following the Canterbury earthquakes), some of Feast's suggestions were revived, and changes to both the RMA and BA were, and are, still being made based on recommendations by the Royal Commission set up to review the Canterbury recovery program. Changes around seismic codes, strengthening of existing buildings, changes to land use, and planning parameters are being made as a response to the Canterbury disaster.

Rolfe and Britton (1995) are of the opinion that the pace of reconstruction is severely impacted by political and cultural conflicts over recovery plans, which means the successful achievement of disaster management goals will depend on the political environment. Once a disaster happens, there is a continuous tension between strictly applying reconstruction regulations which aim at preventing a recurrence of the previous community vulnerabilities and allowing an affected community to move back to their former habitation quickly. Clearly, the quicker communities return to habitability of as many of their homes as possible, the better it will be for restoring a sense of normality. However, to reduce future vulnerabilities, it is rational to approach rebuilding programs cautiously to build in resilience and build back better than before the disaster. In New Zealand, the rebuilding of Napier following the 1931 earthquake did not reduce vulnerabilities to future disasters as the city was rebuilt in the same location mainly producing unreinforced masonry buildings. Retrofitting of Napier buildings was subsequently required under new seismic codes because, as has been repeatedly demonstrated, unreinforced masonry buildings are vulnerable to earthquakes.

When considering the effects of legislation changes after disasters, it can be seen that legislation changes post-disaster can be broadly classified into two categories: (1) legislation for compliance and (2) legislation for facilitation. *Legislation for compliance* entails using legislation to enforce recovery initiatives, such as those that would require buildings to be upgraded or rebuilt to different standards and codes. The lack of enforcement of hazard-related laws and adequate risk-based building controls contributed to the large-scale devastation caused by the 2004 Indian Ocean tsunami (Mulligan and Shaw 2007). The same was witnessed in countries such as Pakistan, Turkey, Samoa, and Haiti. In reconstruction programs, there is a need to enforce the new building design codes which inevitably appear after a disaster. Inspection of the reconstruction, including buildings using the new codes, requires clear guidelines to maintain the required standards.

Legislation for Facilitation denotes legislation being used to simplify and assist recovery activities to speed up the recovery process. These changes can usually be seen in changed processes, such as in building and development consent processing. However, legislation that is customarily used to impose security and safety controls (such as building consents) can become an obstacle to rebuilding programs. Time-consuming procedures, insufficient resources to process permits, and lack of fast-tracked methods could delay reconstruction. For example, delays in the issuance of permits were a major reason for the holdup in housing repair and rebuilding following the 2005 Bay of Plenty storm in New Zealand (Middleton 2008). Fast-tracked consenting procedures, collaboration between councils, open access to information between stakeholders, and using legislation to remove bureaucracy are viable options to speed up recovery. During the 1994 Northridge

earthquake, legislation was suspended, and emergency powers were used with the consequence of reducing highway reconstruction time. Similarly, during recovery from the Australian bushfires, planning and building permits were exempted for temporary accommodation so they could be put up quickly. For permanent dwellings, planning permits were exempted, and only building permits were needed after the bushfire (DPCD 2013). Also property falling under the Wildlife Management Overlay which would normally be subject to more rigorous planning and building permit requirements had to be relaxed to only require a simplified planning consent and building permit (DPCD 2013).

From the forgoing, it is clear that legislation and regulatory requirements can have significant influence on the rate of recovery after a disaster event. The overall desire is for legislation to enhance the recovery and reconstruction process so that it improves the functioning of an affected community and reduces risks from future events. Any legislation changes that need to be made post-disaster may be better considered before a disaster so that its implementation could be facilitated early on during recovery. Often the opportunities to introduce mitigating measures become limited over the course of recovery because of the desire to return to normalcy and thus rebuild quickly after disasters. Menoni (2001) notes that “market forces put pressures to reconstruct as quickly as possible . . . hampering efforts to implement lessons learnt from the disaster in the attempt to reduce pre-earthquake vulnerability.”

Pressures to rebuild critical infrastructure quickly are borne by national and local administration with the possible implication of reduced quality of delivery. Rushed rebuilding programs have led to increased vulnerability of poorly planned and designed built environments to future disasters (Jigyasu 2010). Ingram et al. (2006) also explain that the clamor to rebuild quickly amplifies the underlying social, economic, and environmental weaknesses that result in large-scale disasters (Ingram et al. 2006).

Improving Recovery Through Legislation

Well-articulated and implemented legislation should not only provide an effective means of reducing and containing vulnerabilities (disaster mitigation) but also become a means of facilitating better thought out and designed reconstruction programs.

After damage assessments and evaluations, building and environmental legislation should not present impediments to reconstruction and rebuilding programs. Martín (2005) suggests that there is a relationship between building/environmental regulations and rehabilitation works (Martín 2005) and that regulations could become burdensome in rehabilitation and reconstruction projects and are worthy of considerations (Martín 2005). Martín (2005) describes burdensome regulations as those which incorporate excessive rules and regulations and red tapes (statutory procedures) that add unnecessarily to costs. Listokin and Hattis (2004) provide useful analysis on two kinds of barriers that building codes could pose to rehabilitation works. They are “hard” and “soft” barriers to rehabilitation. The hard barriers are impediments to rehabilitation as a result of overregulation, which would not add appreciably to building value or public safety (Burby et al. 2006) and could discourage housing development or rehabilitation because they are added burdens (May 2004). For instance, building and environmental regulations that do not reduce the vulnerability of built assets to a hazard event are unnecessary. Also to insist on expensive structural solutions in a highly hazardous zone, where a simple alternative will be to restrict development in that zone, is another example of regulation that could fall under Listokin and Hattis’ hard category.

Soft impediments, on the other hand, are administrative requirements that require extra time, money, and effort to accomplish rehabilitation and reconstruction projects (Listokin and Hattis 2004). These are red tapes (bureaucratic procedures) that could delay new construction and rehabilitation/reconstruction of physical facilities (May 2004). Such soft impediments are the focus in this entry.

Bureaucratic procedures must be supportive of emergency management under different emergency scenarios whether routine or chaotic. However, research suggests that bureaucracies have been less supportive of the expediency that is desired in disaster response and recovery. May (2004) suggests three sources of impediments by regulatory processes:

- Regulatory approvals. These are delays associated with consent processes and approvals that arise from cumbersome decision-making processes and duplication of regulations. These types of delays are inherent in building and environmental legislation.
- Regulatory enforcement strategies and practices. These are overly rigid practices that foster an unsupportive regulatory environment for the development and rehabilitation of the built stock. In post-disaster situations, rigid enforcement strategies discourage genuine recovery efforts.
- Patchwork of administrative arrangements. This could result from duplication of administrative structures (as in layers or hierarchies of control) and gaps in regulatory decision processes. May (2004) explains that patchwork frustrates regulatory implementation and adds to complexities in regulatory processes.

Regulatory process barriers could also result from *administrative conflicts* in and among disaster agencies (Listokin and Hattis 2004). For example, rivalry between responding agencies is not foreign to emergency services and is an obstacle to effective emergency management (McEntire 2002; Quarantelli 1998). Rotimi (2010) explains that rivalry may result from existing silos, from the absence of a coordinating agency, and from the ability of a coordinating agency incorporating other agencies perceived responsibilities. Hence, a broad cooperative effort is needed for the success of post-disaster reconstruction activities. Rotimi (2010) therefore contends that organizations have to coalesce to plan for resource utilization in the restoration of physical assets. Coordination is therefore central to multi-organizational response and recovery programs (McEntire 2002). This multi-organizational coordination is often embedded into emergency legislation post-disaster and usually involves the creation of new recovery coordinating agencies such as Victorian Bushfire Reconstruction and Recovery Authority (VBRRA) in Australia or Canterbury Earthquake Recovery Authority (CERA) in New Zealand.

Another useful dimension to the problems with burdensome regulations is provided by Listokin and Hattis (2004). It is that regulatory procedures could become too rigid forcing implementers to “go by the book” even though variations may be warranted. This places implementers in a state of continuous fear of liability should things go wrong. Rotimi (2010) explains that some latitude of control and discretion is often required to aid decision-making as long as such decisions are pragmatic. Commenting on the rebuilding program after the flooding incident in New Orleans, Stackhouse (2006) says “removing democratic processes from the rebuilding process has the advantage of expediting decision making by allowing politically dangerous but practical outcomes.” This statement suggests that greater freedom in decision-making by officials of coordinating agencies could increase the speed of rebuilding programs after significant disaster events. Evidence from literature on recovery often shows slow recovery. For example, on the Bay of Plenty storm in New Zealand in 2005, Middleton (2008) showed that at 300 days after the event, 35 households still required permanent rehousing out of a total of 300 compulsory evacuations. At the same time, nine

households were still occupying temporary accommodation. Middleton (2008) suggests that the slow pace of recovery was attributable to the inadequacy of personnel to carry out the stipulated building safety evaluations and to process consents for reconstruction work. Both of these factors have legislative connotations.

Considering New Zealand before the Canterbury earthquakes, there was an emphasis on readiness and response activities, with little consideration given to planning for sustained recovery activities. Where recovery was considered, it was for the short term, as evident in emergency awareness campaigns that encouraged communities to prepare for 3–7 days after an event. Recent emergency events clearly show that longer-term recovery plans and more robust legislation were required given the complexities associated with the rebuilding of damaged built assets. Warnings about the inadequacies of routine construction processes being modified on an ad hoc basis during the small disaster recovery phases in previous hazard events were unheeded in New Zealand (Rotimi et al. 2006). While such an approach works reasonably well for small-scale emergencies, the effectiveness of reconstruction in a large disaster required large-scale legislative changes (Rotimi et al. 2009). Post-Canterbury, an extensive review of legislation to cope with future disasters is now underway.

Post-disaster Legislation Changes in Action: Three Case Studies

Despite the type of disaster, there are often commonalities in the post-disaster legislative changes enacted and the impacts of these changes. Starting with an earthquake, and ending with a fire, this section demonstrates through three cases, the impact of legislation on recovery and some good and bad practices.

The Northridge Earthquake, USA, 1994

The Northridge earthquake provides an example of a disaster situation where legislative changes helped to facilitate reconstruction projects. The moderate earthquake struck Southern California in the early hours of 17 January 1994 with a magnitude of 6.8 on the Richter scale, small compared to other earthquakes, but causing significant damage.

Comerio (1996) gave an insight into the extent of damage. There were damage to 27 bridges and a collapse of sections of six freeways. Four hundred and fifty public buildings suffered significant damage, 6,000 commercial buildings, 49,000 housing units in 10,200 buildings had serious structural damages, while 388,000 housing units in 85,000 buildings experienced minor damages. The total value of damage to houses in Los Angeles was estimated to be about \$1.5 billion.

The Northridge earthquake caused a shift in emphasis from disaster preparation and relief to recovery (Comerio 1996), and this shift largely resulted in the success of emergency management programs for the restoration of the affected areas. Reconstruction contributed to the economic revitalization of the affected area, and bureaucratic requirements were suspended to encourage rapid rebuilding of damaged infrastructure. Marano and Fraser (2006) conclude that “identifying and easing regulations and statutes that inhibit reconstruction can mean a dramatically faster and less costly recovery.”

Wu and Lindell (2004) provide an insight into some of the actions that were taken to increase the speed of housing reconstruction in Los Angeles after the earthquake showing that it is possible to expedite procedural requirements by establishing fast-tracked processes that would operate after a disaster would benefit recovery.

While the rapid recovery experienced after the Northridge earthquake can be attributed to other factors, such as political will, public policy changes and enabling emergency management legislation played a substantial role in the rebuilding programs after the earthquake (Comerio 2004).

Hurricane Katrina, New Orleans, USA, 2005

The disaster that followed Hurricane Katrina provides lessons on legislative changes either proposed or already implemented to enable its recovery from the event. The Hurricane was a category 3 storm when it struck New Orleans and the Gulf Coast in the morning of August 29, 2005. The storm surge caused severe destruction along the Gulf Coast from central Florida to Texas in the USA. The most severe damage occurred in New Orleans, Louisiana, because of the failure of the levee system that was designed to contain the resulting storm surges. The worst damage was caused by floods with an estimated 1.2 million people evacuated before the incident and another 100–120 thousand afterward. About 350,000 houses were destroyed and over 200,000 persons required temporary shelters scattered around 16 states in the USA. By all accounts, Hurricane Katrina was a catastrophic event with economic loss estimates of about \$200 billion (Burby et al. 2006).

A brief description of some of the policy changes and legislative reviews that occurred as a result of Katrina is provided by Rotimi (2010) including:

1. Changes in building codes and standards. There were changes made to the building codes in New Orleans with a view in improving the resilience of built spaces in New Orleans. For example, there were revisions made to the base flood elevation levels for new construction to 3 ft or higher (Colton et al. 2008). This is a risk mitigation strategy which has been tied to flood insurance cover so that only buildings that meet these new guidelines can qualify for flood insurance and subsequent compensations. Overall, funding sources and budget priorities have been developed for reconstructing flood protection in New Orleans (Colton et al. 2008).
2. Changes in emergency management regulations and guidelines. Colten et al. (2008) explain that the Katrina event necessitated the review and updating of Louisiana and New Orleans' response strategies and their emergency operations plans. The legislative reviews included the adoption of an all-hazards approach thus expanding the scope and magnitude of anticipated hazards and allowing greater involvement of non-agency actors who proved crucial to response and recovery after the event. Colton et al. (2008) noted that partnering with nongovernmental stakeholders was a paradigm shift that emerged out of the Katrina experience.
3. Changes in land development regulations. Changes to land and development regulations are largely seen as a veritable tool for mitigating disaster risk in disaster management (Ingram et al. 2006). After Hurricane Katrina, changes in land use planning and zoning systems have been proposed to reduce the vulnerability of the New Orleans region from future flooding disasters (Burby et al. 2006).

The legislative changes in New Orleans show the importance placed on built asset reinstatements as a major input to holistic recovery. Similar to Northridge, building reconstruction in New Orleans aimed to stimulate development and growth. The rate at which recovery is achieved is therefore tied to the speed of reconstruction, and any recovery is underpinned by well-thought-out and implemented legislative and regulatory changes.

Victorian Bushfires, Australia, 2009

The “Black Saturday” disaster was one of the most damaging disasters in Australian history, leaving 173 people dead and many seriously injured, affecting 6,000 households, destroying more than

2,000 homes, and damaging around 430,000 ha of land. Despite the institutions and procedures set up for expediting community recovery, reconstruction proceeded slowly. Shortly after the bushfires in March 2009, the Victorian Government introduced a new residential bushfire construction building standard AS3959-2009 in response to the need to better protect the bushfire-affected communities from future fire events. Under the new codes, there are increased construction requirements depending where a building is situated, ranging from ember protection to direct flame contact protection.

Changes have been documented by Mannakkara and Wilkinson (2013) which showed that one of the first steps taken in Australia was to publish a revised edition of the Australian building code for bushfire-prone areas (AS 3959) on March 11, 2009 (VBBRA 2009). The revisions introduced Bushfire Attack Levels (BAL) to identify the bushfire risk of properties. Stringent design and construction requirements were specified for each BAL to provide greater fire protection. Another key change in legislation was regarding land use. Soon after the fires, the entire state of Victoria was declared bushfire prone and placed under the Wildfire Management Overlay (WMO) which imposed stricter planning regulations (VBBRA 2009). The introduction of the buy-back scheme posed a solution for people on high-risk lands (Victorian Government 2012).

As with earthquake recovery, constructing bushfire-resistant buildings contributes to saving lives and properties in the event of a bushfire. Mannakkara and Wilkinson (2013) report on the bushfire legislative and code change impacts. The more stringent construction requirements stipulated in the new Australian building standards are mainly concerned with the use of noncombustible materials for housing reconstruction. Bushfire housing reconstruction proceeded slowly because the advanced resources for direct flame contact protection such as the window systems, roof systems, shutters, and external cladding materials as required in the new AS3959-2009 were not available in the market. The main reason for the unavailability of these resources was that it required a considerable amount of time for manufacturers to undertake the research and development needed to test and release these new materials onto the market. Only in March 2010, a year after the bushfires, for instance, a combined window and screen system manufactured for use in direct flame contact protection zones was ready for release onto the market. The delays with production of compliant materials for the bushfire recovery, combined with growing demand on building services in the local construction market, created a series of scarcities, which greatly hindered housing recovery in the fire-affected areas. During the bushfire recovery, there were extra costs for the construction requirements of bushfire houses; these extra costs were significantly underrepresented (i.e., officially given assessments were from AUD 10,000 to 40,000 depending on the protection levels required, whereas the extra real cost of a house to be rebuilt to new codes was somewhere up to AUD 100,000). The increase in costs caused financial pressure for the affected house owners who already struggled to procure suitable resources for rebuilding their houses. The uncertainty about the number of houses in the direct flame contact protection zone was another major concern for the building product manufacturers.

Given few incentives from the government and the low likelihood of profitability, material producers were reluctant to put effort into developing materials for houses in the direct flame zone, which they believed would account for only a small fraction of their market. Lack of training and understanding of the new standards introduced in Australia slowed recovery; even one and a half years after the bushfires, designers and builders were still trying to come to terms with the application of the standard.

General Implications of Legislation on Recovery

Having highlighted some of the issues that are connected to the appropriateness of legislation and regulatory provisions in the previous sections, this section presents a summary of their implication on recovery. The summary is in line with Rotimi (2010) who describes the effect that poor legislative provisions could have on post-disaster reconstruction activities, thus:

1. Loss of vital momentum of action. The efficiency of post-disaster reconstruction activities is impacted as a result of delays caused by poor planning and implementation, restrictive legislation and regulatory provisions, and lack of government commitment in reconstruction programs.
2. Loss of commitment to the reconstruction process. There is a tendency for poor commitment to recovery programs by responsible authority because disaster practitioners are unable to apply pragmatic solutions to real-time reconstruction problems for fear of being held liable for their decisions.
3. Difficulties in achieving reconstruction deliverables and inability to accelerate the process of reinstatement. Introduce measures for risk and vulnerability reduction and aid planning for sustainable developments
4. Impairment of overall community recovery and quality of life. Of essence, reconstruction should become a tool for empowerment till a level of functioning is reached where communities are self-sustaining and require no external interventions and also a therapeutic process for overall community recovery.

Summary

This entry has shown common practices relating to changes in legislation for disaster recovery. Changing legislation after a disaster is a common response to the disasters but takes on different forms. Most disasters are followed by legislative changes, emergency legislation, and new disaster legislative, and these measures aim to encourage better building practices and future resilience. Putting in place legislation which enforces revised building codes to increase disaster resilience in the built environment is recommended as is that which speeds up slow processes or offers flexibility. Putting in place rigid rules and bureaucracies slows recovery and creates confusion. As cautioned by Ingram et al. (2006), legislative and regulatory changes need scrutiny to avoid issues such as resource constraints, high costs, and impacts on livelihood that can unnecessarily hinder recovery progress.

Cross-References

- ▶ [“Build Back Better,” Principles of Reconstruction](#)
- ▶ [Earthquake Risk Mitigation: Strategies and Policy Perspectives](#)
- ▶ [Economic Recovery following Earthquake disasters](#)
- ▶ [Reconstruction Following Earthquake Disasters](#)
- ▶ [Reconstruction in Indonesia Post 2004 Tsunami; Lessons Learnt](#)
- ▶ [Resilience to Earthquake Disasters](#)
- ▶ [Resourcing Issues Following Earthquake Disasters](#)

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