

The impact of post-disaster legislative and regulatory changes on the recovery of the built environment

Post-disaster reconstruction depends upon building and planning activities such as, deconstruction, debris clearance, provision of temporary accommodation, hazard analysis, land selection, infrastructure re-development, repair and rebuilding. A difficulty which commonly arises in post-disaster environments is the sudden increase in work load, especially in the building industry, together with a drop in the workforce, which creates bottlenecks that slow down and impede recovery (Chang et al., 2010). During recovery, governments try to balance speed with the need to make the environment more resilient to future disasters (Johnson and Lizarralde, 2012; Kim and Choi, 2013). It is common to facilitate recovery-related activities by simplifying, fast-tracking, and exempting certain rules and regulations using special legislation in post-disaster periods (Rotimi et al., 2009). However, changing the regulations and introducing special legislation present obstacles to successful disaster recovery (Bakir, 2004; Florian, 2007). This paper shows how legislative and regulatory changes impact on post-disaster reconstruction and recovery and offers guidance for better implementation of post-disaster legislative and regulatory changes. The 2009 Victorian Bushfires in Australia was chosen as a case study to explore the legislation and regulation decisions made and their impact on reconstruction. The findings from this study are integrated with existing knowledge to determine general legislative and regulatory policy recommendations to enable better disaster recovery.

The lack of enforcement of proper hazard-related laws restricting development in high-risk areas and adequate risk-based building controls is a prominent cause for disasters by natural hazards

(Bakir, 2004; Bird et al., 2011; Halvorson and Hamilton, 2010; Kijewski-Correa and Taflanidis, 2012; Mulligan and Shaw, 2007). Enforcing updated risk-based building design standards through the use of compulsory building codes and maintaining construction standards through careful inspections is a common response to improve disaster-impacted buildings (James Lee Witt Associates, 2005; Lewis, 2003). The United Nations Hyogo Framework (United Nations, 2005) advocates hazard analysis, classification of land into risk-based zones, and land-use planning to be performed for all potential land re-developments. But hasty introduction of new legislation for risk reduction can have negative consequences. A blanket regulation banning construction within an arbitrarily chosen 100m of “coastal buffer zone” was introduced in Sri Lanka to prevent future coastal threats following the Indian Ocean Tsunami (Boano, 2009; Ruwanpura, 2009). After the zones were declared it was found that there was a shortage of vacant land in surrounding areas suitable for resettlement causing the buffer zone policy to be revised several times creating community confusion and resentment. The creation of new regulations should not be rushed and should consider sustainability and practicability (Ingram et al., 2006). A key recommendation made by Rotimi et al. (2009) is to evaluate and determine the legislative requirements for post-disaster reconstruction, such as that concerning resources and consenting procedures in the pre-disaster period itself.

The main focus of recovery is the community, thus locals must be consulted and included in the process of developing new legislation and regulations to ensure the changes are suitable and beneficial for the community (Ingram et al., 2006). Minimal consultation and consideration of the lifestyle, livelihood and economic structure of local communities when creating regulations can lead to increased vulnerability. Florian (2007) reported that there were no provisions in place to

support the community's economic recovery in Aceh Indonesia, and the lack of regulation around how funding would be provided led to inequality and uncertainty.

Lack of awareness and understanding of new legislation can lead to non-compliance (Boano, 2009). The National Post-Tsunami Lessons Learned and Best Practices Workshop highlighted the importance of training stakeholders (especially external NGOs) about existing and newly introduced legislation and regulations (GoSL and UN, 2005). The community's support can also be obtained by educating them about legislation and regulations that must be adhered to in reconstruction and recovery (Batteate, 2005). Putting in place information centres to support people through all aspects of recovery including legislative and regulatory changes was of great assistance in Iran and Australia (Omidvar et al., 2010; VBRRA, 2010).

Legislation that is customarily used to impose security and safety controls can become an obstacle in post-disaster environments. Such an example can be seen with building consent procedures which are used to enforce building and planning controls. Time-consuming procedures and insufficient resources to process permits and the lack of fast-tracked methods delay reconstruction (Rotimi et al., 2009). Delays in permits was a major reason for the hold-up in housing repair and rebuilding following the 2005 Bay of Plenty storm in New Zealand (Middleton, 2008). Meese III et al. (2005) suggests that fast-tracked consenting procedures, collaboration with other local councils for additional consent personnel, and open access to property records between relevant stakeholders can speed up recovery. Issues with land tenure affected the recovery progress in Haiti and Sri Lanka (Boano, 2009; DesRoches et al., 2011). Regulation around the release of available state lands for resettlement, clearance of debris and

release of funds for recovery also create undue delays in recovery (DesRoches et al., 2011; GoSL, 2005; Haigh et al., 2009).

Meese III (2005) reported a good example in the recovery following the 1994 Northridge Earthquake, USA where legislative suspensions and emergency powers greatly reduced highway reconstruction time. The construction work and the access provided to the communities through opening up the highways shortly after the disaster provided employment and boosted the economy of the affected neighbourhoods.

Post-disaster legislative and regulatory changes help or hinder recovery. In order to understand how, a detailed analysis of the legislative and regulatory changes affecting the recovery of the 2009 Victorian Bushfires on the 7th of February 2009 in the state of Victoria were studied. The bushfires destroyed 430,000 hectares of land and affected nearly 3500 properties, forests, national parks and agricultural facilities in 78 communities (VBBRA, 2009). The Victorian Bushfires provide an opportunity to view the impacts of legislative and regulatory decisions on the recovery process.

Data was collected from Victoria by conducting site visits on three consecutive years in 2010, 2011 and 2012 to monitor annual progress. A range of stakeholders involved in the reconstruction and recovery effort were interviewed using open-ended semi-structured questionnaires to obtain qualitative data (table 1). The interviews were used to determine their involvement in the recovery effort; the positive and negative impacts of existing/newly introduced legislation; lessons learnt; and recommendations for improvement. Interviewees

were selected from the recovery authority which was established to oversee the recovery process (VBRRRA and FRU), the organisation responsible for community recovery (DHS), the Building Commission (BC) who were involved with structural regulations, DPCD and the Department of Justice who were in charge of land-use planning, the Rebuilding Advisory Service (RAS) set up by VBRRRA to provide rebuilding advice to the community, volume builders, local council, town planners (VBRRRA), and grassroots-level organisations such as the Marysville Temporary Village, Marysville CRC, and Marysville Chamber of Commerce to understand the local community responsibilities and perspectives on recovery. The interview data was transcribed and an inductive approach using Grounded Theory and the Constant Comparative Method was used to analyse the data using the computer programme NVivo 9 (Maxwell, 2005; Yin, 2009). The results were then triangulated with reports and other documentation produced about the Victorian bushfires to ensure validity and accuracy of the information.

Table 1: Profiles of the Interviewees in Australian Case Study (Source: Author)

<i>Research Trip</i>	<i>Interviewee Code</i>	<i>Number of interviewees</i>	<i>Description</i>
<i>Research Trip 1 July 2010</i>	P1 – P9	9	Victorian Bushfire Reconstruction and Recovery Authority (VBRRA)
	P10 & P11	2	Building Commission (BC)
	P12	1	Temporary Village
	P13	1	Local Council
	P14 & P15	2	Volume Builders
	P16 & P17	2	Department of Human Services (DHS)
<i>Research Trip 2 July 2011</i>	P18	1	Rebuilding Advisory Service (RAS)
	P19	1	Building Commission (BC)
	P20	1	Department of Human Services (DHS)
	P21	1	Department of Planning and Community Development (DPCD)
	P22 – P23	1	Fire Recovery Unit (FRU)
	P24	1	Marysville Community Recovery Committee (CRC)
<i>Research Trip 3 October 2012</i>	P25	1	Marysville Chamber of Commerce (CoC)
	P26 – P28	3	Volume Builders
	P29 – P30	2	Fire Recovery Unit (FRU)
	P31	1	Building Commission (BC)
	P32	1	Department of Planning and Community Development (DPCD)
	P33 – P34	2	Rebuilding Advisory Service (RAS)
P35	1	Department of Justice	

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 11th 2009(VBBRA et al., 2010). The revisions introduced six Bushfire Attack Levels (BAL) which were more specific in identifying the bushfire risk of properties, to replace the broader Construction Standard Levels that were in the code previously (Ecological Australia, 2010). Stringent design and construction requirements were specified in relation to each BAL to provide greater fire protection. New regulations were introduced for bushfire shelters as well (2009 Victorian Bushfires Royal Commission, 2010b). Interviewees P3, P10 and P13 among others found the changes promising

in increasing bushfire resilience and easy to implement in low-medium risk BAL. However interviewees P3, P10, P13 and P20 declared that the unavailability of necessary building materials to comply with the building code specifications and significant cost increases in the high risk BAL zones created problems and major delays to recovery. Interviewees P19 and P22 pointed out that bringing in compulsory structural regulations that were expensive in high risk areas was a weakness, as those who were not covered by insurance were left stranded.

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 meant both a planning permit and building permit were required for construction(2009 Victorian Bushfires Royal Commission, 2010a; VBBRA, 2009).Interviewee P20 said that by 2011 more accurate mapping of bushfire risk in Victoria was being carried out to replace the WMO with a Building Management Overlay (BMO). BMOs integrated WMO with building controls and imposed three risk levels: low risk, where no special bushfire regulations were needed; medium risk, where a building permit was required and AS 3959 had to be complied with; and high risk, where a planning permit, building permit and compliance with AS 3959 were required(DPCD, 2013; Victorian Government, 2012).Interviewee P36 however noted that planning regulations were intended for future developments which caused issues for people who had bought properties in the past which now fell under the high risk zones as a result of the re-mapping. Some of these people were unable to build due to the new regulations or had to comply with costly stringent building standards. Interviewee P33 added during the interview in late 2012 that the mapping exercise was still on-going meaning regulations could change further in the future.

A solution to the difficulties encountered by people with properties on land classified as high risk following the recent re-mapping exercises was the introduction of the buy-back scheme (Department of Justice Victoria, 2012; Gray, 2011; Victorian Government, 2012). Interviewee P36 who was a member of the buy-back scheme project team provided in-depth insight into the workings of the scheme. The eligibility criteria for the buy-back scheme were that: it is for those who lost their owner-occupied principle place of residence (PPR) in the 2009 bushfires; it hasn't been rebuilt yet; and it is within 100m of significant forest. One-on-one community consultation was done to receive feedback about the suitability of the criteria. The scheme was voluntary and those interested had to apply to be considered for the scheme. Interviewee P36 explained the reason for opting for a voluntary scheme over a compulsory scheme which would have made more sense theoretically: "There are always two extremes. You can either tell people you cannot build here. Or you tell people build where you want but we can't come rescue you. The Government can't say either of these things. The Labour Government that was in power at the time of the bushfires promised that people would be able to rebuild in their previous locations. It is difficult for a new Government to come and change that expectation, so we decided to make it voluntary, and we publicized it as widely as we could. At the end of the day if people don't want to opt for the scheme I guess the fail-safe is if people do decide to stay and rebuild, they have to build to a certain standard".

Interviewee P19 raised a potential problem with the buy-back scheme with regards to empty lots left among other properties which do not choose to go for the buy-back scheme. He questioned who will maintain these empty lots to prevent increasing the risk levels of neighbours, and how

affordable it is for councils to maintain and provide infrastructure and utility services to areas where most rate payers would have opted for the buy-back scheme and left. Interviewee P36 responded that currently maintenance of empty lands has been undertaken by the Government and the plan is to try and sell these empty lands to neighbours at affordable rates, or merge the lands to adjoining forest. He also said that there will be a restrictive covenant put on the lands to prevent residential use if sold in the future. Interviewee P21 suggests land-swap schemes as another way to deal with high risk lands: “With a land-swap, you can open up new subdivisions in safe areas and say that you can have any section in there that you like in exchange for the land that you have. That could be cheaper and more attractive than the Government having to buy back all high risk lands”. Interviewee P36 mentioned a land-swap scheme successfully implemented in Grantham, a town affected by the 2011 Queensland floods in Australia where the entire town was resettled by offering lands of similar size and value to what was previously owned in a different safer location which was outside of the flood path (Queensland Floods Commission of Inquiry, 2012).

Another legislation change was to approve the removal of trees and vegetation within a specified range of an existing building in Victoria for bushfire protection (DPCD, 2009; DPCD, 2013). “There was confusion and controversy when people started to use the rule change to clear their lands beyond the specified distance for added safety, while the councils were intent on preserving trees and staying green” (P21). Interviewee P19 said that in the case of hazards like bushfires, maintenance of vegetation is a way in which risk levels can be reduced. He recommends that legislation should be put in place to enforce continued maintenance of vegetation by local councils and residents.

The Victorian Bushfire Appeal Fund (VBAF) was established by the Victorian Government following the fires to provide financial support to bushfire-affected individuals and communities (VBAF and Australian Red Cross, 2009). Interviewees P16 and P24 confirmed that based on each individual's situation, appropriate assistance was provided by the fund. However interviewee P25 being a member of the bushfire-affected local community observed that the lack of regulations around the usage of funds led recipients to misuse the money provided. Interviewee P25 shared that "people around here who were in no fit mental state were receiving large amounts of money with no regulation on it. The ones you find who are now struggling to rebuild are the ones that have blown the money in the early days". He suggested that "it would have been better to say that you can use \$10,000 for your own personal needs, another percentage to be used for rebuilding etc. and put some regulation around it although it's unpleasant, to avoid the kind of problems we are seeing now". Interviewees P25 and P26 mentioned that the policies for financial support mainly addressed primary home-owners and local businesses, discounting holiday home-owners who owned secondary homes in bushfire-affected communities like Marysville which provided a major source of income. This oversight affected overall recovery in these communities.

Residential rebuilding of homes was predominantly done using small-scale builders who drew up their own building contracts (interviewees P3 and P4). The contracts were supposed to be in-line with the Domestic Building Contracts Act 1995, but the RAS officials came across many dispute cases where home-owners had been misled and disadvantaged. Interviewees P19 and P20 expressed the importance of building advisory services such as RAS to help home-owners understand contracts and legislation in the rebuilding process. Interviewee P27 said from a

builder perspective that some building regulations were unclear and interpreted differently by other builders: “Like a lot of things, it was about the interpretation of the regulations. Sometimes some regulations are open to interpretation. For example, having brick in the sub-floors; some people didn’t do that, while we did, and that added a big cost”. Interviewee P29 strongly encourages administering training courses to explain new legislation and regulation. Interviewee P20 said that a five day training course held to introduce and educate building professionals about the BAL and WMO assessments were a success and also agrees with the concept of using training programmes to educate stakeholders before recovery work is begun.

The processing and issuing of planning and building permits was identified as a potential bottleneck due to the high demand and low capacity in the councils of affected areas. Interviewee P22 explained how permit procedures were facilitated over the recovery period: “Planning permits were exempted for temporary accommodation so people and councils could put up sheds and emergency accommodation without them. The system in Australia is that you need a planning permit and a building permit to build. During recovery the planning permit for rebuilding was exempted and you only needed to submit a building permit(DPCD, 2013)”. Interviewees P19 and P20 added that properties falling under the WMO which would normally be subject to more rigorous planning and building permit requirements were relaxed to only require a simplified planning consent and a building permit(DPCD, 2013). The Government also reimbursed building permit and building permit levy fees as a concession during rebuilding (interviewee P20) (Building Commission, 2010). The periods of time that the above exemptions were valid for have been extended many times (DPCD, 2013). Although these extensions may seem to delay recovery progress interviewee P24 maintains that flexibility is necessary in

recovery programmes taking into consideration the vulnerable unsettled situations of disaster victims.

A common problem was that people misunderstood the exemptions and believed they could build without both planning and building permits resulting in the construction of sub-standard homes (interviewees P21 and P22). In light of this issue interviewee P34 revealed that “you can’t get a building permit retrospectively. But what you can do is prove that it is compliant and get a Class 1A, which allows you to live in it. But it won’t be considered an actual building permit, so you won’t be allowed to modify it. And when trying to sell that house, the house will be considered non-existent so they’ll only get the money for the land which will have a financial impact”. Interviewee P25 reiterated the importance of educating the public and stakeholders about new regulations and changes to prevent such issues.

Interviewees P1, P2 and P31 said that there were no special permit facilitations put in place for businesses to support economic recovery. The slow revival of businesses in the affected towns impacted on overall recovery. Residents felt unsure of settling down in communities without any commercial promise, while in turn businesses did not want to establish themselves in a community without sufficient residents. Therefore putting in place special provisions to enable businesses to re-establish themselves speedily would benefit disaster-affected communities.

The findings from the Victorian Bushfires provide guidance for future building legislative and regulatory changes for disaster recovery. Putting in place legislation which enforces revised building codes to increase disaster resilience in the built environment is recommended. However

as cautioned by Ingram et al. (2006) *legislative and regulative changes need scrutiny* to avoid issues such as resource constraints, high cost, and impacts on livelihood that can unnecessarily hinder recovery progress as stated in literature and observed in Australia.

Land-use planning legislation should be introduced to deal with high risk lands. Land-swaps can be offered instead of compulsory resettlement operations (Kennedy, 2009; Potangaroa, 2009). In land-swaps, being relocated from high risk lands is counterbalanced by the provision of new land in new/upgraded subdivisions in nearby low risk areas. In land-swap schemes Governments have to arrange the new subdivisions to be attractive with new/upgraded infrastructure, and livelihood and recreational opportunities. Community input is also needed to allow locals to have a choice about where they would like the new subdivisions to be and what services they will require. These offers should be extended to all high-risk land owners and not only disaster-victims.

On-going management of hazard risks and structural upgrades through retrofitting should be a legislative requirement. Although existing research stresses the importance of incorporating disaster risk reduction (DRR) during post-disaster reconstruction and future developments, on-going maintenance of hazard risks and resistance to these risks is seldom mentioned. The Australian participants stated that especially with regards to bushfires on-going management of vegetation is important and should be a legislative requirement.

Facilitations and exemptions to the permit process should be made to speed up rebuilding as recommended in literature. But the Australian case study showed problems faced due to the lack

of understanding and misinterpretation of the legislative exemptions. *Training and education should be provided for all stakeholders and the community about new legislative changes.* Extra support and advice can be provided through advisory/support centres as recommended in literature and by interviewees from Australia.

Current literature does not give high importance for putting in place legislation to implement aspects such as social and economic recovery, stakeholder management, community consultation and monitoring and evaluation of recovery activities. The VBRRA strategy in Australia addressed some of these aspects, but interviewees felt that more support could have been provided. Economic and social recovery should be supported more specifically by using legislation and regulation. *Special facilitations should be made for businesses above what is normally provided for residential rebuilding.* Rebuilding of business buildings and providing more public access to businesses can be supported through special fast-tracked processes, simplified permits and subsidized resources for construction. Further assistance can be provided to set up/recover businesses by allowing legislative provisions for subsidized equipment, low-interest business loans and special arrangements between businesses to support each other.

Legislation could be used for better management of stakeholders through fast-tracked tender processes for stakeholder selection, imposing quality controls, creating partnerships and role allocation/modification. The Australian case study raised an issue about inconsistent contracts used by builders for residential rebuilding. It will be beneficial to consider *producing a standard special post-disaster construction contract to be used by all builders.*

Community consultation was encouraged heavily in the Victorian bushfires rebuild. *Mandating community inclusive recovery planning and decision-making through legislative provisions* will be central to creating communities that cater to local needs. The creation of community consultation groups, introducing mechanisms to allow community feedback into decision-making, holding regular multi-stakeholder meetings to include the community throughout the recovery process can be introduced through legislation.

Recovery continues long after rebuilding has been completed; until the community reaches economic and social stability equal to that or better than the pre-disaster condition. Therefore *legislation must impose continued monitoring and enforce necessary facilitations to support recovery-related activities for long-term recovery.*

Effective post-disaster reconstruction and recovery requires restoring and improving communities. This research supports the use of legislation and regulation to improve recovery activities. The Victorian Bushfires case study shows that there were common legislative shortcomings which prevented fast and efficient reconstruction and recovery. In post-disaster environments it is common to facilitate recovery-related activities by simplifying, fast-tracking, and exempting legislation and regulation. However, rules and regulations using special detailed and developed guidance drawing on past disasters are required. The developed guidance for post-disaster legislative and regulatory changes discussed in this paper could enhance recovery and improve the rebuilding process.

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