

## LEGISLATION FOR EFFECTIVE POST-DISASTER RECONSTRUCTION

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**ABSTRACT.** New Zealand is vulnerable to natural disasters. When disasters occur, the effects can be devastating on the built environment. As one aspect of a major programme of research in New Zealand, the authors address the recovery issue in terms of how legislation either facilitates or hinders reconstruction. The results of a survey to building control officers and other disaster practitioners in New Zealand on the application of the Building Act 2004 post-disaster are presented in this paper. There are indications that the New Zealand Building Act 2004 will not be supportive or enabling in post-disaster reconstruction environments, particularly in large-scale disaster events. Key problems found were procedural constraints as a result of high consenting standards and logistic considerations. The desire is to create the best possible conditions that will encourage rapid rebuilding of lives and communities after large-scale disasters in New Zealand and that can only be done within a supportive legislative environment.

**KEYWORDS:** Reconstruction; Legislation; Building Act; Post-disaster reconstruction

### 1. INTRODUCTION

The need to develop a resilient community capable of recovering from disasters is of increasing concern in many countries. New Zealand especially is vulnerable to most forms of natural disasters, such as earthquake, volcanic activity, flood, fire, landslips and tsunami. New Zealand therefore has to prepare for the implementation of a robust response and

recovery programme. Unfortunately the magnitude of its recent disaster events gives it a relatively limited experience. It has been suggested by Rolfe and Britton (1995) that these local events reflect on New Zealand's state of preparedness; and that major disasters could pose considerable economic, physical and social challenges that will make the task of recovery and reconstruction extensive (Hopkins et al., 1999).

In preparing for disasters there is often an emphasis on readiness and response, with poor understanding and little consideration given to the implications of recovery (Angus, 2005). Experience has shown that (Le Masurier et al., 2006) recovery is often carried out by modifying routine construction processes on an ad hoc basis following a disaster. Whilst this can work reasonably well for small-scale disasters, the effectiveness of reconstruction could be improved by modifying the legislative and regulatory framework in advance of a disaster. For larger scale disasters there is a greater imperative to have appropriate systems in place in advance, to accelerate the process of reinstatements through effective coordination and reconstruction delivery.

The current study shows that the achievement of reconstruction objectives will be positively influenced by planned and implemented viable policies in the form of enabling legislative and regulatory frameworks. In comparison to routine construction, there is little provision in several areas of legislation to cater for post-disaster reconstruction processes. Following a major disaster it is unlikely that coordinating authorities and regulatory bodies would be able to cope with the volume of work due to shortfalls in experienced personnel, thus the coordination and management of a major programme of reconstruction could become cumbersome and inefficient.

An important recovery objective is to re-settle displaced persons as quickly as possible after a catastrophic event. This will help to stem the risks of permanent harm and other psychosocial losses. It is often the case that evacuees moved to temporary shelter and accommodation end up being permanently kept away from their homes for reasons traceable to their inability to build back their homes because of restrictive institutional policies or legislations. Studies allude to the fact that subsisting legislation have become impediments to the realisation of post disaster reconstruction objectives (Meese et al., 2005; Rotimi et al., 2006; Middleton, 2008).

There is therefore the tension between strictly applying re-development regulations which aim at preventing a recurrence of the previous community vulnerability; and on the other hand, to allow the affected community to move back to their former habitation. 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 (recovery) although this is tempered with the need to decide whether building back in the same location is right for the community, especially if reduction in vulnerability is not embedded into the rebuilding process. However disaster management agencies will aim at a 'build back safer' situation. The paper highlights some of the issues that may arise from the implementation of a key piece of legislation, the Building Act (2004). It presents survey information on how the Act will either facilitate or hinder the achievement of reconstruction objectives in the event of a large scale reconstruction programme in New Zealand.

## **2. RECOVERY AND RECONSTRUCTION**

Recovery is an integral part of the comprehensive emergency management process (Sullivan, 2003). It refers to all activities that are carried out immediately after the initial response to a disaster situation. This will usually extend until the community's capacity for self-help has been restored. In other words, the end-state is when the assisted community reaches a level of functioning where it is able to sustain itself in the absence of further external intervention (Sullivan, 2003).

The effectiveness of the process will depend on how much planning has been carried out and what contingencies are provided for in preparing for the disaster. It is expected that recovery and reconstruction works will restore the affected community in all aspects of its natural, built, social and economic environment. The recovery process may present an opportunity for improvement in the function-

ing of the community, so that risk from future events can be reduced while the community becomes more resilient. The process will typically follow five key stages (Brunsdon and Smith, 2004).

*Impact Assessment* – which is the information gathering stage in the recovery process aimed at gaining knowledge on the impact of the disaster event on individuals, community and the environment. It involves all stakeholders as it is at this stage that the necessary inspections and surveys (needs assessment) are carried out that will form the basis for all reinstatement activities. The needs assessments will include building inspections, insurances, and health and safety assessments.

*Restoration Proposal* – this is the stage where decisions are made on whether to repair, replace or abandon affected properties. These decisions are reached based on the input of the impact assessment activities. Realistic proposals for meeting the anticipated recovery tasks are presented for the consideration of funding organisations.

*Funding Arrangements* – this is the stage in the recovery process where funds are sought for the rebuilding programme. Affected parties have access to two types of funds in New Zealand, these are funds from private insurance companies and from government.

*Regulatory Process* – design and regulatory approvals are sought for the reinstatement of damaged facilities at this stage. Processing of resource consents is usually painstaking and the target of approving authorities is to ensure that considerable level of resilience is incorporated in all developments. New knowledge gained on risk from hazards after the disaster will assist approving authorities to correct former design concepts to mitigate future disaster risks.

*Physical Construction* – this is the regeneration stage in the recovery process where every aspect of the community and its environment (natural, built, social and economic environments) return to normalcy. Experience has shown that it is difficult to return to the

pre-event status quo but effort is made to restore the functions of the affected community.

The period from the damage assessments to the implementation of reconstruction programmes and complete recovery could take years to achieve. Prevailing legislation would either facilitate or hinder rebuilding efforts, thus shortening or elongating the recovery period. The effect of legislation was evident in recovery after the Northridge earthquake in the U.S.A. Changes made to recovery-related legislation (Phillips, 2005) positively influenced the rebuilding of damaged highways and other civil works after the event. Similar or even more proactive changes (either through legislative repeals or waivers) may be required to speed up recovery at New Orleans (Meese et al., 2005; Marano and Fraser, 2006). Meese et al. (2005) posit that some subsisting environmental regulations have become too restrictive and burdensome on recovery efforts.

In New Zealand, anecdotal evidences suggest that statutory building and resource application procedures may frustrate genuine reconstruction needs (WRLAWG, 2004; AELG, 2005); and with a corresponding loss of innovative solutions to real time problems. Residential property owners are particularly vulnerable to over-regulation and they may have to bear the burden of remaining in temporary shelter for longer periods than otherwise necessary.

### 3. THE PROBLEMS WITH LEGISLATIVE PROVISIONS

Feast (1995) identified several issues in relation to planning and construction legislation that would impede reconstruction of Wellington, New Zealand following a major earthquake. His study suggests that much of the existing legislation was not drafted to cope with an emergency situation and was not developed to operate under the conditions that will inevitably prevail in the aftermath of a severe seismic event.

Middleton (2008) also provided a situation report of the housing situation after the Bay of Plenty storm in New Zealand in 2005. At 300 days after the event, 35 households still required permanent re-housing out of a total 300 compulsory evacuations. By the same period 9 households were still occupying temporary accommodation. Middleton (2008) suggests that this situation could be the result of a poor processing of consents for reconstruction work. Apparently there is clear gap between the process of identifying homes that are suitable or unsuitable to continue to be lived in and helping households to recover from a disaster so that they get back to their normal life.

Processing of building consents at the early stages of reconstruction and recovery are a potential bottleneck (WRLAWG, 2004). A shortage of qualified people and material resources to handle impact assessments, and consent processing is likely to cause further delays. A more flexible approach to the standard consent process might be necessary to expedite the process and help cope with the high volume of consent applications after a major disaster. Although MCDEM (2005a, 2005b) proposes a management structure that could obtain fast-track building consents at the immediate post-impact, such schemes only last as long as a declared state of emergency is in force. The reconstruction work would need to be carried out under current legislative requirements.

#### **4. THE BUILDING ACT 2004, NEW ZEALAND**

The Building Act provides for the regulation of building work, the establishment of a licensing regime for building practitioners, and the setting of performance standards for buildings, to ensure that –

- (a) people who use buildings can do so safely and without endangering their health; and
- (b) buildings have attributes that contribute appropriately to the health, physi-

cal independence, and well-being of the people who use them; and

- (c) people who use a building can escape from the building if it is on fire; and
- (d) buildings are designed, constructed, and able to be used in ways that promote sustainable development.

The Act prescribes the requirements of the national building code which requires buildings and other associated features to meet certain performance standards such as durability, fire safety, sanitation (services and facilities), moisture control, energy efficiency and access. The Act is administered at the national level by the Department of Building and Housing (DBH) and at the local level by Building Consent Authorities (BCA) through a building consent process. The responsibilities of BCAs under the Act can be assigned to Independent Qualified Persons (IQP). IQPs include building and engineering professionals who have undergone an accreditation and certification process to act in the capacity of consent and compliance officers. This provision in the Act for IQPs is useful as it devolves responsibility from the BCAs to IQPs and helps to reduce workloads in times of need.

Building consent processing involves the house owners, the designer/builder and the Building Consent Authorities. Consent is required for all building work in connection with the construction, alteration, demolition or removal of a building; and is only granted when the BCA is satisfied that works are in accordance with the building codes and associated regulations. Works cannot commence until approval/consent is granted. Under normal circumstances, the building consent process would be expected to take 20 days, but the reality is far from this.

The Act requires a strict inspection of work progress during construction at 'hold points' corresponding to progress milestones. Each defined stage must be inspected and certified before subsequent stages can be started. In-

spection provides some certainty about code compliance and construction quality; and that constructed works are in accordance with the original specified in the approved consents. At completion of all works a Code of Compliance Certificate (CCC) is issued.

Under the Building Act, there is a special waiver to allow alterations to take place without necessarily complying with the relevant provisions of the Building Code. BCAs are expected to prepare policies and guidelines on how this discretionary power can be exercised (DBH, 2005), but this is not being done across all councils. BCA's should also prepare modalities for collaboration with other councils and disaster agencies for resource sharing and deployments to relieve the likely demands for external services when consent applications increase.

Another dimension to consent processing is with the effect that the process will have on the rights to compensation. The Building Act requires that Territorial Authorities must refuse to grant building consents on land subjected to natural hazards unless they can be protected from the hazard, and where waivers are granted, it requires that notices be placed on the land to indicate the risk of natural hazards they are exposed to. If this provision is strictly implemented, then house owners may not qualify for insurance claims where there is an identified risk to their facilities. Previously risk-free buildings may become risk-prone, hence notices will be placed on them that may prevent them from being compensated in future disasters.

## 5. THE IMPLICATIONS FOR POST-DISASTER RECONSTRUCTION

Strict implementation of the Building Act post-disaster could have the following implications on reconstruction:

- Loss of vital momentum of action as a result of delays caused by poor planning and implementation; other restrictive

regulatory provisions; and lack of government commitment to reconstruction programmes (Aysan and Davis, 1993).

- Loss of commitment to the reconstruction process because disaster practitioners are unable to apply pragmatic solutions to real-time reconstruction problems, due either to its inflexibility and fear of being held liable for decisions taken.
- Difficulties in achieving reconstruction deliverables and inability to: accelerate the process of reinstatements (Ye, 2004); introduce measures for risk and vulnerability reduction; and aid planning for sustainable developments (Jigyasu, 2004; Shaw et al., 2004).
- 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 (Ofori, 2004).

Best practice approaches that will facilitate reconstruction programmes within an enabling legislative framework in New Zealand are required. Such a legislative framework should prepare disaster agencies to meet recovery objectives whilst not compromising the need to build back safer.

## 6. RESEARCH METHODS

The primary source of data for this research was an on-line questionnaire (n = 200) administered to building control officers and other disaster practitioners in New Zealand. The invitation for participation was made through 85 local councils including web links to the on-line survey. The questions were largely in the form of ordinal and Likert scales, with respondents required to rate some statements about the Building Act, in line with their opinions on how the Act will affect the implementation of reconstruction works after disasters. It

was hypothesized that some of the provisions of the Building Act will constitute significant impediments to the realisation of large-scale reconstruction programmes after a natural catastrophe in New Zealand. The research hypothesis was arrived at on the premise that the provisions for consent processing within the Building Act will be the source of frustration for disaster-affected building owners as it will slow down the reconstruction work particularly when there is a wide scale devastation of the built environment in New Zealand. Improvements that could be made to the existing legislation and regulatory provisions were determined so that they facilitate the implementation of large scale post-disaster reconstruction programmes in New Zealand.

## 7. DISCUSSION OF RESULTS

Respondents were required to rate their understanding of the Building Act and to indicate how often they make reference to the Act in the course of their work. This was done for purposes of reliability; hence only respondents who were familiar with the Act were used for the analyses. A total of 80 responses were received altogether. Of this number 67.5% ( $n = 54$ ) of the respondents have an average to very high understanding of the provisions of the Building Act; while 50.5% ( $n = 41$ ) very often make reference to the Building Act in the course of their work activities. Generally the respondents (above 65%) have working experiences in their various local councils of more than 15 years.

### *Building Consent Processing under the Act*

On the building consent process and the potential effects this would have on post disaster reconstruction, 77% of the total responses ( $n = 65$ ) agree that the process may become cumbersome during a large scale reconstruction programme; and 74% agree that councils will struggle to meet the requirements for consent processing after a major disaster. These reflect

the reality that there will be a spike of consent applications for reconstruction that will overwhelm the local councils' capacity.

The consent process under the Building Act may not be the cause of the problem for consent processing, rather the resources available to facilitate the process. Most of the respondents have indicated that the capability of the building consent authorities coupled with designers and engineers and IQPs for on-the-spot assessments of built facilities, is in doubt. During normal times, councils struggle with the consent process because of inadequate resources and would be challenged further by a larger volume of requests if the current resource levels are maintained during 'abnormal times'.

Councils will need to make prior arrangements for the deployment of resources from neighbouring councils and outside the country to meet resource demands. On-the-spot assessments of affected built facilities would facilitate decisions on whether facilities are safe enough to be re-occupied; will require minor repairs before occupation; or that the repairs would be extensive. Such timely assessments are a necessity. This will depend largely on prior arrangements and preparations for the high demands. However, only 39% believe that the local councils have made adequate arrangements for such on-the-spot assessments.

55% of respondents hold the view that the strict application of the Building Act provisions will result in inefficient reconstruction operations. Few (25%) are of the opinion that the procedural arrangements can be shortened in any way for post disaster reconstruction. There appears to be only two circumstances by which the consent process can be bypassed. One is if an application is made by the facility owner under urgency or where an allowance is made by a council to allow for construction work to take place without complying with the relevant provisions of the building code. These can be exercised in a post-disaster environment.

### *Resource Sharing under the Act*

Considering the importance of resource availability in the consent process, respondents were requested to indicate if there were memoranda of understanding, between councils in New Zealand, for resource sharing in the event of a major disaster. 45% confirm the existence of loosely written memoranda. These memoranda are considered very generic documents that may not commit neighbouring councils to their implementation. 16% of respondents are not aware of its existence in their councils; and 39% are unsure. Of the total number that indicate that memoranda of understanding exist; indicated that such memoranda contain the following: procedural arrangements (responsibilities, liabilities etc) between councils; information dissemination and sharing; personnel sharing and deployment modalities; arrangements for financial contributions and financing; operational logistics and assistance; and the participation of external aids/agencies.

In summary, there is little doubt that building consent processing under the Act will slow down reconstruction work however respondents are not in favour of a short-cut to the process or outright deregulation. The general opinion is that the benefits for 'development control' outweigh those of speedy recovery. Consent processing problems were perceived more as a logistic issue that could be resolved through adequate resourcing (making available Assessors, Engineers, Building Control Officers etc. to facilitate the process). BCAs and IQPs are central to post-disaster reconstruction. The certification process must be flexible yet robust. Pro-active approaches rather than reactive response/recovery is generally preferred. In the same vein, there has to be prior arrangements (detailed modalities for action and re-action) on the use and deployment of resources. Such prior planning would benefit reconstruction programmes.

## **8. LEGISLATIVE CHANGES NEEDED FOR EFFECTIVE POST-DISASTER RECONSTRUCTION**

The building consent process is a potential bottleneck considering that there will be a spike of applications that could overwhelm the capacity of BCAs and IQPs. The process needs to be simplified by allowing approvals to be granted in retrospect, this is without a compromise to applicable building codes. There are only two situations where the consent process can be bypassed under current BA provisions. One is if an application was made by a building owner under 'urgency'; and the other is reliant on local council prerogatives. BCAs need to be proactive in preparing policies and guidelines on how these discretionary powers can be exercised.

Training and re-training of Inspectors, Assessors and Evaluators must be given priority. Particularly packaged-induction schemes need to be prepared for loaned/external resource persons so that they come to grips with local procedures in a short duration. It is important that the methods and legal requirements for the exchange of resources are prepared in advance of a disaster event. Procedural constraints may slow down the reconstruction phases in New Zealand. The key issues of concern are: How to process the increased volume of applications that will be many times above the base workload?; the ability/inability to meet the statutory timeframe required of all consent applications and design uncertainty on repairs/alterations to partially damaged buildings and whether the scope of work will require a building consent.

A fast track approach will need to be devised for the consent procedure. Repair of buildings in a controlled manner can be achieved (WRLAWG, 2004) through; collaboration with other local councils for the redeployment of additional consent personnel; and to work up processes for quick access to property

records. Controlled relaxation of building permit requirements may be necessary. For example reconstruction works on buildings with no significant health or safety risks may be permitted as early as possible without having to go through the entire consent process.

Lastly but critical to recovery after a major disaster event, is the need to statutorily empower local councils and other disaster agencies beyond the expiration of the civil emergency period. There is no specific power to direct emergency activities by lifeline utilities (AELG, 2005) and the duties and obligations of governmental bodies, especially local and regional councils, have not been clearly expressed in legislation (Messrs Anthony Harper, 2006).

## 9. CONCLUSIONS

This paper has focused on the process of reconstruction, and the impediments to reconstruction which may be found in current legislation. Should the routine regulatory and legislative processes be followed after a major disaster it is unlikely that regulatory bodies would be able to cope with the volume of work. Building consent processing in accordance with the Building Act at post disaster may be cumbersome, and may slow down reinstatements and reconstruction programmes. However the benefits for controlling the reconstruction of the built environment outweigh those of a deregulated reconstruction process. Local councils and governments would need to be proactive in designing ways of managing the implementation of the Building Act in a post-disaster situation. Local councils for example could prepare memoranda of understanding that details the modalities for exchange of resources and of receiving external aid and assistance. Such prior arrangements would hasten structural and safety assessments. The effectiveness of every recovery process will depend on how much planning has been carried out and

what contingencies are provided for in preparing for the disaster. The task of reconstruction after a major event can be an onerous challenge. Legislation needs to be revised before hand as hasty revisions during the course of reconstruction works do not provide the best solution to major disaster problems.

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**SANTRAUKA****EFEKTYVAUS APLINKOS ATSTATYMO PO STICHINIŲ NELAIMIŲ ĮSTATYMAI****James Olabode ROTIMI, Suzanne WILKINSON, Kelvin ZUO, Dean MYBURGH**

Infrastruktūros tinklai Naujojoje Zelandijoje platūs, miestai išbarstyti, tačiau tankiai apgyvendinti, tad stichinės nelaimės gali pridaryti žalos. Tokios nelaimės gali nusiaubti gamtinę ir užstatytą aplinką. Bendruomenė tam turėtų pasiruošti iš anksto, o ne pasikliauti operatyviu atkūrimo procesu po įvykio. Kaip vieną iš Naujojoje Zelandijoje vykstančios stambios tyrimų programos aspektų autoriai pasirinko atkūrimo klausimą ir jį nagrinėja analizuodami, kaip įstatymai padeda arba trukdo atstatymo projektams ir programoms. Įprastoms statyboms taikomi įstatymai numato saugų infrastruktūros, kapitalo investicijų ir žemėtvarkos plėtojimą, užtikrindami aplinkosaugą, tačiau dažnai jie netinka atstatymo po stichinių nelaimių projektams. Šiame darbe pristatomi rezultatai, gauti apklausus Naujosios Zelandijos statybų kontrolės pareigūnus ir kitus stichinių nelaimių specialistus dėl Statybų įstatymo (2004) taikymo po stichinių nelaimių. Yra ženklų, kad Naujosios Zelandijos statybų įstatymas (2004) nebus palankus arba sudarantis galimybes nuo stichinių nelaimių nukentėjusioms teritorijoms atstatyti, ypač kai stichinės nelaimės yra stambaus masto. Apklausos rezultatai rodo, kad tebekyla iššūkiai, kaip pagal šį įstatymą atstatymo uždavinius įvykdyti veiksmingai. Daugiausia dėmesio tarp iškeltų klausimų skirta procedūriniais suvaržymams, susijusiems su aukštais kvalifikaciniais standartais ir kitomis logistikos aplinkybėmis. Būtinai nemanoma dėmesys, norint taikyti Statybų įstatymą reagavimo į nelaimes ir aplinkos atkūrimo srityje. Siekiama sukurti geriausias įmanomas sąlygas, kurios skatins spartų gyvenamosios aplinkos ir bendruomenės infrastruktūros atstatymą po stambių stichinių nelaimių Naujojoje Zelandijoje ir kurios įmanomos tik palankioje teisinėje aplinkoje.