REGULATORY ISSUES IN THE PROPOSED CHANGES TO THE NEW ZEALAND BUILDING ACT 1991

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SUMMARY

This is a companion paper to that by Hopkins et al [Ref 1] and outlines the development of New Zealand legislation relating to the resistance of buildings to earthquakes, culminating in the current provisions of the Building Act 1991. Proposed changes to those provisions are described. The issues underlying those proposals are discussed, as is the process by which the Building Industry Authority developed the proposals with the advice of the New Zealand Society for Earthquake Engineering and consultations with the building industry.

INTRODUCTION

New Zealand is a single jurisdiction with a national Parliament and a Westminster-type cabinet government. An Act of Parliament may authorise the Cabinet to make Regulations for the purposes of the Act concerned. Local authorities (regional, city, and district councils) also have limited rule-making powers delegated to them by Acts. The only other source of law is the common law established by judicial decisions.

Originally, New Zealand followed the UK system of local government, and building controls consisted of local authority bylaws. The building industry's dissatisfaction with those bylaws led to the passing of the New Zealand Building Act 1991 ("the Act"), which came into full force in 1993. The Act can be seen as part of the wider reforms described in the paper by Britton and Clark [Ref 2]. It made many radical changes to the previous building control system, particularly by introducing a national performance-based building code (the First Schedule to the Building Regulations 1992) and establishing the Building Industry Authority ("the Authority").

The Act requires, in section 46 (unless otherwise stated, section references are to the current Act), that any building which is to undergo a change of use shall be upgraded to comply with the provisions of the building code for structural behaviour and other matters. However, the Act's provisions for existing buildings deemed to be earthquake-prone, in sections 66 to 69, are otherwise little different from the previous legislation. Key features of those provisions are that they:

- Apply only to unreinforced masonry and unreinforced concrete buildings.
- Apply only if the building is likely to suffer catastrophic collapse in a moderate earthquake.
- Define "moderate earthquake" by reference to an outdated 1964 design standard which has not been current for many years.
- Specify a convoluted enforcement process.

Difficulties with sections 66 to 69 were recognised even when the Act was passed in 1991, and recent overseas earthquakes have highlighted the threat posed by some buildings constructed as recently as the early 1970s. In 1998, therefore, the Authority, with advice from a study group of the New Zealand Society for Earthquake Engineering ("the Society") and after extensive public consultations, submitted to the Minister of Internal Affairs

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a series of recommended amendments intended to overcome those and other perceived shortcomings. Table 1 shows the current sections 64, 65, and 66 together with the recommended amended versions.

This paper discusses the recommended amendments and outlines some of the public policy issues involved, together with the process by which the Authority developed its proposals, but the technical basis for the proposals is covered in the paper by Hopkins et al [Ref 1].

As at August 1999, the Authority's recommendations have not been accepted by the Minister and do not represent Government policy.

Views expressed in this paper are those of the authors and are not necessarily shared by the Authority or the Society.

HISTORICAL BACKGROUND

General

Until the Act came fully into force in 1993, the design and construction of buildings had been regulated by bylaws or local regulations made by the local Council (now "territorial authority") under a series of Municipal Corporations Acts, enacted by Parliament between 1867 and 1954 and eventually replaced by the Local Government Act 1974. At least since 1886 the power to make bylaws had been very wide, but until 1931 there does not seem to have been any specific provisions for resistance to earthquakes.

That changed when the Hawke's Bay earthquake of 1931 devastated the city of Napier. The immediate legislative reaction can be seen in section 41(2) of the Finance Act (No. 2) 1931, which gave local Councils "power to make bylaws under the Municipal Corporations Act 1920 for the purpose of regulating and controlling the design of buildings in relation to their resistance to earthquake shakes".

In fact, earthquakes were nothing new in New Zealand. Members of Captain James Cook's second voyage of discovery had experienced an earthquake in 1773. Wellington had been severely shaken in 1840, again in 1848, and was completely devastated in 1855, which left the town with not a single undamaged brick building. Christchurch had lost its Cathedral tower in 1888. Between 1900 and 1931 there had been more than 30 earthquakes of comparable magnitude to the Napier one, although fortunately with not nearly such serious results.

One can only speculate as to why earthquake had not earlier been recognised as ranking with fire and pestilence as a reason for the regulation of buildings. Perhaps the 1855 disaster had been so enormous that it seemed impossible to legislate against such devastation, but in any case, until well into the 20th century, structural engineers lacked the knowledge to design building specifically to resist earthquake vibrations.

By 1931, however, technology had advanced sufficiently for the problem to be quantified, however crudely, and thus brought within the ambit of rational engineering design. In 1935, the then New Zealand Standards Institute (itself established in reaction to the Napier earthquake) published a model building bylaw, NZS 95 [Ref 3], which was constantly revised and, as NZS 1900 [Ref 4], had become generally used throughout New Zealand, with local amendments, until it was replaced by the Building Act. The modern approach to seismic design was established in New Zealand in 1976 with the publication of NZS 4203 [Ref 5], which was incorporated by reference into NZS 1900 and which, with various amendments, is still current.

The problem of existing buildings

Bylaws based on NZS 1900 dealt primarily with the design and construction of new buildings, although they did require certain upgrading to be undertaken when an existing building was altered or underwent a change of use. Independently of the bylaws, the Municipal Corporations Act gave Councils the power to require remedial work to be done on buildings which were "in such a condition as to be dangerous". However, in 1964 the Supreme Court held [Ref 6] that the Council had no such power when "the danger will arise only in the event of a major earthquake".

The effect of that case was countered in 1968 when the Municipal Corporations Act was amended to provide that Councils could, on application to the Minister of Local Government, be empowered to apply provisions very similar to sections 66 to 69. The relevant provisions of the Municipal Corporations Act were retained when that

Act was replaced by the Local Government Act 1974 and were eventually transferred into the Building Act with little alteration, although there is no longer any need for a territorial authority to apply to the Minister for powers in respect of earthquake-prone buildings.

The Authority has investigated various reforms of specific provisions of the Act. The procedures of reform are described below in relation to existing buildings and earthquakes, and similar procedures were followed for many other topics. The recommendations resulting from those procedures, including those discussed in this paper, were submitted to the Minister of Internal Affairs towards the end of 1998.

THE PROCESS OF REFORM

In the light of advice from a study group established by the Society, Authority staff prepared preliminary draft amendments which were made available for public comment in 1998. The draft amendments were sent to persons and organisations who, in the Authority's opinion, were likely to be affected, and were also sent to anyone else on request, in each case accompanied by:

- A discussion document prepared by Authority staff, and
- A separate discussion document prepared by the study group. The paper by Hopkins et al [Ref 1] addresses the key issues discussed in that document, which included:
    - Discussions of technical considerations and of benefit/cost analyses, and
    - Suggestions for the development of methods of evaluating whether an existing building was likely to be not safe in earthquake and, if so, how it could be evaluated in terms of the current seismic design standards and strengthened accordingly.

In addition, public seminars were held in Auckland, Wellington, and Christchurch. Members of the study group made technical presentations at the seminars, which were facilitated by the Rt Hon Jim McLay, a former Prime Minister. The seminars were widely advertised and well attended, but mainly by regulators, designers, and other professionals, with a noticeable absence of building owners.

The Authority received numerous written comments and also a report on the seminars from the Rt Hon Mr McLay, all of which were carefully considered when the Authority revised the preliminary draft to prepare the recommended amendments which it submitted to the Minister.

MAJOR ISSUES RELEVANT TO REFORM

Buildings to which the provisions apply

When legislation first addressed earthquake-prone buildings in 1968, unreinforced masonry buildings were seen as the prime if not the only buildings to be of concern. The same view was expressed by some commentators on the Authority's preliminary draft amendments, who took the view that the current provisions were working well (if slowly) and there was no need to extend them to take account of other types of construction.

Although there are still significant numbers of unreinforced masonry buildings that are likely to be not safe in earthquake, significant progress has been made, particularly in the metropolitan centres. However, a survey of territorial authorities made by the Authority in 1997 revealed that out of the 64 (out of a total of 74) territorial authorities which responded, only 5 had actually issued notices under section 66 over the four years during which the Act had then been in force. Many of the others were apparently waiting for the legislation to be clarified before they took further, or any, action.

The Authority recognised that buildings erected before 1935, of whatever type of construction, could well be not safe in earthquake. The Authority also accepted advice from the Society's study group to the effect that some buildings which comply with the structural design standards current between 1931 and 1976 might nevertheless contain critical structural weaknesses that make them not safe in earthquake. The Authority also recognised the possibility that faulty design or construction errors might have resulted in a building of any age or type of construction being not safe in earthquake.

Accordingly, the Authority recommended that the Act's provisions for existing buildings should not be limited to buildings of any particular type of construction. However, the section 66(2) exclusion of certain residential buildings was retained.

As to the numbers of buildings affected, the Society's study group estimated that the overall number of unreinforced masonry buildings coming within the scope of section 66 that have not yet been addressed is in the range 1,500 to 2,000. The group also estimated that the total number of buildings, of two or more storeys which do not meet modern seismic design standards is in the range 35,000 to 50,000. However, the number of buildings likely to collapse in a moderate earthquake is thought to be as low as 10% of that range.

The trigger level: definition of "moderate earthquake"

Currently, action under section 66 is triggered when a building is "earthquake–prone" because its ultimate load capacity would be exceeded in a "moderate earthquake" defined in terms of a 1965 design standard. That is significantly different from the corresponding trigger for action under section 64 trigger when a building is dangerous because it "in the ordinary course of events (excluding earthquakes), [the building] is likely to cause injury or death . . . or damage to any other property."

That raised the question of whether it was necessary or advisable to treat buildings threatened by earthquakes as different in kind from buildings threatened by fire or flooding or any other occurrence. In other words, should upgrading be triggered by the "ultimate load capacity" of the building or by the likelihood of injury or death or of damage to other property? After all, the stated purposes of the Act include safeguarding people from possible injury and providing for the protection of "other property" (defined in terms of legal boundaries). The wording of section 64 corresponds to the purposes of the Act, the wording of section 66 does not.

The Authority accordingly decided that it would be preferable to treat all buildings on the same basis in respect of all relevant threats to life and property. It also decided, again by reference to the purposes of the Act, that the phrase "not safe" was preferable to the word "dangerous". Similarly, the Authority decided that a building should be deemed to be not safe only in relation to its failure to comply with the building code. Threats to life or other property not covered by the building code should not be dealt with under the Act.

Accordingly, the Authority decided on a general trigger (the recommended new section 64(3) shown in Table 1) covering all cases, supported by two specific trigger provisions, one for fire (not shown in Table 1) and the other for earthquake (the recommended new section 64(4)(b) in Table 1).

In the preliminary draft amendments made available for public comment, the specific trigger for earthquake was that the building "would be likely to give rise to loss of life in an earthquake having a return period of 150 years". Some commentators criticised that as being too uncertain for practical application, and some because it was too demanding and would apply to an unacceptably large number of existing buildings. There seemed to be a widespread feeling that the proposal underestimated the level of risk generally accepted as justifying the mandatory strengthening or demolition of the building concerned. Feedback from the seminars was to the same effect.

In the light of the comments and feedback, and with further advice from the Society, the Authority finally recommended the specific trigger that the building "would be likely to give rise to loss of life in an earthquake that would generate shaking at the site of the building one-third as strong as the earthquake that would be used to design a new building at that site". The value of one-third must be seen in relation to likely loss of life as distinct from damage to the building itself. That formulation has the advantage of being related to whatever seismic design standard is in use at the time without detracting from the performance-based approach of the Act as a whole.

Required level of strengthening

Section 66 refers to "requiring work to be done on the building to remove the danger" but does not specify any particular level of upgrading to be achieved by that work. Different people have taken different approaches, but as a matter of law section 66 appears to require an earthquake-prone building to be strengthened to only just above the trigger level.

That is in marked contrast with section 46, which requires the building to be brought to comply "as nearly as is reasonably practicable" with the relevant provision of the building code. The Authority preferred the approach of

section 46, noting that the phrase "as nearly as is reasonably practicable" (in the context of upgrading a building's means of escape from fire) has been authoritatively interpreted by the High Court in *Auckland City Council v NZ Fire Service* [1996] 1 NZLR 330, in which it was said that the phrase:

> . . . must be considered in relation to the purpose of the requirement and the problems involved in complying with it, sometimes referred to as "the sacrifice". A weighing exercise is involved. The weight of the considerations will vary according to the circumstances and it is generally accepted that where considerations of human safety are involved, factors which impinge upon those considerations must be given an appropriate weight.

However, strengthening "as nearly as is reasonably practicable" might not be enough to prevent a building from being deemed to be not safe under the recommended revision, and that point has been covered also (the recommended new section 65(1)(c)(i) in Table 1). In the light of comments and feedback described above, the Authority did not accept the Society's recommendation for a higher minimum level of strengthening, see Hopkins et al [Ref 1].

The Authority recognised that there was a need for guidance on assessing whether a particular building meets the trigger of being likely to cause injury or death in shaking one-third as strong as would be used to design a new buildingr, and also on assessing the effect of any particular strengthening work in relation to compliance with the current standards. The Authority accordingly recommended amendments to the Act (not shown in Table 1) which would authorise it to issue or aprove documents for those purposes, and which would provide that compliance with such documents is to be accepted as establishing compliance with the relevant requirement of the Act, but not as the only means of establishing such compliance.

Several commentators saw it as unfair that buildings which have already been strengthened might need further strengthening under the recommended revision. Indeed, in future a building strengthened under the recommended revision might itself need further strengthening because of changes to seismic design standards. The Authority recognised the validity of those comments, but decided that safety must take precedence over perceived unfairness, and that in any case the revision gave territorial authorities sufficient flexibility to treat each case on its merits, particularly in the time allowed for remedial work to be undertaken.

Procedures for enforcement

Sections 67-69 (not shown in Table 1) set out a convoluted procedure allowing for an owner served with a notice under section 66 to object to the territorial authority, to have that objection heard, to have further hearing in the District Court, where the Judge is assisted by technical assessors chosen from a panel of engineers appointed by the Authority, with a right of further appeal to the High Court on questions of law, each step involving formal requirements as to notice and so on. In practice, however, under section 66 and its predecessors, there appear to have been only three hearings in the District Court and none in the High Court, and each of them turned on its own facts so that the Court's decision was about engineering rather than legal questions.

Currently, certain technical disputes may be submitted to the Authority for determination under section 17 (not shown in Table 1). The Authority frequently engages appropriately experienced experts to undertake a peer review and advise the Authority accordingly. That determination process is quicker and less expensive than proceedings before the Courts. The Authority accordingly recommended that the section 67-69 procedures be drastically simplified by providing for doubts and disputes to be submitted to the Authority for binding determination under section 17 subject to appeal to the High Court on questions of law.

Nevertheless, even if the Authority determines that the building was not safe in terms of the revised section 64, the territorial authority would not be authorised to undertake the necessary strengthening, or to demolish the building, without an order from the District Court. That safeguard is considered necessary because of the major infringement of property rights arising from such actions.

Mandatory inspections

The Authority's preliminary draft amendments, as made available for public comment, included a requirement for territorial authorities to make a rapid assessment of buildings to be specified by the Authority (for example, building erected before 1976 and having four or more storeys or being used for public assembly). The rapid assessment would either establish that the building was safe or leave open the possibility that it contained critical structural weaknesses, in which case the owner would be required to engage an engineer to make a more detailed

assessment to establish whether the building was or was not deemed not to be safe in terms of the revised section 64.

In the light of comments and feedback, and after consideration of the costs and benefits of the proposal, the Authority decided not to include such mandatory inspections in its recommendations to the Minister. Territorial authorities will still be able to make such assessments, as several are doing currently, but would not be specifically required to do so.

CONCLUSIONS

Developing legislation to reduce the risks associated with existing buildings presents considerable challenges. The process described above revealed a variety of views on the issues involved in such legislation.

In New Zealand, such legislation must take account of general public perceptions as well as of informed advice from technical specialists. The Authority attempted to strike a balance between sometimes conflicting views. Its recommendations will be accepted only if they are seen by the Government not only as technically appropriate but also as realistic in terms of achievable public policy.

Some recommendations from technical experts were modified or not accepted, but the key technical objections to the current legislation have been addressed so that the recommendations apply to buildings of all types of constuction, are to be applied in accordance with modern methods of seismic design, and have simplified enforcement procedures withut compromising the rights of buildng owners.

Of course, what is generally acceptable in New Zealand might be seen as excessive or inadequate in other jurisdictions. Feedback from others who have dealt with similar problems elsewhere is welcome.

REFERENCES

1. Hopkins, David C, Brunsdon, David R, Jury, Rob D, and Shephard, R Bruce, 2000: *Dealing with Buildings Likely to be Unsafe in Earthquake – Technical Considerations.* Proceedings 12th World Conference on Earthquake Engineering, Auckland, January.

2. Britton, Neil, and Clark, Gerard, 2000: *Non-regulatory Approaches to Earthquake Risk Reduction: The New Zealand Experience.* Proceedings 12th World Conference on Earthquake Engineering, Auckland, January.

3. NZ Standards Institute 1935: New Zealand Standard 95 Model Building Bylaw.

4. NZ Standards Institute 1964: New Zealand Standard 1900 Model Building Bylaw.

5. Standards New Zealand 1976: New Zealand Standard 4203:1976 Code of Practice for General Structural Design and Design Loadings for Builidngs.

6. *City of Lower Hutt v Leighton* [1964] NZLR 558 (SC),

Table 1: Current and recommended versions of sections 64, 65, and 66 of the Act

Current	*Recommended*
64 Buildings which are deemed to be dangerous or insanitary - (1) A building shall be deemed to be dangerous for the purposes of this Act if it is- (a) A building which, in the ordinary course of events (excluding earthquakes), is likely to cause injury or death (whether by collapse or otherwise) to any persons in it or to persons on other property or damage to any other property; or . . .	**64. Buildings to be safe and sanitary** – (1) The owner of any building, whenever constructed, shall ensure that the building remains at all times safe and sanitary to the extent required by this section. . . . (3) For the purposes of this section, a building shall be deemed not to be safe if it fails to comply with any of the provisions of the building code to such an extent as to be likely to cause injury or death to any person or damage to any other property under either normal conditions or reasonably foreseeable abnormal conditions. (4) Without prejudice to the generality of subsection (3) of this section, a building shall be deemed not to be safe: (b) If the building would be likely to give rise to loss of life in an earthquake that would generate shaking at the site of the building one-third as strong as the earthquake that would be used to design a new building at that site.: Provided that this paragraph shall not apply to any building which is used wholly or principally for residential purposes, unless the building is of 2 or more storeys and contains 3 or more household units.
65. Powers of territorial authorities in respect of dangerous or insanitary buildings - (1) Without limiting its powers under Part V of this Act, a territorial authority, on being satisfied that any building is a building deemed to be dangerous under section 64 of this Act, may- (a) Put up a hoarding or fence so as to prevent persons approaching nearer than is safe: (b) Except as provided in section 74(1)(b) of this Act, give notice in accordance with section 71 of this Act requiring work to be done on the building to reduce or remove the danger within a time specified in the notice, being not less than 10 days. (6) Work required or authorised to be done under this section may include the demolition of all or part of a building . .	**65. Powers of territorial authorities in respect of buildings which are not safe or sanitary** – (1) Without limiting its powers under Part V, a territorial authority, on being satisfied that any building is deemed not to be safe or not to be sanitary, or both, under section 64, may take any or any combination of the following actions- (a) Put up a warning notice; (b) Put up a hoarding or fence so as to prevent persons approaching nearer than is safe and sanitary; (c) Except as provided in section 74(1)(b), give notice in accordance with section 71 requiring: (i) That work shall be done to bring the building to compliance with the relevant provisions of the building code as nearly as is reasonably practicable as if it were a new building but not less than is necessary to make the building safe and sanitary under section 64; (ii) That such work shall be done within a reasonable time specified in the notice but not less than 10 days Provided that in the case of a building deemed not to be safe under section 64(4)(b), the time specified in the notice shall take account of the matters listed in section 47 which the territorial authority identifies in the notice as relevant to the time within which the work shall be done; (iii) That pending the issuing of a code compliance certificate in respect of that work, the building shall be used only subject to such conditions as the territorial authority considers appropriate. . . (5) Work required or authorised to be done under this section may include the demolition of all or part of a building. . .

66. Buildings which are deemed to be earthquake prone - (1) Subject to subsection (2) of this section, a building shall be deemed to be earthquake prone for the purposes of this Part of the Act if, having regard to its condition and to the ground on which it is built and because of its construction being either wholly or substantially of unreinforced concrete or unreinforced masonry, the building will have its ultimate load capacity exceeded in a moderate earthquake and thereby would be likely to suffer catastrophic collapse causing bodily injury or death to persons in the building or to persons on any other property or damage to any other property. (2) Subsection (1) of this section shall not apply to any building which is used wholly or principally for residential purposes, unless the building is of 2 or more storeys and contains 3 or more household units. (3) Without limiting its powers under Part V of this Act, a territorial authority, on being satisfied that any building is a building deemed to be earthquake prone, may- (a) Put up a hoarding or fence so as to prevent persons approaching nearer than is safe; and (b) Except as provided in section 74(1)(b) of this Act, give notice in accordance with section 71 of this Act requiring work to be done on the building to reduce or remove any danger within a time specified in the notice, being not less than 10 days. (4) For the purposes of this section, in relation to any building that is deemed to be earthquake prone,- "Masonry" means any building work in units of burnt clay, concrete, or stone laid to a bond in and joined together with mortar: "Moderate earthquake" means an earthquake that would subject a building to seismic forces one-half as great as those specified in New Zealand Standard Model Building Bylaw NZS 1900, Chapter 8: 1965 (notwithstanding its revocation) for the zone (as described in that New Zealand Standard) in which the building is situated: "Unreinforced masonry" means masonry classified as unreinforced by New Zealand Standard Model Building Bylaw NZS 1900, Chapter 9.2: 1964 (notwithstanding its revocation).	*Section 66 repealed and replaced by the revised section 64(3) and (4).*