



ADAPTIVE REUSE

AN INTRODUCTION TO

SEISMIC ARCHITECTURE

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introduction

New Zealand can boast being at the forefront of seismic building design, with pioneering work in both new structures, and existing structure renovation.

Here, it is a necessity, given our location on a fault-line. Our rugged landscape bears witness to the power of nature, in this regard.

Our current standards ensure that all new buildings are designed to be safe, under a seismic event, and many structures have proven that they can withstand significant seismic activity.

A while back, legislation was put in place to bring existing buildings, not designed to the current standards, up to speed. This was planned to occur over a timeline that sought to address strengthening critical infrastructure, and high priority cases, first.

However this plan was revised in the aftermath of the Christchurch earthquakes, which have redefined problem buildings, and set shorter timelines for remedial action.

For those who own or occupy an earthquake prone building this is now a pressing issue, and the cause of considerable stress.

Apart from the cost of an upgrade, there is also consideration of tenants, and occupiers who will be disrupted while strengthening work is being carried out.

riding on emotion: people love older buildings

People buy buildings as an investment, and as a numbers game, spending money on general maintenance is factored-in, whereas spending on significant upgrade work can be difficult to justify.

What is not commonly thought about is the emotional attachment many people have to their buildings, especially where these are part of a long-term investment that might span generations.

This is not irrational behavior as there is often value in the history, aesthetic and built quality of some of our older buildings, that can be difficult to quantify in dollar terms, but is there nonetheless.

Some of the best examples are our heritage buildings, where it would be unthinkable to purposely demolish a well-loved icon, in order to make way for a more modern structure, regardless of the promises the newer design will deliver.

For the wider public, this is a common source of conflict with building developers, where short-term investment goals tend to work against quality in the built environment.

reasons why you save a building: it's already there

The first, and obvious reason, to refurbish an existing building, is that it is already part of the existing neighborhood fabric. This means that it is highly likely that there will not be the negative reactions to development that seeks to reuse, instead of demolish and rebuild.

Even if your building is not the flavour of the month, there is the opportunity to improve the building, and also win the hearts of locals, tenants, or new owners, with a value transformation.

For those holding the ugly duckling, you can hardly go wrong, with any upgrade proposal.

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reasons why you save a building: cost to demolish

Again, looking at the numbers, it is difficult to make a new build, on an empty site, viable these days. Add the further handicap of having to pay for the demolition of an existing structure before you start, and you are further behind.

While it is easy to talk about a building being at the end of its economic life, the economic reality is that it is going to be expensive to end its life, proper.

A lot of cost goes into the process of construction , a lot of cost is required to demolish, and a lot of cost goes into disposal of materials.

There is a lot of debate about embodied energy, and one school of thought is that once the energy is spent on production, this justifies spending more energy on new energy efficient products, to replace the old.

This is probably explains the uncertainty we feel when we hear the term sustainability.

In any case, the economics of refurbishing existing buildings is well documented, especially in terms of the common good uplift, in revitalised city districts.

The opportunity to benefit the environment is even better when this translates to increased capital value, and increased rental returns, for individual building owners.

reasons why you save a building: easy planning

These days, it is common to have to go through a resource consent process to develop, or renovate existing buildings. This can be a costly and harrowing experience.

However, if your building is heritage listed, there is support, and advocacy from both Councils', and the Historic Places Trust, in support of any resource application to renovate an existing structure.

Note that to obtain resource consent, to demolish a heritage listed building, is almost impossible.

If your building is not listed, but it has some historic significance, the councils and Historic Places Trust are more likely to lend their support to retain existing structures.

Another important point to consider is that existing buildings have established use rights that may override current, and more restrictive planning rules, which will be extinguished if the existing structure is demolished.

reasons why you save a building: aesthetic appeal

There is something about older buildings that is similar to the desirability of antique cars or furniture.

The fact that they have survived, over time, is a statement of their enduring value.

Many of the intricately detailed examples speak of a time where craft, and built quality were highly respected.

It is difficult to overlook this positive reference when dealing with buildings of this type.

There are also some good examples of modern architecture, where clever design highlights the quality of the machine made aesthetic, and leverages sophistication.

If we look to some of the most respected and high value brands, in fashion, we see the same references to quality and craft.

Having these effectively built-in to a building project, before you even start, is a valuable position to move forward from.

reasons why you save a building: sustainability

It is a myth that sustainability all comes down to a balance between individual needs, and the bigger picture.

This idea is often used in marketing green technologies that sell emotional choice, over logic.

Many new technologies are still reliant on the availability of relatively cheap energy for their viability. Air-conditioned structures, built using production line methodology, and serviceable parts, are a good example, and these tend to become the benchmark for green comparisons.

In fact, it is ironic that the older buildings were designed specifically to provide a comfortable climate for its inhabitants, using many of the passive design ideas that are now becoming fashionable again.

Apart from the inherent green aspects of some of our existing building stock, it is obvious that it is a backward step to put energy into demolition, and create unnecessary waste for disposal.

In all of the green building ratings systems, reuse carries significant weight in terms of sustainability points.

new zealand legal requirements

The Building Act 2004 is the legislation that drives the regulation of building and construction, from overall governance down to detailed specific requirements.

The Building Act also brings together the regulations into the Building Code, and sets the minimum standards for Health and Safety of occupants, and users, and includes some requirements for protection of other property, and energy efficiency.

In terms of existing and new buildings, and any new work to existing buildings, the overarching requirement is that all new construction is required to be in accordance with the New Zealand Building Code. There is no requirement for building owners to upgrade existing buildings, unless there are changes made to the building, including how the building is used.

Section 112 of the Building Act 2004 covers alterations to existing buildings and the requirement to upgrade means of escape from fire and accessibility only.

Section 117 of the building Act 2004 covers changes in use where not only means of escape from fire and accessibility must be upgraded, but requirements to upgrade structure may also be applicable.

Under recent changes to the Building Act 2004, Councils are now charged with developing policy to identify buildings that are likely to cause damage to other property, and are a risk to the safety of occupants and passers-by, in an earthquake.

While individual councils may approach this with different documentation and management style ,the process is essentially the same, across the country.

As part of the process these buildings will be assessed against current theoretical design criteria for earthquake, and if found to be earthquake prone, by definition, they will appear on a register, held by councils, and will have this noted on file, for Land Information Reports.

Buildings will be deemed earthquake prone if they fall below 34% of the current structural requirements to resist earthquake loadings.

Under section 124 and section 125, of the Building Act 2004, councils will notify building owners, and those having interests in earthquake prone buildings, of the requirement to upgrade existing structures. The timeframe given to upgrade will be either 10,15 or 20 years depending on the building category, and more recently, the building location.

Building categories are related to the function and occupancy, where hospitals, that are required for post disaster functions, for example, are required to be upgraded earlier, where private commercial buildings, with low occupancies, will have a longer timeframe to upgrade.

Building location is relative to known fault lines and zones well recognised for significant seismic activity.

Powers given to the Councils under the Building Act 2004, are significant and the requirements are mandatory for all building owners.

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working towards an architectural solution

Given that the whole building will go under a structural analysis, for any alteration works, this is a good time to explore the potential of a change in use.

As noted previously a change in use will normally trigger an upgrade in structure as required under section 115 of the Building Act 2004 anyway.

In terms of economic justification of retaining existing buildings, a change in use is something that shouldn't be ruled out, as this will determine the level of upgrade required, and the real estate value.

There are many good examples of change in use, where uplift in value has justified the alterations.

Good news too, is that there are new and efficient methods available to analyse existing building structures, and there are numerous construction options available for strengthening.

Selecting the appropriate option is driven by the architectural design, and may include feature elements or new structural elements buried within new parts of the building.

After the merit of architectural elements are assessed, and any potential rearrangement of plan, or any addition is identified, then the dialogue can begin with the structural engineer to optimise the structural design, to the required level.

In many cases there is the opportunity to add new parts to an existing structure that will compliment and add value to the building. The overall goal is to create something that is richer than constructing a new building from scratch.

At the same time it is possible to install any new technology, like automated systems. Having an older refurbished building does not rule out being on the cutting edge.

in summary

The information contained in this document is designed to highlight the possibilities open to building owners to add value to their existing buildings.

Looking at options to seismically strengthen existing structures, before establishing potential use, means that structural engineers are in the dark, and the solution may not suit your needs, or your tenant's requirements.

Seeking advice of an architect up front is the key, to assist with planning and objectives to achieve the desired result. This can then be used to brief the engineer, for the design of the new structural systems.

Ask yourself:

What are the possible uses that are going to enhance the value of my building?

Which parts of my building are worth keeping and how do I accommodate a new use?

Where can I find the consultants required to assist with this process ?

Building projects are exciting but can get intimidating at times, however choosing the right team can make it an enjoyable process. That team always starts with choosing the right architect and this document is designed so that you are able to ask all the hard questions that will help you make a better choice.