Investigating the impact and effectiveness of the 2019 BRANZ guide on multi-storey light timber-framed buildings

BRANZ investigated the impact and usefulness of its guidance for designers developing Code-compliant multi-storey light timber-framed (LTF) buildings. General feedback in interviews was positive. The guide was seen as being aimed at the right technical level for structural engineers using it for multi-storey LTF building design. Those interviewed made numerous suggestions for additions, improvements and follow-up activities. This feedback will inform any future revisions and further assistance with using the guide.

In 2019, BRANZ published the guide *Multi-storey light timber-framed buildings in New Zealand – engineering design* (Figure 1). Intended for structural engineers and consenting officials, it provides guidance on designing 3-6-storey LTF buildings, which are outside the scope of NZS 3604:2011 *Timber-framed buildings*. This guide is freely available to download from the BRANZ website.

The guide includes design methods and resources for multi-storey LTF buildings. It also includes an example to help apply the guidance to real-world scenarios.

When BRANZ publishes technical guidance resources, there are generally activities to promote them before and after they are published. This guide was introduced in two webinar series, as a part of a roadshow, at conferences and workshops and in three *Build* articles.

By April 2021, the guide had been downloaded 1,884 times by a wide range of professions. Downloads continued past this date, and it is still being downloaded at the time of writing. Although the number of downloads is encouraging, they do not show whether the guide is actually useful to its users or whether users would have preferred to see other content included.

BRANZ investigated further to find out whether the guide was effective in supporting designs of this type of building, whether it changed work behaviour and whether its users had any suggestions for improvements. This sort of feedback is valuable for future improvements to this guide and other BRANZ publications.

Collecting feedback

The majority of people downloading the guide were consulting engineers, ranging from multi-national consultancies to small engineering firms. The next largest groups by profession were architects and building consent officials. The guide was also downloaded by academic researchers, building and construction professionals and timber component manufacturers, including those from prefabrication companies. It was also downloaded by people in Australia, Italy and the United Kingdom.

A handful of people who had used the guide regularly for relevant projects were approached for one-to-one interviews by phone or online. They were identified through

other stakeholder networks and included six structural engineers and a software developer employed by a structural engineering consultancy. One of the structural engineers was not a building designer but used the guide for solving structural issues as part of his regular work for a product manufacturer. The design engineers were mostly senior level and from medium and large consultancies, both national and international.

For the interviews, BRANZ developed a list of questions as an outline for the conversation. These were not always asked directly, depending on the way things went during the interviews.

Findings

Effectiveness of the guide

Based on the range of feedback provided, the guide is considered an effective document. The overall feedback was positive and that it is aimed at the right level for structural engineers using it for multi-storey LTF building design. The guide provides a starting point for engineers to be able to speak a common language and rationally discuss multi-storey LTF building design from a shared perspective.

The engineers mentioned several examples of buildings designed using the guide. Some are still being designed and others are under construction. Design methods from the guide are also making their way into peer reviews of specifically engineered design solutions, and some already consider it a valuable reference for these buildings. One person mentioned that they suggest the guide to other engineers who are not as familiar with the design of LTF buildings to increase their knowledge.

Impact on user behaviour and their work

The behaviour changes following the publication of the guide relate mostly to having a resource to base designs on. This allows different ways of designing these types of buildings. Many of the engineers already had methods for designing multi-storey LTF buildings but still felt it was valuable to have a documented method available. This suggests that engineers consider the guide worthwhile for structural design purposes, even though they already use established methods.

Other engineers cited specific technical methods from the guide that they now incorporate within their designs, which is a change in behaviour that would not likely be seen without the guide. With the guide, the engineers noted they can rely more on basic structural engineering principles rather than relying solely on outputs from structural analysis software. This is because the guide provides a 'first principles' approach to design and incorporates current design standards that engineers can refer to, as well as an extensive list of technical references for more information.

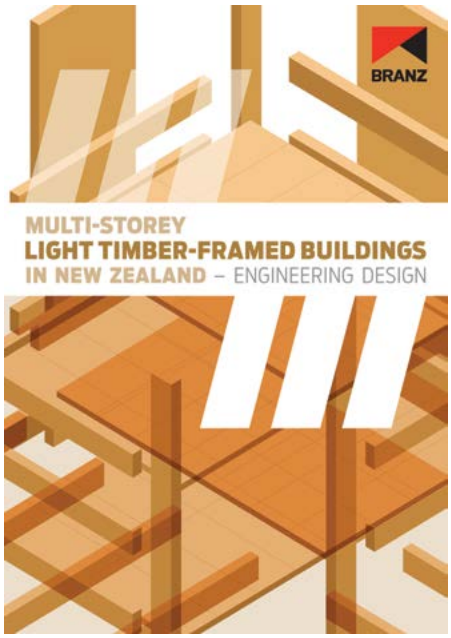

Figure 1. *Multi-storey light timber-framed buildings in New Zealand – engineering design* is available for download from the BRANZ website.

Possible improvements to the guide

The people interviewed gave extensive feedback on how the guide could be improved and what was missing. This showed more about the needs of the target audience and indicates there is much to be gained from co-creation with key stakeholders during the scoping of BRANZ publications and follow-up activities. There was also value in understanding what might potentially make the guide more useful and appealing to a wider audience.

A few people also asked whether future versions of the guide would reflect the shift to NZS AS 1720.1 *Timber structures - Part 1: Design methods*, which is scheduled for publication during 2022. Ideally, with the publication of the new timber design standard, the guide should be reviewed and kept aligned with the most current building standards.

There has been considerable change in the New Zealand building sector with a greater focus on carbon sequestration and reducing the emission of greenhouse gases within the built environment. This provides additional opportunities to consider using timber for larger buildings and may result in increased interest for guidance on multi-storey timber building design. A revised version of the guide could be reintroduced and publicised to address this change, which is likely to further increase the impact of the guide by responding to changes rather than remaining static.

Recommendations

This research has provided important insights into the usefulness and improvement for the BRANZ multi-storey LTF guide. Some of the general insights confirm the following for future guidance development:

- Ensure that the data collected when promoting and distributing BRANZ publications is suitable for later assessment of the effectiveness of publications.
- Engage early and often with critical stakeholders and end users to understand what they need. Co-creation should also be considered for certain projects.
- To support positive behaviour change, align the technical detail to the communication and learning needs of the user.
- Organise follow-on activities. Where needed, ensure follow-up after the release of a guide to determine the effectiveness of the guidance. Seek opportunities for improvement. In this way, BRANZ can progressively improve what we do.

More information

BRANZ Study Report SR475 *Investigating the impact of the 2019 BRANZ guide on multi-storey light timber-framed buildings*, 2022

BRANZ *Multi-storey light timber-framed buildings in New Zealand - engineering design*, 2019.