



# THE COMMERCIAL CASE FOR STEEL CONSTRUCTION

# ASK ANY DEVELOPER OR INVESTOR ABOUT THE MOST IMPORTANT PART OF A BUILDING PROJECT, AND THEY'LL TELL YOU IT'S THE RETURN ON INVESTMENT.



To bring the commercial case for steel construction to life, we've developed a model four-storey office building project based on Auckland and Christchurch construction and rental rates.

Our analysis over the past 10 years shows that, compared to alternative materials, developers and owners can procure a seismically resilient steel building solution with the additional commercial benefits of a faster build and earlier rental streams, without paying a cost premium.

The model project consists of a four-storey office building with a footprint of approximately 1,300m<sup>2</sup>. Within this framework, we modelled three different construction options, representing the three most common building materials – steel, concrete and timber.

All three buildings were supported on 10-12m-long screw piles, with each having a concrete slab. The costs for the foundation elements were included in the total structure cost estimates.

Option	Floor system	Framing	Lateral load-bearing system
1. Steel framing and metal deck slab flooring	130mm-thick slab, 60mm trapezoidal metal deck profile	Hot-rolled steel sections	Eccentrically braced frames in cross direction. Moment-resisting frames in longitudinal direction
2. Timber-framed floor, in situ concrete topping, plywood shear walls	Potius panels and 65mm in situ concrete topping	LVL sections	Plywood shear walls in both directions
3. Precast concrete flooring, concrete framing	Double-Tee flooring and in situ concrete topping	Concrete beams and columns	Moment frames in longitudinal direction. Concrete shear walls in transverse direction

Table 1: Model project – summary of construction options.

# COMPETITIVE BUILDING COSTS

Investment in fabrication technology and workshops, and the modern approach of simple bolted connections, has improved productivity in New Zealand’s structural steel industry, resulting in reduced costs. This is reflected in the lower cost of structural steel solutions shown in Table 2. In Auckland, structural steel is two percent and five percent cheaper than building with timber and concrete, respectively. In Christchurch, structural steel solutions are a solid seven percent cheaper than using timber; and, notably, it just edges out concrete in the once concrete-dominated city.

Option	Total estimated structural cost	
	Auckland	Christchurch
1. Steel	\$3,726,279	\$3,005,036
2. Timber	\$3,803,078	\$3,224,410
3. Concrete	\$3,916,814	\$3,011,973

Table 2: Model project – cost estimates for construction options, foundations and superstructure.



# PREFABRICATION

One key attribute of steel construction that adds real value to building projects is that much of the work, particularly critical operations such as welding and painting, can be undertaken off site – some of it in other cities.

## FASTER CONSTRUCTION PROGRAMMES

The model project shows that modern steel construction, featuring simple on-site bolted connections, results in faster overall construction programmes. Steel is 25 days faster than timber and 75 days faster than concrete.

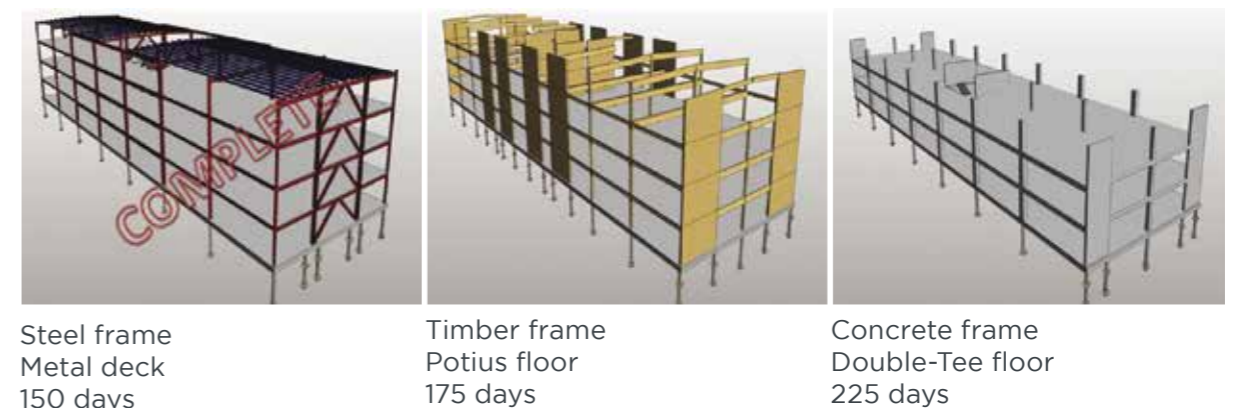


Fig 1: Graphic representation of steel’s superior construction speed.

## SIGNIFICANT NATIONAL CAPACITY

Approximately 130 fabricators nationwide collectively produce circa 100,000 tonnes of structural steel annually. This structural steel is turned into buildings and bridges by the industry’s network of steel distributors, fabricators and erectors. SCNZ’s recent quarterly fabricator forward-workload survey indicates there is significant spare industry capacity based on a current estimated total capacity of 120,000 tonnes per annum. The survey results are available on the SCNZ website.

## HIGH-QUALITY NEW ZEALAND PRODUCT

Prefabrication also brings quality control advantages to building projects. It is much easier to produce quality workmanship in the controlled environment of a workshop rather than on site, where adverse weather can have an impact. It is also easier to undertake quality assurance work off site.

The structural steel industry has developed the Steel Fabrication Certification (SFC) scheme to ensure participating steel fabricators manufacture product of the highest quality. SFC aims to provide procurers and specifiers with not only certainty of product quality, but that they are dealing with a fabricator who employs personnel and procedures that represent international best practice.

## EARLIER RENTAL RETURNS

Importantly, the model project found steel’s speed advantage is maintained to the end of the contract – steel’s overall construction programme is 15 days faster than timber and 39 days faster than concrete. This allows construction equipment and personnel to be released sooner for other projects, and for building owners to have an earlier income stream due to tenants taking earlier occupation of their premises.

To quantify this, rental income calculations have been made based on the model project and shown in Table 3. The difference in construction programmes has been combined with the market rates applicable to Auckland and Christchurch buildings to show the loss of income associated with delayed occupation by the tenant.

When the structural cost and the overall construction programme are considered together, structural steel leads to an earlier return on investment compared with timber and concrete.

Option	Auckland			Christchurch		
	Estimated Structural Costs	Lost rental income	Structure cost plus lost rental return	Estimated Structural cost	Lost rental income	Structure cost plus lost rental return
Steel	\$3,726,279	\$0	\$3,726,279	\$3,005,036	\$0	\$3,005,036
Timber	\$3,803,078	\$236,588	\$4,039,666	\$3,224,410	\$103,275	\$3,327,685
Concrete	\$3,916,814	\$615,128	\$4,531,942	\$3,011,973	\$268,515	\$3,280,488

Table 3: Timber and concrete options are slower to offer a return on investment, representing a loss of income to the building owner. Cost of the structure, the construction programme and rental income calculations are based on the model four-storey project. To calculate the loss of income associated with delayed occupation by the tenant, the difference in construction programmes has been combined with the market rates applicable to Auckland and Christchurch buildings.

1. Rental rates based on commercial rental data published in Colliers International Report: National Review Office, Industrial and Retail, R4 2021 2. Net lettable area – office 1,170m<sup>2</sup> per floor 3. Net lettable area – retail 1,170m<sup>2</sup> 4. Average net office rental per annum: Auckland (Grade A, Victoria Quarter) \$485/m<sup>2</sup>; Christchurch (Prime CBD) \$385/m<sup>2</sup> 5. Average net retail per annum: Auckland (Victoria Street West to Wellesley Street) \$2,050/m<sup>2</sup>; Christchurch (CBD) \$375/m<sup>2</sup> 6. Total rental income per annum: Auckland \$4.1m; Christchurch \$1.8m 7. Ratio of net lettable area to gross area of 0.9

**AS A GENERAL RULE OF THUMB, STEEL OPTIONS RESULT IN A 10-15% REDUCTION IN THE CONSTRUCTION PROGRAMME FOR MULTI-LEVEL COMMERCIAL BUILDING PROJECTS, COMPARED TO OTHER MATERIALS.**



## SUSTAINABLE STEEL

The sustainability credentials of building materials are under increasing scrutiny. Steel supports a wide range of sustainable choices, and it allows wider use of other materials, a more extensive range of designs and greater design innovation. In New Zealand, the majority of steel scrap is recycled.

The material is also an enabler for a low-carbon future – all renewable energy infrastructure, including hydropower, solar, wind, wave, hydrogen and geothermal, requires steel. And, because you know precisely what you are getting, you don't have to over-engineer structures, meaning less material is used.

So, when it comes to sustainability and the broader outcomes, there are six reasons to choose steel. Steel is:

- extremely resilient
- surprisingly low-carbon over its lives
- a solution that offers a wide range of sustainable choices
- cost-competitive
- a low-risk building approach
- enduringly beautiful.

To find out more about structural steel's sustainability story, visit the Sustainable Steel Council website ([sustainablesteel.org.nz](http://sustainablesteel.org.nz)).

## ABOUT SCNZ

Steel Construction New Zealand (SCNZ) aims to advance the interests of New Zealand's diverse steel construction industry by promoting the benefits of steel solutions in commercial building and infrastructure projects. Members include manufacturers of structural steel and steel products, distributors, fabricators, designers, detailers, galvanisers, and paint and building supply companies. SCNZ provides its members with technical advice on the latest in steel design trends and standards, networking opportunities, and a representative voice with key industry and government decision-makers.

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Disclaimer: Construction cost data is based on 2022 figures; rental property data is based on 2021 figures.



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