

THE BENEFITS OF LIGHTWEIGHT STEEL FOR EXTERNAL FAÇADES





INTRODUCTION

The design and construction of the built environment has, and always will, involve considerations of speed, cost and quality. This applies across all stages and scales of a project, although the weighting of each of these three factors will often vary across individual builds. In best-case scenarios, each will be considered equally. However, across many projects, there is still the constant pressure to construct projects faster and for less, whilst still maintaining the same desired level of quality.

Choosing systems and construction methods that lend themselves to faster construction times, flexibility in construction and high quality builds – in strength, longevity and appearance – can greatly assist in achieving these demands. However, when specifying products, it is highly important not just to consider the properties of any individual element, but also how it will affect those around it. High quality lightweight steel systems meet these expectations, particularly for external façades, as it is capable of reducing construction time and cutting costs, whilst still demonstrating desirable characteristics and compatibility with the surrounding construction.

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LIGHTWEIGHT STEEL'S CHARACTERISTICS

LIGHTWEIGHT AND STRONG: True to its name, lightweight steel has an excellent strength to weight ratio, which allows it to support additional loads with less material. Lightweight steel is capable of supporting a variety of exterior façade lining system, including brick veneer, AAC panels, lightweight cladding or panel systems.¹ Unlike alternative, heavier external façade systems that might require additional slab reinforcement, lightweight steel systems allow for flat plate floor slab construction, which removes the necessity for beams, minimises structural depth and reduces the floor-to-floor height required.² Flat slab construction also requires simplified formwork, thus resulting in faster construction times.³

The steel coating type and thickness of lightweight steel can also be changed to accommodate site environmental conditions to provide superior durability. The durability of steel also impacts on the building maintenance. Selecting the correct coating means the building façade system will require little or no maintenance, making it a more economic choice for building owners, who may save thousands of dollars in maintenance costs over the course of a building's lifetime.⁴

FLEXIBLE DESIGN: From a design perspective, lightweight steel's narrow profile can offer slimmer lines in building facades. It broadens the design possibilities as it can be customised for a project and can support a variety of external facades such as brick veneer, AAC panels, lightweight cladding or panel systems. Its flexibility extends into its ability to provide support for internal linings and create an internal cavity for insulation and services. Designs can also be tailored to wind conditions in specific regions and urban environment.

SPEED OF CONSTRUCTION: Lightweight steel is a very quick material to install, facilitating a faster overall build. All steel elements can be very precisely fabricated offsite to tight specifications and under controlled, highly regulated and safe factory conditions, greatly reducing the time it takes to install them, onsite labour costs and waste. Lightweight steel is also 80% lighter than a wet block work system and its dry construction characteristics mean there's no curing time and no wet trade required.⁵

When lightweight steel is used for external facades, these benefits are enhanced. Lightweight steel can be easily produced to special lengths for differing wall heights, further reducing onsite waste and increasing installation efficiency. One product which can produce exceptional cost savings through its speed of construction and strength is Rondo's MAXIjamb®, which forms

part of the Rondo MAXIframe® External Wall Framing System. One MAXIjamb® is equivalent to two regular Steel Studs boxed together, but comes without the hassle of two products to install. In addition, MAXIjamb® can support a greater load than regular wall studs, therefore removing the need for boxed or back to back stud configurations. This results in significant labour cost savings across a project.⁶

FLEXIBILITY IN CONSTRUCTION: Lightweight steel is incredibly versatile and economic in its construction. The strength of lightweight steel opens design possibilities as large areas of framing to be achieved with small volumes of materials. This translates to economic savings as less crane lifts are required per square metre of walling, resulting in minimised machinery and labour costs. In addition, one contractor can frame both internal and external walls, streamlining construction processes and providing cost efficiencies. The flexibility of lightweight steel extends into its ability to be readily updated and modernised should the design trends change over time. This further improves its economic viability and reduces waste.⁷

SUSTAINABILITY: Steel is billed as one of the most sustainable construction materials and is an ideal choice to create a long-term sustainable development. Its strength and durability make it a long-lasting material, future-proofing the design and offering an increased lifespan. Its production requires large amounts of energy but steel can be recycled time and time again without losing quality.⁸ When a structure reaches the end of its life, the steel used can be reused or returned to the steelmaking process to create new components, eliminating wastage. A total of 80 million tonnes of steel are recycled every year, making it the world's most recycled product⁹, and globally, recycled steel accounts for 50% of new steel production. The energy needed to produce steel has also been reduced. Since 1990, the industry reduced energy intensity per tonne of steel produced by 28% and CO₂ emissions by 35% per tonne of steel shipped.¹⁰ In addition, the need for less extensive foundations to support steel due to its lightweight nature results in a smaller overall impact of the build.¹¹

FIRE AND PEST RESISTANCE: The safety of occupants will always be a top concern of the building industry. As a non-combustible material with a melting point of approximately 1500°C (2700°F), steel doesn't burn and does not contribute to the ignition of fires, the spread of fires, or the size and severity of fires. The material maintains its non-combustibility throughout its entire lifecycle.¹² In addition, unlike timber structures, steel provides superior pest resistance as it does not provide pests such as termites with a food source.

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The inevitable pressure on building professionals to continue to deliver quality projects within increasingly tighter timeframes and on smaller budgets can be difficult to relieve when relying on standard materials and construction techniques. The superior characteristics of lightweight steel systems provide architects with the perfect and unrivalled solution for external facades. When choosing the right lightweight steel product for the external façade of any project, it is absolutely vital to opt for a supplier with a solid reputation and product range, backed by top-notch service to ensure the entire process of specifying right through to the install goes smoothly.

Rondo is a highly respected business involved in the manufacture and supply of a wide range of lighter gauge rolled formed steel products and systems. It is a proudly Australian company with the primary purpose of providing customers with industry leading systems incorporating high quality rollformed products and accessories, complemented by outstanding customer service.

One of Rondo's leading products is the Rondo MAXIframe® External Wall Framing System. This system is paving the way for lightweight steel framing in external wall construction and offers more versatile and cost-effective design options than traditional external wall framing construction methods. It provides a simple, solid structure that not only outperforms typical boxed stud configuration, but also reduces the required number of nogging tracks, saving the builder both time and money. The system incorporates standard Rondo 92mm and 150mm Studs as the main framing, with the inclusion of two new major profiles, MAXIjamb® and MAXItrack® and three complementary cleats to provide a simple, yet solid structure. MAXItrack® provides positive connection between stud and deflection head which has allowed the Nogging Track normally located 100mm below the head track to be removed. It offers greater performance capacities than traditional external wall framing construction methods and is available in custom lengths. In addition, MAXIjamb® can be used both as a vertical jamb member around openings or as a horizontal head and sill member in window openings. Since its release in 2011, Rondo's MAXIframe® External Wall Framing System has been used in significant projects across Australia and New Zealand.

Rondo has also created an External Non Load Bearing Wall and Facade Framing Systems. To register to attend, simply visit: rondo.com.au/CPD





CASE STUDY

The Sunshine Coast University Hospital used Rondo's MAXIframe® system in its design. The MAXIframe® system was chosen after it was determined that the initial design using standard 150mm back to back stud configuration located at 300mm centres was not going to be an economical solution or able to meet the window design requirements. Rondo was brought in to offer an alternative solution and produced a special 150mm MAXIjamb® Stud in 1.2BMT, G500 material that could achieve wall heights of 4.1m and meet wind load requirements. It could also be spaced at 675mm centres to suit the window modules.

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