

Technical & Engineering Solutions





Engineering and Technical Solutions

Why you should build your house in steel structure?

- Introduction.
- High Strength.
- Longevity
- Versatility
- Sustainability
- Safety
- Faster Build Time.
- Earlier revenue generation.
- Lower finance costs.
- All-weather construction.
- Lower overall costs.
- Recyclable.
- More stability.
- Less excavation and smaller foundations.



Introduction

Timber, concrete, and steel are all common materials used in constructing structures, and arguments could be made as to why each of these materials might suit a given project.

Steel framing is a construction method in which steel columns and beams are assembled to create a support for floors, roofs, cladding, internal fixtures, finishing and occupants. This article will look at the advantages of steel frames over other construction materials and why they are a common choice in modern buildings.

Higher strength

Steel has a higher density than timber or concrete which means that for the same dimensions, steel will be heavier. However, a length of 50mm x 100mm steel will be able to carry more load than the same length of 50mm x 100mm timber. In practice, this means that less steel is necessary to provide the same amount of support.

The consequences of this decrease in material use are reduced material shipping costs, reduced labor and simplified design of foundations and other structural supports.



Longevity

Steel can last longer than timber or concrete, assuming that all three are properly maintained.

Unlike timber, steel does not split, crack, or creep as it ages. It is not vulnerable to insect attack and lacks porosity, so mold and mildew cannot grow. It does not warp, rot, or expand when there is an increase in moisture. However, contact with water must be prevented as corrosion may result.

To protect the steel, a coating of fire-resistant and water-resistant material must be applied. The fire-resistant material prevents the steel from losing its strength and integrity in a fire while the water-resistant material prevents rusting.

Versatility

Structural steel can be fabricated into different shapes while still maintaining its strength. The use of steel allows for creative and innovative designs. Architects and other designers use this capability to create structures that are not only aesthetically pleasing but also structurally sound.

Structural steel also allows for the creation of large-span buildings such as indoor arenas and aircraft hangars, as well as the capability to build very high skyscrapers, bridges and other structures.

It is also easy to future-proof steel frames because they are more conducive to structural addition or modification, such as renovations or expanding the size of an existing building.



Sustainability

The use of computer modelling before fabrication reduces the amount of scrap steel produced.

Any scrap that is produced can be recycled for use in other projects. Steel is endlessly recyclable because it does not lose any inherent properties such as strength when it is melted down and recast.

It is possible to reuse timber by transforming it into other things, such as tables or chairs, but there will come a time when the scrap wood is too small or the shape is too awkward to work with. Concrete can also be broken down for use in future mixes, but is only successfully used for works such as pavements.

Safety

The tensile strength of steel frames allows them to perform well under a range of natural phenomena such as hurricanes, seismic activity and snow loads. These phenomena become more problematic as the structure becomes higher. Steel also performs better in man-made emergencies such as explosions and impact.

On lower structures, timber offers enough flexibility but there will also be a fire risk. Steel is non-combustible so it is not a fire risk but, unlike concrete, its strength becomes compromised when subject to extreme temperatures. However, concrete in itself is not very flexible so its tensile strength must be increased by reinforcing it with steel.



Faster build-times

Computer-assisted manufacturing of standardized bolted connections and repetitive floor plates make production faster while standardization and regulatory policies have made structural steel components dependable and easy to erect.

The steel frames are prefabricated offsite to fit a certain specification before being sent to the construction site. After they are sent out, they are immediately ready to be assembled by bolting or welding the pieces together, unlike in-situ concrete, where it is necessary to wait for a section to cure before continuing the construction.

There is also no need for temporary formwork which needs to be assembled and then dismantled afterward, delaying the construction as well as producing waste.

Cost-effective, since steel frames are fabricated off-site, on-site labor can be reduced by 10%-20%. Fewer workers also mean fewer accidents.

Shorter construction times result in less financing costs, fewer interest payments, and means that the building can be used or rented as soon as possible for faster payback.

Steel is durable so maintenance costs in terms of repairs and replacements can be lower. Insurance companies may also offer cheaper premium insurance for structures that are constructed with steel because of their ability to withstand decay, pests, and natural disasters.

Space maximization, By being stronger, bays within steel frames can be spaced wider apart, which also creates wider bays. The wider available space allows for more flexible floor designs that can maximize the available space. Although concrete is also strong, it has a more limited floor-to-floor construction height as well as inferior spanning.

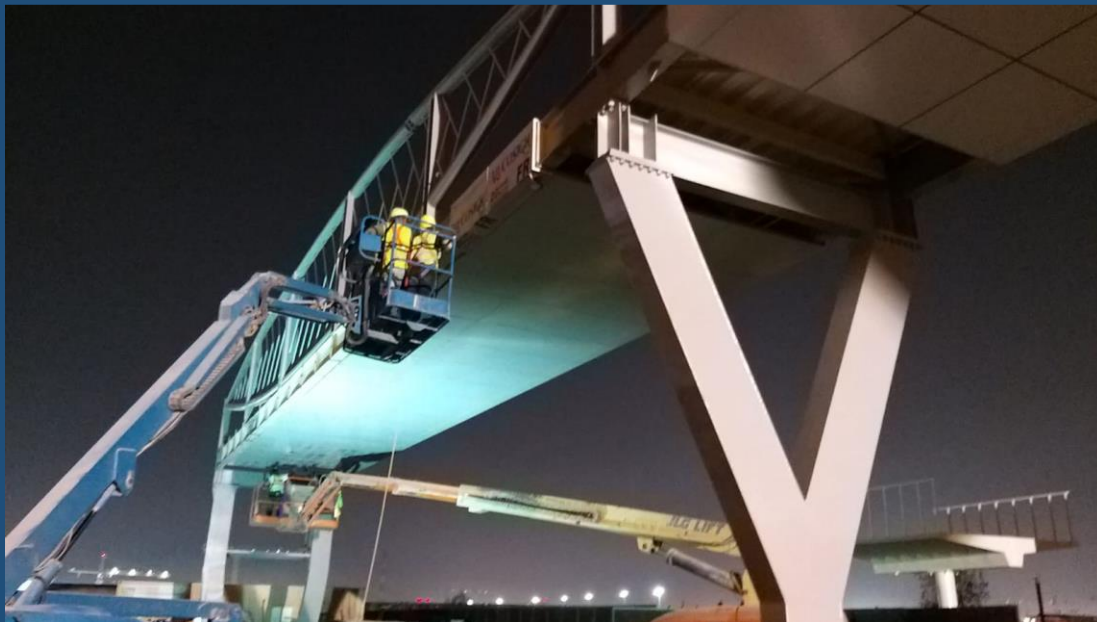
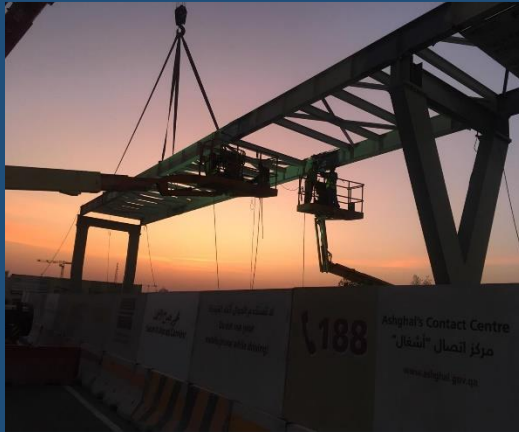


In housing, the use of steel can reduce the need for load-bearing timber posts, thereby maximizing floor space in an age of sky-rocketing property prices.

Steel frames have many other benefits. They can be constructed in any weather, and are easily adaptable to sudden design changes. They can also be easier to maintain assuming the frame is accessible for inspection.

However, the advent of hybrid construction materials has resulted in, e.g metal-reinforced timber beams, as well as fibre-reinforced concrete. These 'composite' materials demonstrate that they can not only be stronger than the individual components but are also cost-effective.





Project: Cycling Bridge | Client : Public Works Authority



Project: Core Cut Spiral Staircase | Client : Aljazeera Media



Project: Membrane Shade | Client : Summer Restaurant



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Project: Site Project Offices



Project: Residence Building



Dokmah



Dokmah for Steel Structure



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