Precast Concrete vs. Steel Framing vs. Wood Framing

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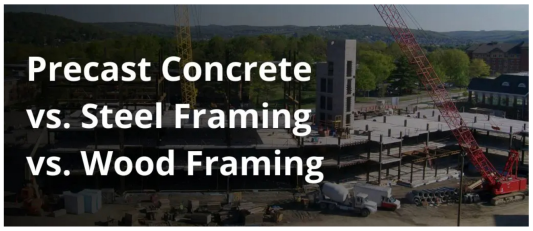
Categories: **Precast**



Jump-To:

Steel, wood and concrete frame structures are three of the most common construction materials in the world. Each has its positives and negatives, but many experts wonder which is the best overall for commercial structures.

If you're looking for the most reliable and cost-effective material for **your next building project**, this guide will help you navigate through the pros and cons of these three popular framing choices to help you find the best fit for your structure.

What is the Most Cost-Effective Construction Material?

Two of the top considerations for any construction project are the project's initial construction costs and the total cost of ownership (TCO). While architects and developers should consider a framing solution that will let them stay within budget, it may be more important to keep in mind that materials that initially seem more costly can end up saving owners thousands of dollars over a prolonged time.

A recent 2017 Initial Cost of Construction comparison study documented the initial cost of six construction types in multi-residential structures, including conventional wood framing and flooring, steel framing with cast-in-place concrete flooring, concrete masonry with **precast concrete flooring** and **precast concrete walls** and floors. The study found that projects using concrete masonry units with precast concrete floor were the least expensive structural system over structural steel or wood frames as of May 2017.

However, while wood or steel frames were initially less expensive than the precast concrete structures, concrete's added benefits can make it the most cost-effective framing material in the long run. According to the study's researchers, both cast-in-place and precast concrete can pay for their added initial costs over the structure's lifetime. Its fire- and damage-resistant properties make concrete more cost-efficient overall.

Other reports have shown that between cast-in-place and precast concrete, precast materials save time and money over standard concrete construction. In a study performed by the National Precast Concrete Association (NPCA), the TCO for precast concrete buildings was **45 percent lower than in-situ structures**.

Overall, concrete provides distinct cost advantages over wood and steel frames, and precast concrete especially aids in lowered construction and operation costs of **commercial buildings**.

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Precast Concrete or Steel Framing

Steel framing is an increasingly popular construction option due to its modern aesthetic qualities and environmental advantages. Some other benefits of steel that make it a popular choice in commercial buildings include:

- **Efficiency:** The rise of 3D modeling technology guarantees steel frames will be built precisely to a building's specifications, which reduces the risk of error. This technology also ensures fast product construction and completion.
- **Reduced Labor:** Off-site steel construction minimizes the need for on-site labor as compared to cast-in-place concrete. Lowered labor reduces on-site risk and noise disruption to the surrounding community.
- **Sustainability:** Steel frames reduce excess waste removal, and most structural steel can be reused and recycled.

Many steelmakers point to off-site construction and sustainability as some of steel's key features over standard concrete. However, precast concrete provides the same efficiency and reduced labor costs as steel, and precast's sustainability reduces the waste associated with in-situ concrete and can match steel's eco-friendliness.

Precast concrete also offers several added benefits, which give it an advantage over steel framing. Some of these include:

- **Durability:** Concrete's strength and durability are ideal for large structures — concrete buildings can last up to 100 years or more when properly maintained.
- **Versatility:** Other materials can be incorporated into concrete for added strength, insulation, and aesthetic attractiveness.
- **Insulation:** Concrete's thermal properties reduce temperature changes in buildings, which significantly reduces energy costs.

Overall, precast can increase efficiency and reduce labor costs nearly as well as steel, and concrete's added durability and energy-efficiency make it an ideal choice for commercial buildings.

Precast Concrete or Wood Framing?

Timber is commonly used in residential construction and is safe to use for buildings of up to five stories. Some of the benefits of wood frames include:

- **Lower Initial Costs:** Many wood structures cost less initially than precast concrete, making it the preferred choice for many smaller architectural projects.
- **Eco-Friendliness:** Timber removes carbon emissions from the surrounding environment and is typically sourced from sustainably managed forests.
- **Natural Beauty:** Wood's aesthetic appeal makes it a popular choice for interior and exterior building design, producing a homier atmosphere than other materials.

However, even with the surge of popularity in high-rise wood frame buildings, wood fails to offer the same level of safety and durability of concrete. Some advantages of precast over timber include:

- **Safety:** Concrete doesn't burn, which often makes it an ideal choice over flammable wood. It offers increased protection to multi-residential buildings and structures built in storm-prone areas.
- **Durability:** Similarly, precast keeps its structure intact for years, even when faced with severe weather conditions. It's also far more resistant to pests such as termites.
- **Economic benefits:** Precast's thermal properties reduce energy costs and TCO. Concrete buildings can save owners in both air conditioning and heating costs as opposed to wood frames, according to the Portland Cement Association.

While wood may be asthetically pleasing as a decorative touch on a building or structure, overall, precast concrete provides more value through the maximum protection and durability necessary for schools, apartments, offices and other buildings where safety concerns and longevity are a top priority.

Our Precast Concrete

The many advantages of precast concrete make it a preferred choice for commercial construction around the world. In fact, the demand for precast is on the rise in the nonresidential market, as more developers take note of its cost efficiency and benefits. **Experts forecasted a 6.5 percent annual rise** in precast's demand from 2015 to 2018.

Precast concrete can often meet industry standards and demands better than wood or steel frames. If you aren't using precast for your small or large commercial projects, it's time to make a change.

If you're ready to choose precast for your next construction job, turn to Nitterhouse Concrete Products to give you the expert advice and quality care you need. You can also **view the extensive range of precast products** we offer and manufacturer.

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