

LadderBlock System



Comparison to Conventional Precast

8436 Spicewood Springs Road
Austin, TX 78759
Tel. +1-512-250-5200
info@LadderBlock.com
www.LadderBlock.com

LadderBlock™ Comparison to Conventional Precast

Q: What makes LadderBlock so revolutionary, and how does it compare to conventional precast concrete products for building construction?

A: Precast concrete products currently available to the building construction market include planks, rectangular beams, inverted tee beams, haunched columns, double tees, spandrels, and wall panels. We'll refer to these products collectively as "conventional precast".

Let's compare Conventional Precast to LadderBlock in the light of several significant considerations:

Design Speed and Flexibility

Conventional Precast offers a broad range of options to the design professional. Unfortunately, too many options can slow down the process by forcing architects and engineers to make too many decisions. Each decision takes time, and each is subject to being revisited at a later date. This circular decision cycle often becomes lengthy and expensive for everyone involved.

LadderBlock is a building block set with surprising architectural and structural flexibility, but the standardization of block geometries and reinforcement allows a structural platform for a LadderBlock building to be designed quickly and easily. Architects have described design with LadderBlock as "very liberating", because the system provides layout dimensions that are predictable and obvious, allowing the design professional to focus his or her attention on the truly unique elements of the finished project.

Production Constraints and Risk

Conventional Precast for building construction generally cannot be released for production until architects and engineers have completed a unique design, the precaster has digested that design and produced shop drawings, and the shop drawings have been reviewed and approved by the design team. Any production prior to this stage is generally at the risk of the precaster, and any design changes or the cancellation of a project after this stage generally mean that parts already cast end up in the bone yard; the resulting waste costs the precaster time, money, and yard space.

LadderBlock is a building block set with standardized dimensions and reinforcement options. While special reinforcement can easily be incorporated for special-use blocks, the standardization of common cages enables risk-free production of LadderBlock inventory of common blocks. This means that production can be run in a steady-state mode; design changes or the cancellation of a project have minimal impact, as already cast parts can remain in inventory as salable product.

Quality Assurance and Control

Conventional Precast largely defies standardization. Every dimension and every stick of reinforcement must be designed, documented, incorporated into shop drawings, and checked in the plant before concrete is cast.

LadderBlock uses the power of standardization to simplify dimensions and reinforcement. While forms and reinforcement still must be checked prior to casting, these items are much easier to confirm, and to get right in the first place, if they are consistent over thousands of cycles.

Production Efficiency

Conventional Precast can be generalized as job-specific, custom part production. Even where standard cross-sections are being built, product dimensions are largely at the discretion of the specifying professional. Custom production requires a higher skill level than mass production of standardized blocks, and it requires more labor in form assembly, reinforcement, quality control, and process management. When every day on the production floor is different, the learning curve never ends, and even the most experienced employee can miss a detail that renders a part unsalable.

LadderBlock enables large scale production using less skilled labor; even the positioning of reinforcing steel is established by the system so that it is easy to get right. Integral crosses also largely eliminate the need for chairs, and they offer handling and connection points that eliminate the need for lift inserts and welded assembly inserts. Production consistency further increases profitability by reducing set-up time, simplifying quality control during manufacture, and ensuring that every casting cycle yields salable product.

Erection Speed and Stability

Conventional Precast generally relies on field-placed welds to interconnect adjoining precast parts at points where anchored assemblies were cast into each part. Lift points and rigging are unique to each part, and must be located by the engineer to ensure a concentric lift. Because conventional precast generally consists of stick and plank elements that offer no global stability on their own, the erection of each element ties up the crane until temporary braces and field-welded connections have been put in place.

LadderBlock is designed to build a self-stabilizing frame and platform quickly and easily by transferring gravity loads to bearing surfaces and providing structural stability through simple connections between moment-resisting framing elements. In a typical LadderBlock assembly, only the first block erected requires temporary shoring; the interconnection of subsequent rigid framing elements eliminates the need further bracing. This allows erection to proceed with remarkable speed. LadderBlock combines the safety of an internally stabilized framework and immediate work platform with the elimination of widespread temporary bracing that congests many conventional jobsites; these features enhance safety in ways no conventional system can.

Structural Durability

Conventional Precast generally relies on welded connections between elements for structural connectivity and stability. Because precast elements undergo volume and length changes during curing and with changes in temperature, it is not uncommon to see fractured concrete around connection embeds in a structure that have seen years of service.

Thoughtful detailing can help eliminate connection distress by incorporating slip capacity into connections, but such details can be expensive to build and defeated by an over-zealous welder on the job site. While a cracked connection may offer enough thermal movement capacity for a structure to perform as intended without diminishing structural safety, the presence of such cracking diminishes the owner's confidence in precast concrete.

LadderBlock relies on padded bearing connections and threaded rod connections through oversized sleeves for load transfer and stability. The interconnected blocks are themselves structurally rigid, and this allows connections between blocks to offer some degree of flexibility when blocks undergo thermal movement. It is that degree of connection flexibility that sidesteps the stress concentrations and distress that are common in welded connections between conventional precast.

Reconfigurability

Conventional Precast construction is generally composed of unique parts designed for a specific job. Unless future openings or features are anticipated and designed into the parts, conventional precast does not generally lend itself to reconfiguration.

LadderBlock is a building block set that, subject to an engineering analysis of the proposed reconfigured assembly, lends itself quite well to disassembly, reconfiguration, and even reassembly on another site. This is recycling at large scale, and one of the many attributes of LadderBlock that make it a beautiful shade of green in the eyes of environmentally conscious builders.

Replacement Part Capability

Conventional Precast offers durable structure, but if a part is damaged during transport or erection, or while in service, the production of a replacement part is a process that requires engineering and manufacturing that must be fit into the current production schedule. The replacement of a damaged part is complicated if lift inserts are no longer accessible, and it requires temporary bracing while welds are ground away and until a new part has been cast and installed.

LadderBlock offers the closest thing to off-the-shelf replacement part capability that has ever been seen in the industry. If a LadderBlock component with a standard reinforcing steel cage is damaged, it can be replaced immediately with another block of like construction. This concept has been proven in the field. We have replaced blocks

damaged during installation even when the blocks were confined between taller structure at both ends. Production records subsequently revealed that the replacement blocks were cast out of different forms than those used to produce the damaged blocks.

Marketing and Sales Advantages

Conventional Precast has been around for decades, and is generally conceived of as suitable for transportation and parking garage projects. The precast industry is working to break into the building construction market, but gains have been slow. Conventional precast frequently lacks architectural appeal, and is often covered by sheetrock or other construction that is considered “finish quality”.

LadderBlock is a revolutionary new product that offers visual excitement in its geometry and aesthetics, and garners significant attention from the public and the press because of its surprising speed of erection. At the time this is being written, both Engineering News Record and Concrete International are planning articles featuring LadderBlock in an upcoming publication. Innovative aspects of LadderBlock construction make it easy for a project to garner the attention of the press and the public, and to thereby drive sales at a fraction of the cost that would be required to gain equivalent attention for a conventional product.