

Design Tip: Beam and Girder Sizes

Using recommended beam sizes for long-span garages, and keeping sizes consistent, improves constructability.

Steel beamform lengths (from column/girder face to column/girder face) for long-span beams can vary up to 4 inches with differing column/girder sizes or bay lengths between uses. The following are recommended standard sizes for long-span garages:

POST-TENSIONED (PT) LONG-SPAN BEAMS

- Width: 14-28 inches (16 inches and 18 inches are the most common) in 2-inch increments.
- Minimum beamside depth: 26 inches (plus slab depth of 6 inches to equal beam depth of 32 inches). Deeper beams can be achieved with beamside form buildup. Sides should be drafted with the beam 2-inches wider at the slab soffit to enable form removal.

Ideally, beamform lengths and sizes should be consistent throughout the project to maximize use of the beamform and girder equipment as well as to expedite reuse between pours.

ADDITIONAL GUIDANCE

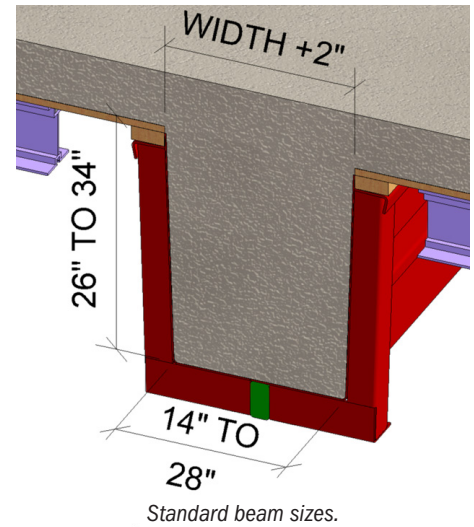
- Steel beamform sizes can vary by project, with bottom fillers that widen the profile and beam side extensions that deepen the beamside. Changing sizes onsite between uses can slow down work.
- The girder's size, width and depth are not governed by the beam size. However, a girder width that matches the column width, with girder depth matching beam depth, enables a more efficient forming method.
- PT beams will lift and crown when tensioned from a horizontal cast position. They also will shorten under the PT tension. It is recommended to plan at least a 2-inch vertical tolerance when determining floor-to-floor heights (and 4 inches whenever possible). Keep these considerations in mind for slopes and drainage needs.
- Columns do not need to be square, but a rectangular profile within the common sizes is recommended. These sizes take advantage of fabricated steel column collars that accept steel beamforms and steel girder forms for the highest-quality result. We encourage consistent column sizes.
- The column face accepting a beamform or girder form should be, at minimum, 4 inches wider than the beam bottom width—2 inches for the two side drafts plus 2 inches for the column form return that accepts the beamform.
- A standard single size is recommended for the project beam size, determined by the worst-case loading condition. The remaining beams should have reduced reinforcing to reflect reduced loading. The same is true for the girder design.
- Beamforms can be fabricated for an occasional intersecting beam, possibly at a stair location. We encourage consistent locations throughout the project. The intersecting beam lateral location may vary beyond normal tolerances due to the location adjustability of the beamform. The application of an intersection throat filler enables reuse of the beamform sans intersecting beam.

GIRDERS

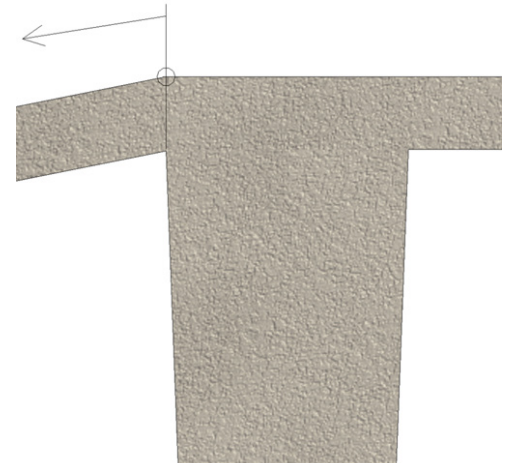
- Column line girder form width: 24-40 inches.
- Minimum girder side depth: 26 inches.

COLUMNS

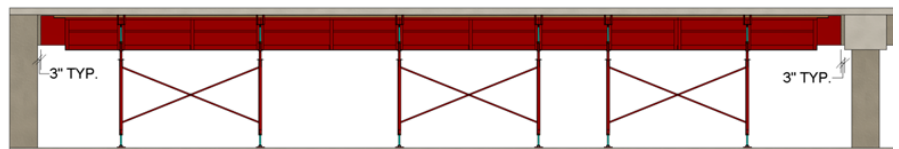
- Common sizes are 20-48 inches at 2-inch intervals.



Standard beam sizes.



Begin downward ramps at the face of the beam.



Limit the variation of beam lengths to allow for standard beam form sizes and tolerances.