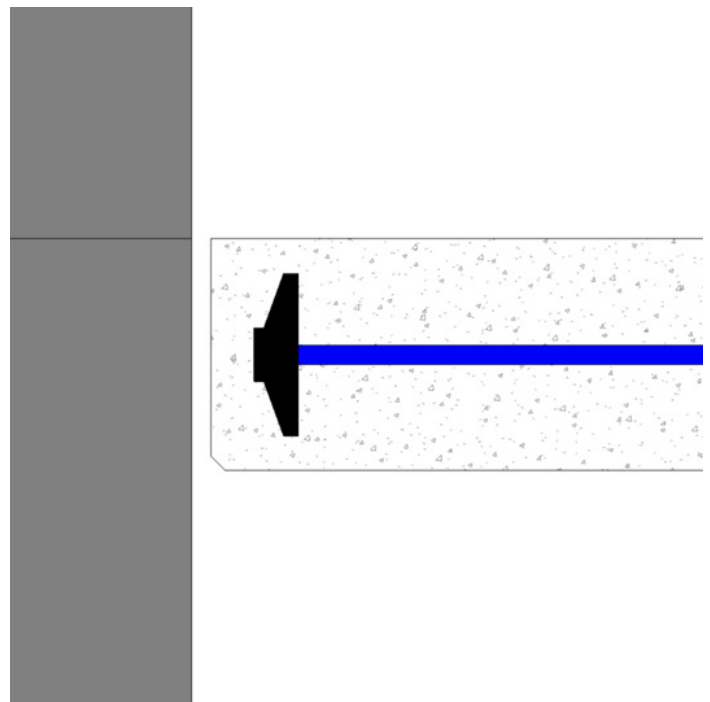


# Design Tip: Post-Tensioning Considerations

*Best practices for post-tensioned reinforcement that improve the constructability of cast-in-place parking structures.*

To improve constructability, consider these recommendations for post-tensioned (PT) cast-in-place garages:

- Using encased post-tensioning (PT) tendons with encapsulated anchors minimizes corrosion of the steel tendons.
- If the project perimeter is not rectangular or the edge perpendicular to the direction of PT slab tendons, provide for a tendon sweep to enable installation of normal PT anchors at the building face. This eliminates the need for expensive 30- or 45-degree-type anchor cones.
- Consider the direction of PT tendon tensioning when other structures or elements are adjacent to the slab. For example, stair and elevator cores are often separated from parking slabs. This allows them to be constructed vertically, ahead of the slab, to accelerate the elevator installation. It also eliminates the external space required for the PT tensioning jack beyond the slab edge. The best solution is to tension those tendons at the opposite-end anchor that is clear of adjacent obstacles.
- Higher-strength slab concrete (5,000-8,000 psi) is often desired. Slab tensioning should occur as soon as sufficient compressive strength is obtained as is required by PT anchors. Often, the minimum strength for tensioning is 3,000 psi for half-inch tendon anchors. Embrace the use of concrete maturity strength monitoring systems that enable the contractor to expedite PT tensioning and formwork removal.
- Pre-plan the PT tensioning elongation documentation and consultant approval process. Establish real-time approval techniques during tensioning. Third-party, onsite approval is desired. Any approval delay will prevent the contractor from releasing the in-place formwork for use. Work platforms to support trades during the cutting of PT tendons also can be unnecessarily delayed. Cutting tendons later can become a logistical or safety challenge that reduces constructability achievement goals.
- Identify, calculate and detail for the contractor the anticipated shrinkage from concrete placement and PT forces on all monolithic elements greater than 60 feet. Doing so allows the pour to be oversized before the shrinkage to better achieve the final desired concrete location. Keep the shrinkage movement and construction tolerances in mind when attaching other elements to the concrete structure by enlarging weld plates or anchorages.



*Decouple stair, elevator and earth-retention walls from PT slabs.*