

SERIES 3, ISSUE 2 – CONCRETE COVER OVER REINFORCEMENT

Concrete cover is the minimum required distance between the outer edge of embedded reinforcement and the surface of the concrete. The engineered production drawings (piece drawings or piece tickets) should specify the required concrete cover over the reinforcement for the component based on the component exposure within the structure.

Proper concrete cover serves to protect the precast concrete component in the following ways:

- It protects steel reinforcing bars and strand from corrosion due to infiltration of moisture into the concrete.
- It provides thermal insulation in the event of a fire.
- It provides proper embedment of the reinforcement in concrete to allow full development of the reinforcement for resistance against the various stresses imparted to the member.
- It reduces the potential for reinforcement shadowing on the concrete face.

Concrete cover problems can occur during fabrication of precast concrete components due to a variety of causes, including:

- Congestion of reinforcement and embeds
- Incorrect dimensioning of reinforcement and associated conflict with other reinforcement or embeds
- Improper fabrication of reinforcement or placement, such as incorrect radius on stirrups, reinforcement being placed incorrectly, or improper chairing of reinforcement
- Formwork built to incorrect dimensions and/or formwork movement
- Insufficient support or anchoring of the reinforcement to withstand the concrete placement and vibration process
- Walking on the reinforcing cage while placing concrete

Best Practices

- Correctly fabricate and check the reinforcement and other embedded items.
- If a conflict between reinforcement and embeds is observed, contact Engineering.
- Adequately support and restrain the reinforcement and embeds from shifting during the concrete placement and vibration process.
- Perform a comprehensive QC inspection using the approved drawings.

ACI Concrete Cover Requirements

The following is Table 20.5.1.3.3, Specified concrete cover for precast-nonprestressed or prestressed concrete members manufactured under plant conditions, from the American Concrete Institute's *Building Code Requirements for Structural Concrete* (ACI-318-19).

PCI Plant Quality Talk Quality Enhancement Committee



NPCA
National Precast Concrete Association



PCI
Precast/Prestressed
Concrete Institute

CONCRETE EXPOSURE	MEMBER	REINFORCEMENT	SPECIFIED COVER, IN.
Exposed to weather or in contact with ground	Walls	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter	1-1/2
		No. 11 bars and smaller; W31 and D31 wire and smaller; tendons and strands 1-1/2 in. diameter and smaller	3/4
	All other	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter	2
		No. 6 through No. 11 bars; tendons and strands larger than 5/8 in. diameter through 1-1/2 in. diameter	1-1/2
		No. 5 bar; W31 or D31 wire and smaller; tendons and strands 5/8 in. diameter and smaller	1-1/4
	Not exposed to weather or in contact with ground	Slabs, joists, and walls	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter
Tendons and strands 1-1/2 in. diameter and smaller			3/4
No. 11 bar, W31 or D31 wire and smaller			5/8
Beams, columns, pedestals, and tension ties		Primary reinforcement	Greater of d_b and 5/8 and need not exceed 1-1/2
		Stirrups, ties, spirals, and hoops	3/8

Aggregate Size Considerations

- The clear distance between reinforcement and formwork shall be equal to the specified concrete cover or 1.5 times the maximum aggregate size, whichever is larger.
- The concrete cover and the concrete mixture design used must comply with the production drawings.
- These restrictions may be waived if the design professional verifies that the concrete can be properly consolidated.
- More information can be found in ACI 211.1, *Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete*, and ACI 302.1R, *Guide to Concrete Floor and Slab Construction*.

Note: Please complete this form and return to the Quality Control Manager. All crew members should be observant and report to their foreman anything out of the ordinary on a project. See something, say something.

NOTES	ATTENDEE SIGNATURES
DATE _____	_____
PRESENTER _____	_____

