Department of Health Care Access and Information
Office of Statewide Hospital Planning and Development
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POLICY INTENT NOTICE

PIN: 81

SUBJECT

Low Carbon Concrete

Effective: 06/17/2025

PURPOSE

Low Carbon Concrete mixes can be used in hospitals and skilled nursing projects in California subject to some conditions.

BACKGROUND

Cement production, a key component of concrete, is a significant source of carbon dioxide, a potent greenhouse gas. Recognizing this, many hospital systems and construction firms have established carbon emission reduction targets for their projects. California, with its goal of carbon neutrality by 2045, aims to reduce statewide greenhouse gas emissions by at least 85% below 1990 levels by that year, and 40% below 1990 levels by 2030.

Fortunately, cement content in concrete can be reduced by substituting it with supplementary cementitious materials (SCMs) like fly ash, silica fume, and slag cement. The American Concrete Institute (ACI) standard ACI 318 limits SCM replacement percentages based on concrete's exposure class, which is determined by freeze-thaw cycles and chemical exposure.

Specifically, ACI 318 Table 26.4.2.2(b) sets limits for Exposure Class F3 (concrete exposed to freeze-thaw cycles, frequent water and deicing chemicals exposure). Although intended for F3, these limits are often applied as de facto standards for all exposure classes, as reflected in California Building Code Sections 1903.6 and 1903A.6.

However, the California Office of Statewide Health Planning and Development (OSHPD) allows alternative methods, per California Administrative Code Section 7-104 and California Building Code Section 104.11, to exceed ACI 318's SCM limits if concrete mix testing demonstrates adequate strength and durability.

Using SCMs typically retards concrete's strength development. Therefore, mixes with high SCM replacement require careful scheduling for formwork removal and slab finishing. Additionally, increased bleed water may occur.

The specified compressive strength of concrete, denoted as f_c', is commonly a 28-day strength. While ACI 318 permits longer durations to achieve f_c' (as specified in Section 19.2.1.3), extending this duration is generally not appropriate when SCM replacement is minimal. ACI 318 does not preclude the use of longer durations to achieve the minimum specified strength, it requires those to specified on the construction documents per Section 19.2.1.3.

POLICY

When a concrete mix design specifies SCM percentages exceeding ACI 318 Table 26.4.2.2(b) and California Building Code Sections 1903.6/1903A.6, an Alternate Method of Compliance request must be submitted, including:

1. **Detailed Mix Design:** Specify all concrete mix designs, including water-cement ratios and admixtures.
2. **Strength Development:** Indicate the days (not to exceed a maximum of 56 days) required to achieve the design concrete compressive strength f_c'. If exceeding 28 days, additional test cylinders shall be required in order to provide an intermediate 28-day test cylinder result to verify strength gain (see item 6).
3. **Compliance with ASTM Standards:** Show compliance with ASTM C618 (Fly Ash), ASTM C989 (Slag Cement), ASTM C1240 (Silica Fume) or ASTM C595 and C1157 (Blended Cements).
4. **Strength Test Records:** Submit strength test records per ACI 301, Section 4.2.3.2, covering the range of specified water-cement ratios and admixtures.
5. **Durability Testing:** Demonstrate compliance with ACI 301, Section 1.8.5 durability requirements.
6. **Cylinder Testing Schedule:** Specify the number of cylinders per sample (per California Building Code 1905A.1.17) and the testing schedule to account for the extended strength gain period.
7. **Placement and Mixing Limits:** Define the maximum time from initial water introduction to final placement and the maximum revolutions for ready-mix trucks.
8. **Construction Schedule Integration:** Show how the extended time for concrete strength gain is incorporated into the construction schedule.

Note: Compliance with ACI 323-24 is voluntary.

Original signed	06/17/2025
Chris Tokas, Deputy Director	Date