

SUSTAINABLE HIGH-PERFORMANCE CONCRETE STRUCTURES

ISSUE:

Guidance on the use of fly ash in concrete in VA construction program is updated. Under federal mandates to move towards more sustainable facilities VA has used fly ash in concrete for a number of years. The use of high-volume fly ash (HVFA) concrete has recently become an issue recently with structural design professionals on VA projects

BACKGROUND/DISCUSSION:

The ACI Board Advisory Committee on Sustainable Development published a white paper in the February 2005 issue of *Concrete International*, which aptly summarized the concept of sustainability.

“The concept of sustainability in human life includes the use of energy and material resources in a way that assumes long term viability. What is threatening the viability is potential shortage of energy and raw materials and unacceptable levels of environmental pollution from solid, liquid and gaseous waste products.”

There is a growing awareness that concrete production and construction practices of today are not sustainable. The principal hydraulic binder used in concrete mixtures is the product of an industry that not only is energy-intensive, but also responsible for large emissions of carbon dioxide. Due to large quantities of coal fly ash available throughout the world, the use of HVFA for replacement of cement seems to offer the best solution of decreasing the escalating demand of cement.

ALERT

RECOMMENDATION:

Current VA Master Specifications Section 03 30 00, dated 02-09, paragraph 2.3.D states, "Cement Factor: Maintain minimum cement factors in Table 1 regardless of compressive strength developed above minimums. // Fly ash may be substituted up to 20 percent of the minimum cement factor at the option of contractor, except fly ash may not be used in concrete designated as architectural concrete.//

With a strong commitment to promote 'green concrete' for building construction VA is modifying this specification to mandate the use of fly ash.

To clarify this change we have modified paragraph 2.3.D of spec section 03 30 00 as follows.

Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums. Use Fly Ash as an admixture with 20% replacement by weight in all structural concrete work. Increase this replacement to 40% for mass concrete, and reduce it to 10% for drilled piers and caissons. Fly ash shall continue to not be allowed in architectural concrete.

Modify all current specifications for projects under design and construction to meet these requirements. If concrete work has already begun on a project, then Project Managers shall make changes in concrete specifications with flexibility to address cost and schedule impacts.

FOR ADDITIONAL INFORMATION:

Contact Krishna Banga of Facilities Quality Service (00CFM1A) at krishna.banga@va.gov

**March 8, 2011
00CFM1A-DA-136**