ECOMATERIAL TECHNOLOGIES
A CRH COMPANY

TECHNICAL BULLETIN

Fly Ash

In Colored Concrete

Colored concrete generally sells for a significant premium, depending on the desired color (or colors), and is subject to damage from aggressive chemicals, corrosion, salts, sulfates and exposure to harsh environments. Protecting the concrete by including fly ash can yield better, longer lasting colored concrete.

Fly ash, which is similar in color to quality cement, does not impact the appearance of the colored concrete in a properly designed mix. Fly ash helps maintain the integrity, serviceability and durability of the initial concrete/color investment while having little, if any, effect on desired color. Soloman and Elementis have both done in house QA/QC evaluations indicating fly ash in the light tan to light gray color spectrum does not affect final color of dust-on or integrally colored concrete. However, trial-batching mixes with desired concrete color (or colors) and fly ash is a good practice. Regardless of the ash's color, excellent colored concrete can be produced.

Colored concrete's best insurance policy against premature deterioration, aggressive chemical attack, and efflorescence is the addition of fly ash, whether using dry or liquid pigments.

PRECAST COLORED ARCHITECTURAL CONCRETE

Pre-cast colored architectural concrete can also benefit dramatically from the inclusion of fly ash. Today's design community is interested in defined detail and quality materials that withstand the ravages of time. A mix with fly ash helps the design professional meet these needs because it easily flows into intricately detailed forms and is more durable over time. In architectural pre-cast work, fly ash helps provide a cohesive mix that fills forms more quickly with less effort, and reduces rock-pockets, voids and other visual defects. It has been said that because of all the quality benefits it lends to concrete, the industry would have to invent fly ash if it didn't exist.

Manufacturers and distributors of colored concrete pigments recommend quality fly ash for a dense, durable mix and to lower the permeability of the concrete by reducing the amount of water needed while achieving

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the same level of workability. Fly ash also greatly reduces alkali silica reaction by combining chemically with naturally occurring alkalis in portland cement to keep reactive aggregates from causing internal expansion in the concrete. Fly ash continues to chemically react with the cement to produce increased strength in the concrete after typical acceptance (28 to 42 days) for up to one year. In colored flat-work where structural integrity is of less importance, mixes with fly ash replacing 20% to 30% of the cement content can be designed to achieve desired strength in 35 to 56 days, and, with proper curing, will produce concrete of exceptional quality.

Fly ash aids the concrete producer and design professional by providing:

- A better, easier finish with no added expense to workmanship or placing
- Sharper detail in stamped or formed applications and jointing
- Color value maintenance
- Reduced water content
- Easier pumping that goes further with a minimum of water

No substitute exists in concrete flatwork for proper water to cementitious materials ratio, workmanship, curing and material selection. Changes in any of these areas can affect the final hydrated hue (true color) and the value (lightness/darkness of the hue). Design professionals, developers and owners should insist on colored concrete being produced and finished with the best available practices in the concrete industry, and this clearly includes fly ash for a better mix.

For more information or answers to questions about the use of fly ash in specific applications, contact your nearest Eco Material Technologies Technical Sales Representative or call 1-770-684-0102.

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