ECOMATERIAL TECHNOLOGIES
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TECHNICAL BULLETIN

Higher Volume Fly Ash

For Concrete Pavement

Historically, fly ash from coal combustion power plants has been utilized for reasons of economy and to maintain workability in warm climates. Experience from coast to coast illustrates how fly ash, in addition to reducing the cubic yard cost of concrete by replacing a portion of the higher priced portland cement, is further reducing the lifecycle cost of roads and bridges by improving concrete durability and longevity.

Beginning with the construction of the Skyway Bridge in 1982, the Florida Department of Transportation began requiring that cementitious materials like fly ash be included at rates of 18% to 50% in concrete subjected to moderately and extremely aggressive environments. Research by the Florida DOT in the 1970s indicated that the addition of fly ash greatly improved the ability of concrete to protect rebar from corrosion and to resist damage from sulfates found in sea water and some soils. Additional testing indicates that the DOT's concrete for bridge superstructures and decks containing 20% fly ash will likely provide a 75-year service life in a marine environment.

Point Mugu Naval Air Station required a 565-foot long, non-jointed pour of 30% Class F fly ash concrete.

Government agencies are using higher volumes of fly ash to improve the durability of roads.

At the Point Mugu Naval Air Station in Southern California, the Navy chose a concrete mix with 30% Class F fly ash for a high durability runway used to simulate aircraft carrier landings. Reducing the portland cement and replacing it with fly ash accomplished improved economy, durability, reduced cracking and high strength. This approach provided the added benefit of meeting environmental/recycling goals by replacing as much cement as possible with fly ash. The high fly ash contents improved the concrete durability by mitigating the damaging effects of potentially expansive concrete aggregates in the region. The mix performance contributed to controlling shrinkage cracking to a single hairline crack in the 565-foot long, non-jointed runway.

The Washington State Department of Transportation allows the use of a mix with 30% fly ash to provide a protective overlay for bridge decks. This mix was developed to provide an alternative to existing temperature and weather sensitive systems that were

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prone to cracking and delamination. The fly ash overlay mix achieves high early strengths to allow for traffic in 3 to 4 days, reduces cracking of the concrete surface, meets the low permeability criteria for protective concrete overlays, and maintains a high level of workability for the contractor allowing for improved concrete quality and durability.

The use of fly ash to improve concrete durability and longevity has proven itself in some of the most aggressive environments that any federal, state or local municipality may encounter. Using fly ash at rates ranging from 20% to 35% or more can provide low cost durable concrete for any municipality and ultimately the public.

Eco Material Technologies actively promotes fly ash use and is continually educating government and state agencies about the benefits of allowing/requiring fly ash in local and federal government projects. Several states are acting to allow or mandate increased volumes of fly ash in concrete. California (Caltrans) has a mandate to replace about 25% of its cement with fly ash. The Utah and Nevada DOTs recently mandated 20% fly ash usage in all concrete work. Previously, these states allowed only an option to use up to 15%.

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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