

## **REDUCE COSTS & ENHANCE PERFORMANCE OF TRANSPORTATION PROJECTS WITH COAL ASH: Support a Non-hazardous Federal Regulatory Approach**

Coal ash, a byproduct of coal combustion for electric generation, has been a crucial element in highway construction projects across the U.S. for decades. The regulation of coal ash as a hazardous waste threatens the recycling of this valuable material.

Currently, over 13.7 million tons of coal ash is used annually in cement and concrete applications across the country. The annual economic value of this use exceeds \$1 billion.

Coal ash improves durability in concrete construction in highway transportation projects by reducing damaging chemical reactions, reducing concrete permeability, and improving concrete strength, which results in improved durability and longer service life:

- **Coal ash reduces concrete deterioration.** Alkali-silica reaction (ASR) is a chemical reaction between aggregates (sand or stone) in concrete and alkaline materials present in Portland cement. ASR causes an expansion of the concrete, leading to cracking and premature deterioration, dramatically reducing the service life of a structure or pavement. Coal ash is the most economical method to mitigate this damage.
- **Coal ash reduces damage from water infiltration.** Coal ash helps reduce permeability of concrete by reacting with compounds to fill pores in the concrete, reducing migration of water through the structure. Keeping water from migrating through concrete is especially important for the protection of reinforcing steel in the concrete structure from corrosion.
- **Coal ash makes concrete stronger.** Coal ash reacts with compounds in the concrete to generate additional compressive and flexural strength, strengthening the internal structure of the concrete.

Transportation engineers rely on coal ash to help solve challenges to creating concrete structures that are both economical and durable.

- When the interstate highway system was created in the 1950's, bridges were designed with a 50 year service life; today, because of the advancements in technology and the use of coal ash, engineers can design structures to provide 100 years of service.
- California's Department of Transportation specifications cause contractors to replace 15 percent to 35 percent of the Portland cement in road concrete.
- The new I-35 bridge in Minneapolis contains about 4,000 tons of coal ash, making it stronger than its design strength, reducing the cost of the materials used in its construction, and reducing CO<sub>2</sub> emissions from Portland cement manufacture.

Other materials - silica fume, metakaolin, blast furnace slag - can also be used to enhance concrete durability. However, these materials are not as readily available, can be 4 - 6 times more expensive, and are not as effective as fly ash. If fly ash were regulated as hazardous waste, even as a "contingent" hazardous waste, engineers and architects developing project specifications would not allow the use of fly ash in concrete. This would increase costs and reduce performance of highway projects.

The regulation of fly ash as non-hazardous waste would ensure the safe management of fly ash while allowing for its continued beneficial use, including the enhancement of the concrete construction in our nation's highway systems.