



ASH Allies: The Natural Pozzolan Association

The Natural Pozzolan Association (NPA) was founded in 2017 as a producer's association to represent and promote the combined interests of natural pozzolan manufacturers as they pertain to product awareness, performance, availability, and competitiveness in concrete and cement markets worldwide, as well as to improve the quality and market presence of natural pozzolans on a continuous basis. One of our most important goals is to establish natural pozzolan as a key ingredient in concrete that is industry accepted and approved by all pertinent regulatory agencies.

Natural pozzolan producers in North America have, in just the last decade, invested heavily in the development of pozzolanic deposits and processing facilities to produce pozzolanic materials that are compliant with ASTM C618 and AASHTO M295. Natural pozzolan production capacity, in the last decade, has increased from less than 200,000 tons per year to approximately 1,500,000 tons per year. An additional 500,000 tons of capacity is currently under development. Significantly more capacity is under consideration as known natural pozzolan deposits are being tested for the appropriate properties to be commercialized. This rapid growth in the production and availability of natural pozzolans is the result of dwindling supplies of artificial pozzolans, specifically fresh fly ash.

Historically speaking, natural pozzolans were used extensively by the Romans, e.g., the Pantheon, the Colosseum, aqueducts, etc. These 2,000-year-old concrete monuments are still in remarkable condition after two millennia of wear and tear. The technology of pozzolans was lost after the fall of the empire and was only rediscovered (largely) in the last 100 years or so. Most of the well-known dams constructed in the western United States (Hoover Dam, for example) incorporated natural pozzolans into the concrete mix design. The key property the engineers were looking for was reduced heat of hydration to protect the mass concrete from thermal cracking. What they also achieved, almost incidentally, was vastly improved durability by way of the pozzolans' ability to protect the concrete from alkali-silica reactions and alkali-sulfate reactions. Pozzolans also improve concrete's durability by significantly lowering its permeability—in other words, reducing or refining the pore structure.

Natural pozzolans were produced in the U.S. from the early 1900s through the 1970s mostly for purposes of large concrete infrastructure. However, with the advent of coal-fueled power production—and the attendant flue gas controls—a new artificial pozzolan became popular due to its widespread availability and lower cost. These materials, known as coal combustion residuals, or more specifically fly ash, quickly captured the pozzolan market and natural pozzolan production plummeted. Only in the last two decades have natural pozzolans made a comeback, with the growth curve particularly steep in the last five to seven years.

The employment of natural pozzolans in concrete has recently evolved from massive structures such as Rome's Colosseum and the Glen Canyon Dam to all concrete applications—airport runways, wind farm foundations, roads, bridges, homes, slabs, etc. In light of the diminishing supply of fresh fly ash, several companies are now blending fly ash with natural pozzolans to extend supply within traditional fly ash distribution networks, as well as remediating otherwise unusable fly ash—converting it to a fly ash/natural pozzolan blend that meets and exceeds all relevant fly ash or natural pozzolan standards and specifications. The production of these blended materials is also growing at a rapid pace, with Caltrans (the California Department of Transportation) the latest major state agency to approve blended and remediated pozzolanic materials.

Natural pozzolans, whether alone or blended with fly ash, enhance the durability and long-term strength of concrete, making them a must for a sustainable future that requires greatly extended built life for major infrastructure projects. Perhaps even more importantly, natural pozzolans can massively reduce the carbon footprint of concrete by anywhere from 20 to 50 percent, depending on mix design and application. In a world in need of a much more durable built environment and a significantly lowered carbon footprint, natural pozzolans have come back just in time...what was old is new again!

For more information about the NPA and natural pozzolans, please visit pozzolan.org.