

# MYTH: More strength requires more cement.

# FACT: Increased strength (& density & durability) can also be achieved with less cement + natural pumice pozzolan.

BOLD TALK, SURE. But it's backed up with ASTM standards-research providing definitive data that Hess Standard Pozz, used as a partial replacement for Portland Cement, strengthens and densifies concrete. Super-charging it, if you will, by introducing a secondary (pozzolanic) reaction within the oh-so-critical hydrated concrete paste. Sure, adding more Portland cement can amp strength, but it also increases cost and does absolutely nothing to address the host of ills that plague standard concrete and, long-term, disrupt the very strength you're after.

The science behind the “less cement and a little pozz = more strength, density and durability” mix design is a fascinating bit of molecular reclamation known as the pozzolanic reaction.

The glue that strengthens and densifies concrete—Calcium Silica Hydrate (CSH)—is the result of combining water and Portland cement. But that same hydration reaction also produces trouble-causing Calcium Hydroxide (CH) by-products (up to 25% of the hydrated Portland cement) that not only do nothing to contribute to concrete strength and density, but actively work against it, introducing problems like

integrity-destroying ASR as well as the swarm of ills that result from CH-induced porosity. The HessPozz, while not cementitious in nature, works at the molecular level within the concrete paste, reacting to and melding with the trouble-causing CH, ultimately converting it into additional CSH. The consumptive transformation of the CH mitigates or completely eliminates the problems it spawns. And that newly-created CSH does what you'd expect: it further densifies and strengthens the concrete, welding the aggregates into a dense, durable, almost impermeable matrix.

Compressive strength gets a significant boost, but the substantial reduction in porosity also means sulfate attacks are mitigated. Reinforcing steel is protected without the need to thicken the cover concrete. The water-infiltration freeze-thaw cycle is broken. Efflorescence is practically eliminated. ASR is flat-lined.

The pozzolanic reaction continues for months, until the pozzolan is used up. It's a truly remarkable, effective and

efficient process. And with pumice pozzolan priced only slightly higher than the cost of the cement it replaces, the economics work beautifully as well.

