

## NEW INNOVATIONS WITH PRECAST CONCRETE

Precast concrete is a high-performance building material that is versatile, efficient, resilient, durable, and sustainable for the long term. Precast concrete producers are constantly innovating to create safer manufacturing processes, improve the efficiency of their operations, develop new hybrid specialty products, and maintain outstanding product quality and on-time deliveries for their customers. Due to the manufacturing process of Portland cement, precast concrete does contribute to the carbon footprint on our environment and the precast concrete industry is working to reduce greenhouse gas emissions through numerous technical innovations.

Because of the inherent high-performance attributes of precast concrete, better performing, longer lasting buildings can help naturally reduce the impact on climate change over the long term. While all the long-term operational benefits are important, it is also important to mitigate the effects of climate change in the short term. Precast concrete industry goals are to reduce greenhouse gas emissions by mitigating carbon emitted during production, reduce the amount of Portland cement used in concrete mixes, and to

increase strength and durability while using less material.

Over the past several years, new technology has emerged to take captured industrial carbon and inject it into fresh concrete to sequester the carbon and permanently store it rather than emitting it into the atmosphere. Another ongoing innovation is the use of supplementary cementitious materials (SCMs) that can reduce the amount of Portland cement in the concrete mix. Recycled by-product materials such as fly ash, slag cement, and silica fume are commonly used to reduce cement content while also improving the strength and durability of the concrete. Research is also being conducted with both recycled glass and with microalgae as cement replacements.

The precast concrete industry is also very enthusiastic about a relatively new technology called ultra-high performance concrete, or UHPC. While conventional precast concrete has a minimum compressive strength of 5,000 psi and a flexural/tensile strength of 700 psi, UHPC has a minimum compressive strength of between 14,000 to 17,000 psi and a flexural strength of at least 1,400 psi. UHPC building and bridge products will use less materials more efficiently with much longer spans. UHPC will be able to do much more with much less material.

Precast concrete is a durable, resilient, and sustainable building material with a service life of 100 years or more. No other building material comes close to precast concrete in terms of resiliency, sustainability, blast-resistance, storm-resistance, inherent fire-resistance and overall durability. The precast concrete industry is continuing to explore innovative new technologies to increase production efficiencies and reduce embodied carbon and greenhouse gas emissions.

