Low Carbon Mixes with Supplementary Cementitious Materials

Less Cement = Less Carbon

More than a decade ago, our parent company, U.S. Concrete, pioneered the technology process that led to the reduction of cement in our products. We accomplish this through the use of supplementary cementitious materials (SCMs), such as fly ash and slag, to partially replace the cement content in standard concrete mixes – ultimately improving the concrete's properties and reducing greenhouse gas emissions.

Higher Performing Concrete. Lower Carbon Footprint

By engineering higher performing concrete compared to traditional concrete, we deliver high early strength, low shrinkage and superior permeability, with a significantly lower carbon footprint than standard ready-mix concretes.

Concrete mixes, with SCMs at various proportions, are available to meet both the structural performance requirements and the contractor's placement requirements for each application.

Applications

- Our standard structural mixes traditionally use 50% cement replacement materials and we have delivered mixes with up to 70% cement replacement materials.
- By introducing SCMs into mass concrete applications, the SCMs help meet temperature limits by lowering the heat of hydration.
- High early strength mixes with SCMs achieving 3,000 – 4,000 psi in three days.
- SCM's are utilized in a wide range of specialty applications such as: architectural concrete, flowable fill, self-consolidating concrete, long-distance pumping, and more.

SCMs: A CLOSER LOOK

Supplementary cementitious materials (SCMs) most commonly used in the concrete industry are slag and fly ash. Other SCMs that Central Concrete has experience with are natural pozzolans and recycled ground glass pozzolan. These materials have strength contributions that are the most similar to fly ash in concrete mixes.

ENVIRONMENTAL BENEFITS

- Significant reduction of the global warming potential (GWP) of mix designs by replacing percentages of Portland cement in concrete.
- LEED points
- Conservation of natural resources
- SCM's are inherently a byproduct, thus utilizing these materials will reduce the overall GWP for a mix design.

PERFORMANCE BENEFITS

- Reduced permeability
- Increased ultimate strength
- Improved workability, due to the round shape of the fly ash particles
- Slag's white color can help achieve lighter, architectural concrete
- Decreased heat of hydration and extension of set time
- Increases sulfate resistance and alkali-silica reaction (ASR) mitigation by binding some of the alkalis in the cement, reducing the concrete permeability and increasing its tensile strength
- Increased solar reflective index (SRI) & reduced heat-island effect

SUSTAINABILITY SOLUTION: LOW CARBON CONCRETE

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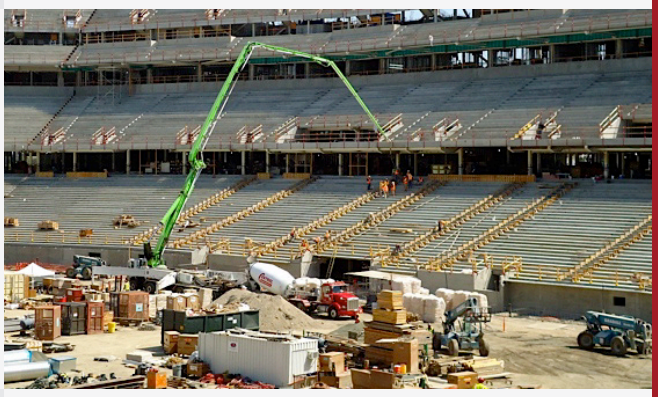
SUSTAINABILITY SOLUTION: LOW CARBON CONCRETE

San Francisco Public Utilities Commission Headquarters, San Francisco, CA

Project Highlights

- 70% cement replacement for mat slab, cores and columns
- 56% cement replacement for elevated P.T. slabs
- Use of low carbon mixes reduced the carbon footprint and saved 7.14 million lbs. in CO_2 emissions

Levi's Stadium – Home of San Francisco 49ers



Project Highlights

- Use of SCMs vs. traditional concrete reduced the overall carbon footprint by an estimated 23 million lbs. of CO_2
- The Stadium was the first U.S. professional football stadium to achieve LEED Gold Certification

NVIDIA Campus, Sunnyvale, CA

Project Highlights

- 32,000 cubic yards utilized 50% SCMs – at least half of this consisted of ground, granulated blast slag.
- Ground, granulated blast-furnace slag contributed to the recycled materials category, critical to the owner's application for a LEED Gold rating
- Use of SCMs vs. traditional concrete saved approximately 6.7 million pounds of CO_2

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