



Building Green with White Concrete

Lehigh White Cement Technical Brief

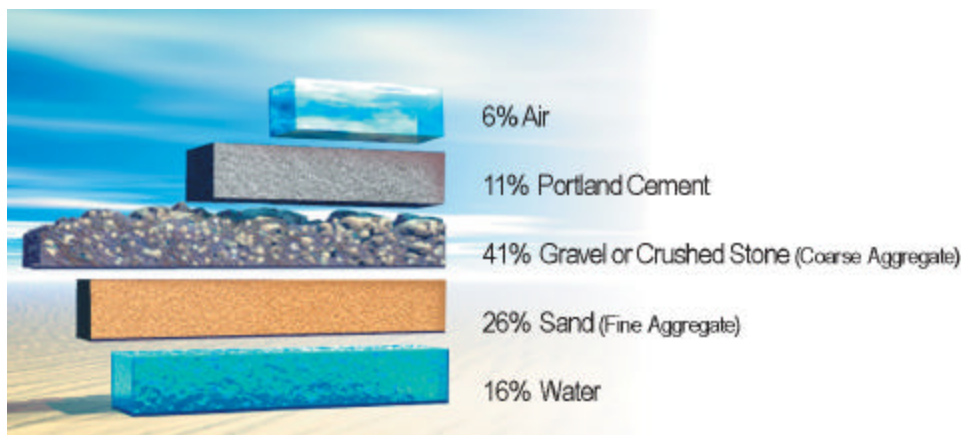
The buildings in which we live and work have a tremendous impact on our global environment. Sustainability or “green building” seeks to balance resource efficiency, health, and social concerns throughout the life cycle of a structure. Concrete has a variety of benefits to offer in achieving this goal.

What is Concrete?

Concrete and cement are often confused. Cement is a powder that, when mixed with water, binds sand and aggregates together to create concrete. Concrete is the world’s most prolific building material. This “liquid stone” can be shaped to make roads, bridges, dams, hospitals and homes. It is extremely strong and durable. The longevity of concrete means less maintenance and replacement when compared to other building products. This contributes to the environmental value of this versatile material.

Although making cement requires a great deal of energy, cement is only a minor portion (10% -15%) of concrete. The other ingredients, aggregates and water, are locally sourced and require very low energy to obtain.

Progress from Research



The high temperatures needed for cement manufacturing make it a very energy intensive process. Both the fuel for heating and the chemical reaction from processing the raw materials generate carbon dioxide (CO²). Worldwide global concerns about climate changes have led industry researchers to find ways to minimize CO² production. The result is a 29% decrease in carbon dioxide output during the past three decades.

Research has also led to the use of industrial by-products in the manufacturing process. Many Industrial by-products are used as alternative raw materials and alternative fuel sources. Partially processed clinker dust, a by-product of the cement industry, can be reintroduced into the kiln as raw material.

A Cradle-to-Grave Perspective

White concrete is an extremely durable material. Life spans for concrete building products are frequently double or triple those of other common building materials. Concrete is virtually unaffected by heat and cold, UV rays, and moisture. This reduces the waste created by the removal and replacement of weathered or moisture damaged materials.

Raw Material Production

The predominant raw material for cement is limestone, the most abundant mineral on earth and readily available throughout North America. Quarries, the primary source of raw materials, can be readily reclaimed for recreational, residential, or commercial use, or they can be restored to their natural state.

Construction Phase

Ever seen the piles of scrap lumber and sheathing filling dumpsters at a construction site? Concrete is ordered and mixed for each individual job, or comes as a precast product. On-site scrap and waste are minimized and any leftovers can be recycled.

Demolition Phase

Although concrete has one of the longest useful life-spans for construction materials, its usefulness does not end after its original purpose. In most urban areas, almost all concrete is crushed and recycled for use in road base and back-fill. In some cases, it is recycled for aggregate in new concrete. Research continues to find new applications for recycled concrete.

Versatility

The applications for concrete and cement-based materials are growing rapidly. Stucco, precast and concrete roof tiles need minimal maintenance and provide long lasting protection from the elements. These products are also useful in fire-prone areas where stray sparks can lead to devastating results. Decorative concrete slabs and concrete pavers for patios eliminate the need for costly annual maintenance, associated cleaners, and solvent-based coatings for wood decks. Even with good care, exterior wood structures require replacement long before their concrete counterparts. White concrete's outstanding thermal properties reduce peak heating and cooling loads, as well as a structure's heat gain, through solar reflectance (albedo.) White concrete surfaces contribute to a better environment by reducing the "Heat Island" effect. (*Lawrence Berkeley Report LBNL-48334*)

For more Information

Learn more about using concrete for environmental benefits from the Environmental Council of Concrete Organizations (ECCO) at www.ecco.org. To learn about the wide varieties of concrete home-building options and applications, visit www.concretehomes.com.



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