

Score LEED points with concrete

- *A new website details where concrete can be used to earn LEED credits.*

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Northwest concrete and cement interests have been working hard during the last several years to both educate themselves on green building practices and to share with the construction community the synergies they see in using concrete and cement products to achieve sustainable solutions. They envisioned a Web site to help educate design professionals about these synergies and brought their idea to the Portland Cement Association, where they found a receptive host and sponsor.

The result, a newly expanded and revised ConcreteThinker.com Web site, was released this spring and will be formally launched at the upcoming American Institute of Architects convention.

20 sustainability solutions

ConcreteThinker.com explains 20 concrete- and cement-based applications and products, 20 sustainability solutions that they can help achieve, and offers a large collection of project examples where these have been applied.

Other resources linked to the topical pages include an extensive reference library, green specification guidelines, and longer technical briefs. Also offered is energy performance modeling, which shows the effects of the increased thermal mass that concrete provides in both residential and commercial building prototypes in various climates. A "Sim City" tour highlights concrete's green applications in a fun and dynamic format.

The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system is the dominant benchmark of achievement in green building. The system is credit-based, allowing projects to earn points for environmentally friendly actions taken during construction and use of a building. See www.usgbc.org for more LEED information.

Concrete offers a wide range of applications, techniques and properties that can help a project achieve 19 to 28 LEED points. Concrete can contribute directly or indirectly to receiving points under 15 credit levels, with additional points possible under the "Innovation in Design" section.

Below are suggestions for earning LEED-NC v2.2 points through the use of cement and concrete products. The paragraph headings below correspond to the credit categories and the credit numbers in the LEED rating system.

Sustainable Sites

Credit 3: Brownfield Redevelopment (1 point)

Cement can be used to solidify and stabilize contaminated soils and reduce leaching concentrations to below regulatory levels.

Credit 5: Site Development (1-2 points)

Concrete parking garages within buildings can be used to limit site disturbance, including earthwork and clearing vegetation, as well as reduce the overall building footprint to help maintain existing natural areas.

Credit 6: Stormwater Management (1-2 points)

Pervious concrete and permeable pavers can be used to increase infiltration of stormwater, reducing both the flow and quantity, and the pollution associated with runoff. Pervious concrete contains coarse aggregate, little or no sand, and insufficient cement paste to fill the voids. It results in concrete with a high permeability that allows water to flow through easily.

Similar results can be achieved by using concrete grid pavers that have large voids where vegetation can grow.

Infiltration of stormwater filters out pollutants as well for a second point.

Credit 7: Heat Island Effect (1-2 points)

The heat island credit addresses the amount of heat buildup associated with roofs and paved surfaces. Using concrete, high-reflectance pavers, or open-grid pavers rather than asphalt for at least 50 percent of sidewalks, courtyards, parking lots, driveways and access roads can garner one point.

Alternately placing a minimum of 50 percent of parking spaces under a building, roof or deck that has a Solar Reflective Index (SRI) of at least 29 will work. A second point can be achieved with a vegetated roof or a roof with white cement tile.

Concrete decks are often needed to provide structural support for the heavy, moist soil in a vegetated roof. Lightweight concrete topping can be used to create a sloping deck to provide drainage for the system.

Concrete constructed using ordinary portland cement generally has an SRI around 35. New concrete made with "white" portland cement can have an SRI as high as 86. For comparison, new asphalt usually has an SRI of 0, and weathered asphalt has an SRI of approximately 6.

Energy and Atmosphere

Prerequisite 2: Minimum Energy Performance (required)

Buildings constructed of cast-in-place, tilt-up, precast, insulating concrete forms, or masonry possess thermal mass to help moderate indoor temperatures and reduce peak heating and cooling loads. When buildings are properly designed and optimized, incorporating thermal mass can lead to a reduction in heating, ventilating and air-conditioning equipment capacity and save both energy and construction costs.

Credit 1: Optimize Energy Performance (1-10 points)

Additional points are awarded when energy cost savings can be shown compared to a base building that meets code requirements of the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Studies show that using concrete walls that are insulated to exceed minimum code requirements by a modest amount (about the same as minimum requirements for wood-frame walls) can contribute to earning 1 to 3 points, depending on the building type, orientation and climate. Optimizing design can achieve up to 10 points.

Materials and Resources

Credit 1: Building Reuse (1-2 points)

Concrete is long lasting and resistant to damage, making buildings with concrete shell components strong candidates for this credit.

Credit 2: Construction Waste Management (1-2 points)

Since concrete is a massive construction material and is frequently crushed and recycled into aggregate for road bases or construction fill, this credit should be obtainable when concrete buildings are demolished.

Credit 4: Recycled Content (1-2 points)

Supplementary cementitious materials — such as fly ash, silica fume and slag cement — are considered pre-consumer recycled content. Furthermore, using recycled concrete or slag as aggregate instead of extracted aggregates would qualify as post-consumer.

Credit 5: Regional Materials (1-2 points)

Concrete usually qualifies because ready-mix and precast plants are within 500 miles of a jobsite, and the materials used to make concrete are extracted within 500 miles.

Indoor Environmental Quality

Credit 4: Low-Emitting Materials (1-2 point)

Although it specifies low VOC paints and coatings for use on the interior of a building, concrete walls and ceilings with no coatings also contribute to this credit. Similarly the point for low VOC carpet may be achieved if flooring surfaces other than carpet, such as polished concrete, can demonstrate equivalent performance to the Carpet and Rug Institute's Green Label Program.

Other points

Concrete can also be used to obtain points indirectly. For example, concrete can be used as cisterns to collect rainwater or gray water for Water Efficiency Credit 1: Water Efficient Landscaping or Water Efficiency Credit 2: Innovative Wastewater Technologies. Bio-based form-release agents can contribute to Materials and Resources Credit 6: Rapidly Renewable Materials. The thermal mass of concrete contributes to Indoor Environmental Quality Credit 7: Thermal Comfort.

In addition to the points discussed above, four points are available as Innovation in Design credits if an innovative green design strategy does not fit into the point structure or if it goes significantly beyond a credit requirement. For example, the U.S. Green Building Council has indicated that an Innovation in Design credit may be allowed for needing the durability credit (MR8) allowed in LEED Canada-NC v1.0.

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