Precast Concrete...
Sustainable Structures for Tomorrow!

Sustainable Design

Precast concrete components can contribute in an integrated design process to achieve sustainable designs. Precast concrete construction can assist architects to achieve as many as 24 to 26 points in the LEED building rating system by the CaGBC.

Pavillion Desmarais Building ▪ University of Ottawa ▪ Ottawa, ON ▪ Moriyama & Teshima Architects

- Precast concrete walls used with integral insulation can provide energy benefits that exceed the benefits of mass or insulation used alone in most climates.
- Precast concrete sandwich wall panels used as an interior surface can save materials by eliminating the need for interior framing and drywall.
- The raw materials used in precast concrete manufacturing are generally sourced locally. Precast panels are usually shipped locally as well.
- Precast concrete walls can be designed to be disassembled, saving materials and extending the service life of the panels.
- Precast concrete's durability creates a long life-cycle with low maintenance, reducing the need for replacement and maintenance during a building's life.
- Precast concrete is manufactured in plants under tight quality controls. Precast concrete eliminates construction waste and minimizes transportation and disposal costs.
- Using plant-manufactured precast concrete components with just-in-time delivery reduces site disturbance and material storage requirements.
- Precast concrete contains recycled steel content and may contain recycled supplementary cementitous materials (fly ash, slag or silica fume).

Thermal Mass Not Appreciated

One of precast concrete's key benefits is its high thermal mass, a property that allows concrete to both cool down and to store heat to help moderate daily temperature swings. Recent studies by the U.S. Department of Energy (DOE), have demonstrated that mass in exterior walls reduces annual energy costs in buildings. Thermal mass helps shift peak loads from mid-afternoon in the summer to after 5 PM, reducing energy consumption. In winter, energy can be saved by storing heat in the concrete at night to be released during the daytime.

The Environmental Council of Concrete Organizations (ECCO) reports: "The guiding principle for all thermal-mass standards has been performance. These standards have successfully translated the behavior of thermal mass into understandable and easy-to-use terms. The result is that thermal mass has become a feasible element of building design."

Precast Helps Projects Attain LEED Certification

Precast concrete's local manufacturing, energy efficiency, recyclability and minimal waste are key factors in meeting environmental standards.

Many owners are constructing sustainable buildings. Attention has been spurred by the Leadership in Energy & Environmental Design (LEED) standards specified by the Canadian Green Building Council (CaGBC). With attention to climate change and a desire to lower the consumption of energy and materials, the use of precast concrete construction can assist designers with "green" advantages.

Durability

Buildings constructed using very robust materials can withstand the elements and occupant use for a very long time. Precast concrete building structures with precast cladding can have life expectancies of over a hundred years.

Precast Concrete Sandwich Wall Panels

Precast concrete sandwich wall panels can help achieve LEED certification in a variety of ways; their ability to be recycled, being locally manufactured, having high thermal mass and incorporating integral insulation. These attributes reduce the expended energy needed to manufacture, transport and erect precast concrete panels, key LEED requirements.

Le Vistal ▪ Montreal, QC ▪ Jean-Pierre Bart Architects ▪ LEED Gold Certified

Leon's Retail Store ▪ Edmonton, AB ▪ Murphy Hilgers Architects

Minimum Energy Use

Precast concrete sandwich wall panels can be constructed with high R values that will lower HVAC demands. Large precast concrete panels have fewer, better sealed joints, reducing uncontrolled air infiltration. These attributes can help a project earn many of the LEED credits in the Optimize Energy Performance category.

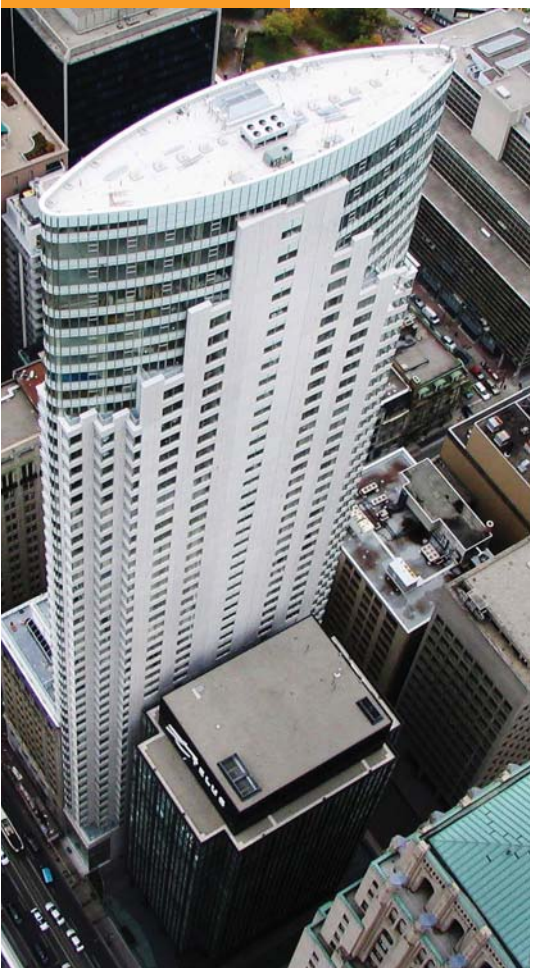
Indoor Air Quality

Mold:

Mold and a lack of air circulation can cause considerable damage to a building. The proper design of building envelopes built with the correct construction materials is a key way to reduce the presence and potential damage from mold.

The concrete, foam and steel in concrete wall systems are not a food source for mold growth. However, organic materials such as floor decking, paper faced drywall and carpet used inside buildings can provide a food source for mold growth and should be treated accordingly.

Woodmont High School ▪ Piedmont, SC ▪ Perkins & Will, Design Architect, Craig Gaulden Davis, Architect of Record



The One King West tower in downtown Toronto is the most slender building in the world and at 51 stories is the tallest residential building in Canada. ▪ Stanford Downey Architects

Increased energy costs and a limited supply of fuel have forced the construction of more energy efficient buildings. Past construction practices allowed moisture from occupant activities to readily escape, along with conditioned air. Sealing a building envelope against air loss is critical in achieving superior energy performance. Problems can arise when moisture and humidity levels are uncontrolled.

Controlled Production:

Precast concrete is produced in a controlled and protected environment in a process that resists moisture intrusion. Precast concrete is made of 35 MPa concrete that is virtually impermeable to moisture migration.

Quicker Close-in:

The speed of construction allows a precast concrete structure to be completed faster, leaving the interior exposed to humidity and moisture for a shorter time. This is particularly vital for the installation of the heating, ventilation, and air-conditioning (HVAC) system, that is a common location for mold formation.

Fewer Entry Points:

Because of their panelized construction and 2 stage joint seals, fewer points of potential moisture penetration exist with precast concrete cladding panels. Maintenance requirements are also minimal.

M-Tech Headquarters ▪ Calgary, AB ▪ McKinley Dang Burkart Design Group

Mission Statement

- Lead and advocate the precast concrete industry's contribution to a sustainable built environment and green building practices.
- Communicate the sustainable attributes of precast concrete products, systems, and services within the construction industry.
- Encourage the development of environmentally sound and sustainable practices in the design, procurement, production, transportation, and erection of precast concrete.

Strategy

Foster the continuous improvement of precast concrete manufacturing and design practices to optimize material, water, energy efficiency, and minimize site disturbance. Create achievable, yet stringent, goals to reduce our industry's environmental impacts while enhancing our industry's societal and economic impacts. Proactively report our industry's impact on the environment.

Advise and educate industry members regarding sustainable practices; raise awareness of the effects of their actions on society and the environment; and communicate them about the financial benefits associated with sustainability. Formulate reliable, scientifically based information about the sustainable design with precast concrete.

Promote the sustainable benefits of precast concrete solutions to owners, developers, designers, municipalities, and all other interested parties. Become a trusted and credible knowledge source with regard to sustainability. Collaborate and partner with other organizations to research and develop design innovations and system solutions related to a sustainable built environment.

Visit www.sustainableprecast.ca for more information.

196 Bronson Avenue, Suite 100, Ottawa, Ontario K1R 6H4
Telephone (613) 232-2619 Fax: (613) 232-5139 Toll Free: 1-877-YES-CPCI (1-877-937-2724)
E-mail: info@cpci.ca Web: www.cpci.ca