CASE STUDY

Concrete Thinking for a sustainable world

Yellowstone National Park Opts for LEED-Certified Buildings

Employee houses built with concrete for optimal energy performance

With more than three million people visiting Yellowstone National Park each year, minimizing the impact of visitors, lodging, and residences on the park's natural beauty is a priority. In the spirit of conservation, Yellowstone started an initiative to create environmentally friendly homes for its employees using concrete.

The movement towards providing energy-efficient homes for Yellowstone staff began with the construction of two single-family homes in Gardiner, Montana. Park officials set the lofty goal of making the structures 40 percent more energy efficient than a standard home. They achieved this level of efficiency through the use of insulating concrete forms (ICFs). In an ICF system, concrete is poured into a form made of foam insulation or other insulating materials to create a solid wall. The left-in-place form and tie system provides continuous insulation and provides a point of attachment for interior and exterior finishes.

In an area where forest fires are a real danger, the highly insulated and fire retardant expanded polystyrene (EPS) shell and reinforced concrete core make the homes both safe and efficient.

Photo courtesy of Quad-Lock Building Systems,

Designers utilized a proven technique called passive solar design to help heat each house. When the sun is low in the sky during the winter months, the houses are designed to allow sunlight to warm the decorative concrete floor. The insulated walls surrounding the floors keep heat inside the houses once it is transferred from the sun. A high-efficiency propane back-up boiler is used in the winter when the area experiences consistent days without sunlight.

As a result of these clever innovations, each home meets the Leadership in Energy and Environmental Design (LEED) standard of construction. LEED certification is the benchmark for energy efficient and environmentally responsible construction from the U.S. Green Building Council, a coalition of builders, architects, and government officials interested in sustainable development. Everything from the outdoor landscaping to the indoor paint and carpet is scrutinized to meet this verification system.

Environmentally conscious builders continue to choose concrete as their building material of choice because it is more durable than other materials. Consequently, these Yellowstone structures will require relatively little maintenance, thus conserving resources. The Yellowstone project is another example of why concrete is the building material of choice for sustainable development.

Project Team:
Architect: Overland Partners Architects and StudioForma Architects
Owner: Xanterra Parks and Resorts, primary concessioner
Builder: Martel Construction
Insulating concrete form manufacturer: Quad-Lock Building Systems Ltd.