

SPECIAL SECTION

Green



Little Big Horn College Health and Wellness Center

Photos courtesy of BNIM Architects

Tribal college uses 'green and fast' SIP building method for LEED vision

By James Hodgson

"We know where we came from, we know where we've been, and we know who we are."

So begins the **Crow Tribe's (Apsaalooke Nation)** history overview. The Montana tribe, whose native name means "children of the large-beaked bird,"

deeply values family and its cultural traditions. Each summer for the Crow Fair – which sometimes is called the "largest family reunion in the world" – more than 10,000 Crow people set-up 1,700 teepees and 1,200 tents for five days of celebrations, including singing and dancing, a parade, rodeo and horse races.

In 1980, the tribe chartered the **Little Big Horn College**, which is "dedicated to the professional, vocational and personal development of individual students for their advancement in higher education, or the workplace and inspiring Crow and

American Indian scholarship." Additionally, the college is "committed to the preservation, perpetuation and protection of Crow culture and language."

When the college decided to develop a Health and Wellness Center to serve students and the surrounding community, it wanted a building design that would reflect the tribe's community and cultural values, as well as demonstrate the center's role in supporting healthy living. In practice, this meant an energy-efficient facility targeted to the rigorous LEED Platinum green building standard.



James Hodgson is the GM for Premier SIPs by Insulfoam, one of North America's largest SIPs manufacturers and the leader in the research, development and manufacturing of high-performance, energy-efficient panels. For more information, visit www.premiersips.com/bc.



Little Big Horn College Health and Wellness Center

Opened in 2011, the 35,000-square-foot Health & Wellness Center features an NCAA gymnasium with seating for approximately 1,300 people, spaces for exercise and community gathering, and related functional areas.

Built fast and tight in winter

The center's design and construction team, working under an Integrated Project Delivery (IPD) approach, faced two substantial challenges: undertaking the construction under a constricted timeline during a harsh Montana winter and making a building with large open spaces energy efficient.

The project development schedule



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was driven by the college's need to make use of a government grant before it expired. As a result, the team had to start construction – moving dirt and pouring the foundation slab – even before they finalized the building design. This was happening during one of the most severe Montana winters in nearly 20 years, which made the need to quickly complete the dry-in even more crucial.

"It's hard to get a gym to meet any energy code, let alone LEED Platinum," says **Ben Mitchell**, project manager with general contractor **Fisher Construction**.

One product, multiple solutions

To meet the dual challenge of rapid construction and high energy efficiency – as well as to create the large open areas needed for the gymnasium and other public spaces – the project team chose Premier Structural Insulated Panels (SIPs) for the walls and roof.

SIPs are an advanced building method that incorporate structural elements and insulation within one component. The panels are made of two sheathing skins of oriented strand board (OSB) laminated to a rigid insulating foam core. SIPs come in large size panels up to 8-feet x 24-feet, and can be pre-cut to size in the factory and individually labeled for ready installation according to construction plans.

"SIPs meet a number of needs with just one system," says **Doug Morley**, principal architect with **Springer Group Architects**. "They install fast, insulate well and are strong. Other than in the large gymnasium, this reduced the need for a secondary support structure in the building, and saved a bunch of time and money."

Structural engineer **Matt Anderson**, owner of **Compass Consulting Engineers**, says SIPs helped the company meet the accelerated project schedule. "SIP shop drawings were done concurrently with design, so by the time we released the foundation package, the SIPs were being fabricated in the shop. The erection was extreme-

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Above - Little Big Horn College East Facade
Below - Little Big Horn College Northeast Corner 2



ly fast and in no time at all we were dried in. Plus, SIPs are strong and provide great design flexibility. They work well in long spans, and have high shear and diaphragm values. This was especially crucial to help create the wide-open space in the project's gymnasium."

Glen Kamerman, partner with **Kamerman Construction**, says with the pre-built panels, you must piece the building together like a puzzle. "The SIPs were accurately constructed and went together well. Using Premier SIPs probably saved about 15 percent to 20 percent, or better on the installation time. It also eliminated the need to heat the walls during winter construction, as would have been necessary with concrete masonry units."

For energy efficiency, the large-size

panels have fewer gaps requiring sealing than other construction methods, and provide continuous insulation throughout the walls and roof. "SIPs provide a super energy-efficient envelope – much better than we could get from other products for the same labor and material costs," Mitchell says.

SIPs help reduce heating and cooling energy consumption up to 60 percent compared to other construction methods. SIP construction is 15 times more airtight than stick framing, for example, and has higher whole-wall R-values, according to **U.S. Department of Energy (DOE)** research.

DOE tests showed that a wall built with 3-1/2-inch thick foam core SIPs had an equivalent whole wall R-14.1, while a wall of similar thickness built

with 2-foot x 4-foot studs, 16 inches on-center with fiberglass insulation had an equivalent whole wall R-9.6 – a 47 percent higher R-value for SIPs.

In addition to the Health and Wellness Center's high-performance building envelope, other green features include overhead prismatic skylights and sun-shading devices – to reduce reliance on artificial lighting and mechanical heating and cooling systems – and on-site rainwater detention.

Getting started with SIP construction

Design and building professionals can use SIPs for nearly any type of low-rise commercial building project. Project teams successfully have used SIPs in buildings up to four stories, and in climates of all kinds. Popular applications include schools, community centers, industrial facilities, apartments, lodging, restaurants and churches.

These buildings can either be designed from the ground up with SIPs in mind or a SIP manufacturer can convert plans to SIP construction. In either case, the SIP manufacturer will convert construction documents into SIP shop drawings that show the dimensions of each panel. The builder, engineer, the building owner and other involved parties, reviews the shop drawings. Once the shop drawings are finalized, the manufacturer fabricates the panels for shipment to the jobsite, where crews install them according to numbered plan sheets.

Working with SIPs is straightforward. The process can be further simplified by careful selection of the manufacturer, as capabilities vary greatly. When evaluating SIP manufacturers, consider the code acceptance reports they offer, along with ability to provide technical expertise on SIP design and construction. Some manufacturers will provide design assistance and training for installation crews. **CCR**