

Building Green on a Budget



Las Vegas school uses SIPs to cut construction costs and reduce energy use by 50 percent

When architect Ken Small of Las Vegas-based SSA Architecture took on the design of the Jacob E. Manch Elementary School, he inherited a unique set of challenges. The Clark County School District had chosen the school as a test case for future green schools in the district, with the goal of reducing energy use by at least 50 percent. These energy improvements would have to be accomplished with no additional costs over the district's typical construction budget. Through the use of structural insulated panels (SIPs), the Jacob E. Manch Elementary School was able to exceed these performance goals and save millions of dollars in the process.

PROJECT AT A GLANCE

LOCATION: **Las Vegas, NV**

ARCHITECT: **SSA Architecture**

BUILDER: **Martin & Harris Construction**

BUDGET: **20 million**

SIP MANUFACTURER: **Premier Building Systems**

DISTRIBUTOR: **Shell Building Systems**

Labor Savings with SIPs

At first, Ken Small did not believe the project would get off the ground at all. A series of delays and escalating construction costs brought the project to the point where it could not be constructed within budget using the district's current concrete-based building technologies. Small began looking at alternate building systems and came across SIPs, sandwich panels made of rigid foam insulation between two sheets of structural sheathing. In addition to adding energy efficiency, SIPs save a significant amount of time in the building cycle because they are fabricated offsite and available in sections up to 8' x 24'.

Small worked with SIP distributor Shell Building Systems and SIP manufacturer Premier Building Systems to provide prefabricated SIPs for the project. With onsite management from Shell Building Systems, framing crews were able to dry-in the 68,000 sq. ft. building in just 47 days, 60 to 80 percent faster than the district's typical construction schedule. Gary Radzat, President of Shell Building Systems, estimates that using SIPs saved over \$1.5 million in materials and labor.

Electrical wiring in the school was installed using precut "chases" in the foam core of the SIP walls. Horizontal and vertical chases were fabricated at custom locations for electrical wiring, data lines, security, clock, intercom and other utilities. Compared with conventional wiring methods, the electrical subcontractor was able to save \$900,000 in materials and labor. Using SIPs also gave the crews an advantage when finishing the interior. SIP walls are perfectly straight and true, meaning interior finishes are installed easily—an advantage that saved crews almost a week of labor.

Workers use a forklift to install prefabricated structural insulated panels (SIPs). The panelized system cut framing time in half.



“This project was the fastest dry-in time of any project that we have ever done,” said Steve Laing, Chief Inspector for the Clark County School District. “The other amazing thing was that when we went to put up the wall coverings over the SIPs, it was incredibly flat and we’ve never had really good, flat walls to work with—we’ve always had to smooth them out and do a lot of post-construction work.”

Energy Savings

In the hot Las Vegas climate, cooling accounts for a large portion of energy use in school buildings. SIPs provide high R-value insulation and exceptional air tightness to limit cooling losses through the building envelope. SIPs also eliminate the “heat sink” effect that occurs with concrete building



products. With summer temperatures commonly rising over 110 degrees, concrete materials absorb heat that is not sufficiently released overnight in really hot climates. SIPs do not act as a heat collector and significantly reduce the amount of energy needed to cool the building.

Lighting is provided by over 400 small skylights. Electrical lighting is only used in one part of the structure that was salvaged from the original school and for nighttime events. SIP roof panels reduced the number of structural supports needed, making skylight installations quick

(Above) SIP roof panels allowed for easy skylight placement and 100% daylighting. (Left) Unlike concrete walls, SIPs do not absorb heat.

and easy. Openings for the skylights were fabricated offsite and Shell Building Systems claimed this reduced the installed cost of the skylights by \$90,000.

“Structurally, SIPs allow more flexibility in locating skylights and skylights are installed far faster than any of the technologies typically used for schools,” said Small.

An efficient HVAC system with each classroom individually zoned provided efficient cooling and helped meet the goal of a 50 percent reduction in energy use.

Learning Environment

Noise control was another key design objective for the school due to its close proximity to Nellis Air Force Base. Small noted that one of the reasons SIPs were chosen is because they help limit both sound conduction from the outside and reduce reverberation of sound inside the building.

“Nellis Air Force Base is one of the busiest Air Force bases in the country,” said Small. “SIPs add significant sound improvement for no extra cost.” Interior walls were also designed to limit the number of parallel walls that cause sound reverberations.

Students at the Jacob E. Manch Elementary School can take advantage of five Building as a Learning Tool stations that show the energy-saving measures used in the school’s construction. These include a model of the SIP wall construction and windows into the mechanical areas. Each station is accompanied by signage so students can understand the energy-saving concepts and learn to save energy outside of the school.



(Above) Sound absorbent SIPs and off-parallel walls create a quieter learning environment. (Left) Nearly completed SIP installation.

