

Manch School Case Study

HEAD: Building Green on a Budget

SUBHEAD: 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 prototype 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.

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 under 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'.

Using SIPs from Premier Building Systems, the construction team was able dry in the 68,000 sq. ft. building in just 90 days, a savings of 50 to 60 percent over the district's typical construction schedule. Small estimates that using SIPs saved over \$1 million that was reallocated for other energy-efficient improvements.

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, and other utilities. Compared with conventional wiring methods, the electrical subcontractor was able to save \$500,000 in materials and labor.

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 reduced the amount of energy needed to cool the building.

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

“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 base 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 start saving energy outside of the school.