

MODULAR CLASSROOMS A NEW GENERATION OF RE-LOCATABLE CLASSROOMS

Modular classroom designs are not new in Alberta. The first modular classrooms or portables were attached to schools across the province in the late 1970's, and early 1980's as a quicker method of providing teaching spaces in parts of the province experiencing high growth. At that time, the portable classrooms were built by manufacturers experienced in constructing accommodation trailers for workers in Alberta's oil patch. These units were modified for classroom use and were easily connected to each other. They were designed to quickly attach additional trailers as more workers moved into camp and similarly, they could easily be dismantled and moved to other sites when required. Over time, these classroom trailers were used less and construction of the portables was done on location at the school site. The portables were designed and built to be less mobile, even though they were called re-locatable.

This means that many of the existing portables across the province were built on the school sites and can-

not easily be relocated, as the enrolment demographics change.

It was for these reasons that Alberta Infrastructure and Transportation developed a modular classroom prototype design that are capable of multiple moves and last at least 10 per cent longer than conventionally constructed portables.

"When you mention the word portables, most baby boomers cringe. A new generation, however, of modular, or re-locatable classrooms if you will, is upon us," said Mitz Simonelli, Vice-President of Modus Structures Incorporated.

In February 2004, the Government of Alberta issued a request for proposals, which challenged potential suppliers to manufacture a portable that met specific design criteria. Modus Structures submitted an innovative proposal to construct their classrooms using structural insulated panels as wall, floor and roof components. When compared to conventional construction method, the structural insulated panel systems provide superior thermal efficiency and envelope air-tight-

ness, which leads to increased health and comfort for the occupants and reduces operating costs. Greater air-tightness also reduces the infiltration of exterior noise and sound transmission between units.

Structural insulated panels are considerably stronger than equivalent wood and light gauge framed components. This means that during transport from site to site the classroom envelope is less likely to flex, which can lead to the weakening of envelope, rupturing of moisture/air seals and distortion of door and window frames. By using structural insulated panels, the insulating values of the walls are R28, the roof is R68 and floor is R40. The panels also provide a continuous solid backing behind the interior drywall finishes that protects them against punctures caused by accidents or vandalism and allows secure fastening of chalkboards or whiteboards at any point on the wall surface.

"The real backbone of the Modus modular classroom is the use of Expanded Polystyrene for the roof and walls," said Simonelli. "It is far



Modus (from left): Mark Cole, Joe Dotto, Mitz Simonelli, John Verhagen.



Current Modus operations and site of new 31,000 ft² plant.



Interior door



Modular classroom on truck to Duffield School

superior to conventional insulation. The fact that many of the drinking cups that we use for hot beverages are made of polystyrene speaks well for both the insulating and the health aspects of the material."

Unlike fiberglass batt insulation, Expanded Polystyrene is a densely packed, non-porous and rigid surface that does not have a problem with thermal bridging, air infiltration, or moisture saturation because there are no significant pores or gaps to allow these conditions to occur.

Modus has also inserted a unique vertical metal channel within

each of the structural insulated panels. The metal channel provides additional structural strength and a location for electrical wiring and outlets, or as an air return duct for improved air distribution to the occupants.

Another new feature of the modular classroom design is the use a welded steel frame under the entire structure. This prevents the building from flexing during transport and helps with its loading and placement. The true versatility of the unit comes into play when it outlives its useful purpose at a particular school and needs to be transferred or

moved to another school. This is made possible by constructing the building as a singlewide 24-foot unit that does not require a field joint, or seam down the middle of the classroom, that could be prone to movement and infiltration of uncontrolled air and moisture.

There are mainly two types of modular classrooms - a 50-foot-long type A unit that includes a hallway section and a 40-foot-long type B unit. Typically A and B units are married to form 90 feet of portable. The interior of the units are drywall painted a soft fern green accented by



"A" and "B" unit joined to form 90' of portable at Guthrie School.



Stacks of SIP panels with LPI joint inserts for building envelope.



Fire Extinguisher Cabinet and Mechanical Room.

darker green doors and trims. A drop ceiling with white tiles and three banks of lights give plenty of light.

"The interior finish of the classroom removes any comparisons to sterile industrial-feeling portables of the past," said John Verhagen, President of Modus Structures Incorporated.

The 115,000 BTU furnace is attached to an intelligent control system that senses ambient temperatures inside and outside the classroom and then automatically adjusts airflow and heating if required. It can also communicate with the core school's control system for remote monitoring and remote control.

The exterior of the re-locatable classrooms are covered with 26 gauge metal cladding with baked on paint, and 1 inch of Expanded Polystyrene insulation to give the walls a solid dent-resistant barrier. The roof is 64 millimeter Sarnafil, a vinyl fiberglass reinforced membrane, which proves to be an extremely durable roofing material that is designed to last generations. In fact, the Calgary Saddledome has this particular type of roof and it is only 48 millimeters thick.

In addition, the new generation of modular classrooms incorporates construction methods used by the telecommunications sector, which builds structures in a central location and delivers abroad as a finished ready-to-go product. Modus Inc adopted this vision as a way of reducing costs and time constraints. Historically, communications shelters were fabricated on site in remote areas creating huge logistics problems for sub-trades that were

required to travel all over the province.

"We realized that by assembling these structures in large urban areas we could eliminate many of the headaches associated with sending sub-trades abroad," said Verhagen. More importantly, Modus found that fabrication time and costs were reduced, and quality was vastly improved by virtue of working in a controlled environment that allowed checks at each assembly process. The one-stop-shop is the basis of the modular classroom concept. Modus Inc. was contracted by the Government of Alberta to build the first twenty-five of these 129 approved modular classroom units. Three units have been built - one single unit has been placed at the

Duffield School located in Duffield, Alberta and two adjoining units are located at the Lancaster School in Edmonton. Construction by Modus on the remaining 22 units are scheduled to be completed and located at schools in Spruce Grove, Stony Plain, Red Deer and Medicine Hat in time for the start of the 2005-2006 school year.

Modus has its operations in Crossfield on 11 acres of land just minutes from the Queen Elizabeth II Highway. Site preparation for a new 25,000 ft² plant with 6000 ft² of additional office space has begun, which will allow Modus to fabricate modular classrooms in a factory-type setting.

