School Renovation Uses New Hybrid EIF System

by Steven Pedracine and Peter Harrison

To renovate the LeSueur, MN Park Elementary School, contractors constructed new curtain walls with a metal stud framework

Let’s face it, the simple truth is that, although there are two EIF system classifications on the market today, PB Type systems, sometimes informally called “soft” systems, have the great majority of the industry’s attention. This attention is, of course, justified by the fact that most EIF installations, totaling hundreds of millions of square feet installed over the years, have been PB systems.

Often overlooked, and perhaps even unrecognized by some specifiers as an alternative type of system, are PM, or so-called “hard” systems. Although they make up a small portion of EIFS market share, they have gained a reputation as a reliable workhorse among industry professionals. Indeed, the importance of the product has not been lost on the EIFS manufacturers, as most carry a PM system among their product line.

Typically, PM systems can be found on construction that benefits from more abuse resistance and durability. This includes but is not limited to schools, medical facilities, correctional institutions, special needs housing, etc.

As wide as the difference is between PB and PM systems sales volumes, it is instructive to note the perception of the two products when compared side by side. Typically, the specifier will be drawn to the PM system simply because he may perceive it to be a more substantial product.

PM Systems Appeal

On the surface, the appeal of PM systems is obvious: The base coat in most cases is approximately twice as thick as its PB counterpart. The insulation board (extruded polystyrene) is of higher density, with better moisture resistance, thermal resistance (R-value) per inch, compressive and flexural strength. These mechanical characteristics of the extruded insulation board make the PM system ideal for mechanical attachment directly to the structure of the building. This is significant because not all building substrates are suitable for the adhesive attachment that is typical of PB systems.

So why aren’t PM systems used more?

As with all building construction, it invariably comes down to economics and aesthetics. PM systems simply cost 33-50 percent more on an installed basis than PB systems. The cost difference can be attributed to a variety of reasons and warrants some analysis:

First, of course, is the fact that the denser extruded polystyrene insulation board is more expensive than the one pound per cubic foot expanded polystyrene typically used in PB systems. Some of the higher cost, however, can be recovered by the extra energy saved as a result of the higher R-value per inch of extruded polystyrene insulation.

Secondly, the base coat is thicker and thus requires more material. Also, because the base coat is thicker, more attention is required by the applicator to insure its uniform thickness. Unlike PB system base coats, whose thickness is chiefly gauged by the reinforced mesh embedded into the product, PM base coats are trowelled over the mesh which has been previously attached. It is then up to the applicator, to judge the thickness, which may range from 3/16 inch to ½ inch, depending upon what has been specified. Additional tooling of this base coat to eliminate trowel flashes and unevenness must be accom-
How can workers be protected?

The following precautions should be taken to prevent serious injuries and fatal falls while working from suspension scaffolds:

• Comply with current and proposed OSHA regulations for working with scaffolds. Proposed regulations include requirements for all scaffolds regarding capacity, construction, access, use and fall protection.
• Assure that design and construction of scaffolds conform with OSHA regulations.
• Shield scaffold suspension ropes and body belt or harness system droplines (lifelines) from hot or corrosive processes, and protect them from sharp edges and abrasions.
• Inspect all scaffolds, scaffold components and personal fall protection equipment before each use.
• Provide personal fall protection equipment and make sure that it is used by all workers on suspension scaffolds. When working from a scaffold, always use fall protection (both guardrail systems and body belt or harness systems).
• Use structurally sound portions of buildings or other structures to anchor droplines for body belt or harness systems and tiebacks for suspension scaffold support devices.
• Secure droplines and tiebacks to separate anchor points on structural members.
• Provide proper training for all workers who use any type of suspension scaffold or fall protection equipment. If you work from a scaffold, participate in any training programs offered by your employer.
• Follow scaffold manufacturers’ guidance regarding the assembly, rigging and use of scaffolds.

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plished with a darby or slicker. An additional cost to the applicator is the time that must be spent trowelling details such as reveals or special profiles in thicker base coat.

Further, PM systems require different design to accommodate the stresses of thermal expansion and contraction. In PM systems, control joint appliances must be positioned in routed grooves at the face of the insulation board to break the facade into stress relieving panels. Panel sizes generally cannot exceed 150 square feet, or a length of 16 feet in any dimension, with a dimensional ratio of 3/2 or less. To an architect, this presents an aesthetic challenge, especially if features such as reveals and projections are incorporated into the design. Even higher cost results when accessories are required to be of zincalloy composition to ensure against rust. This in itself can be a determining factor that can break the budget of a potential PM application, because the cost of a zinc control joint can be over $1.00 per lineal foot. These
and other plastering accessories can become a very substantial cost factor.

In summary, PM systems cost more than PB systems, and they have the aesthetic limitation of control joints. In addition, applicators may not have enough mechanics available with the skills to gauge the plaster thickness by trowel, as PB systems have required.

**Fresh Solutions**

Presented by the physical constraints of practically any project, EIF systems have proven their adaptability to meet the challenge. This tradition of adaptability was important in the thinking of the people on the research and development team when they envisioned a product that combined the advantages of PM and PB EIF systems.

Indeveloping the system, the manufacturer recognized the value of mechanically attached extruded polystyrene and wanted to combine that with the design freedom and installation convenience of PB coatings.

The new I-C Gold System from Parex, Inc. allows the same design freedom as a soft system, but it is applied over extruded board and can be installed over virtually any substrate. The applicators like it because many of the same components and application techniques are taken from our soft system.

**A Case Study**

Like many other communities, the city of LeSueur, MN had an elementary school that was structurally sound but otherwise deficient in its other systems including windows, walls, roofs and interior materials and spaces. But instead of abandoning the structure, they recog-

This type of construction was obsolete by current standards and needed renovation.

The remodelling began by demolishing the existing curtain walls. All that remained before reconstruction were the structural steel pipe columns, the roof and about three feet of brickstem wall that skirted the base of the build-
Three different colors of acrylic finish coat were used to enhance the elementary school building.

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In place of the old walls, new curtain walls were constructed with a well insulated metal stud framework sheathed with Georgia-Pacific's Dens-Glass Gold Sheathing and two insulated punch-out windows per classroom.

**EIFS Solution**

According to Jim Steider of Tamarack Materials, a PB EIF system was originally specified for the cladding of the renovation. “The obvious concern of the designer was to develop a fresh new look, but also to make the building resistant to air infiltration and energy efficient,” said Jim.

When Jim went into the office of Vetter Johnson Architects, he knew he had an exciting product that would be of some interest to the designers. “I think the system appealed to them because it could be installed over extruded polystyrene insulation board while still maintaining the design elements they wanted to feature.

The building didn’t have a lot of complicated ornamental shapes, but it did have a number of ins and outs created by varying thicknesses of foam. What complicated matters was the number of reveals cut into panels to simulate a cut stone appearance. Actually, the job was well suited to a traditional hard coat application for this reason. “We could have substituted control joints for the reveals,” said Dennis Hayes, the manufacturer’s regional manager, “but it would have taken the job cost out of budget.” In the end, this option wasn’t even raised for the architect’s consideration.

The installation of the system was completed by Mulcahy, Incorporated of Oakdale, MN. “Although they had to rearrange their installation procedure somewhat, I think they appreciated the fact that the components and methods they used were not all that different from ‘soft coat’ installations,” said Jim Steider. The mechanics also seemed pleased with the trowelability and coverage of the product.

The system was installed from the beginning in much the same manner as a PB system, by first backwrapping short detail mesh at all locations where the system was interrupted or terminated. The extruded polystyrene insula-
tion board was then mechanically fastened through the sheathing and into the steel studs. The face of the insulation board was then lightly rasped, and the backwrap was completed by embedding the mesh into base coat applied around the edge and face of the board. Because the board is mechanically, instead of adhesively fastened, these procedures can be done on the same day the board is installed.

Unlike PB systems, in which the applicator may use the reinforcing mesh embedded in the base coat to gauge the thickness, the product used took advantage of a slight variation of this method. Instead of embedding the mesh, it is simply laid onto the fresh base coat, then trow-
elled into place without being completely covered by the base coat. Larger, interlocking granules of aggregate in the base coat prevent the mesh from being “buried” in it as the trowel is passed over the mesh. After this first layer had dried to the touch, the applicator then applied a second layer of base coat. Gauging of the total base coat thickness was done through the unique sizing of aggregates in the product. This made it possible for the applicator to apply a base coat between 1/8 in. and 3/16 in. thick in which the reinforcing mesh is equally suspended between base coat layers. (See illustration.)

To complete the installation, three different colors of acrylic finish coat were used to dramatically enhance the appearance of the building. A lighter color was contrasted with a darker color that banded around the building, and small accent squares were painted on using a compatible exterior grade acrylic latex paint. Before the finishes were applied, the base was coated with primer. A roller was used to apply the primer, which improved spreading and floating of the finish, for a very consistent appearance.

The new look for the school was crowned by a new entry canopy that rises above the one story structure, complimenting the color scheme of the walls and columns with a blue standing seam metal roof.

**A Successful Renovation**

According to Mark Vetter, the project architect, the renovation was a success “because it gave the city of LeSueur a bright, new looking elementary school that includes a large gymnasium and an auditorium. The community has responded positively to the three color scheme with the new canopy. It has given the building a new visual expression.”

Mr. Vetter was satisfied with the quality of the installation work by Mulcahy, Incorporated and was equally pleased with the service he received from the manufacturer and Tamarack Materials. Henderson-LeSueur School Superintendent, Mr. Bob Fossom, also expressed his approval with the end results. “All of the materials that went into the renovation transformed the building. It looks like a new school. It’s just fantastic!”

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