Hosts EIFS Workshop

The Metropolitan ballroom of Seattle’s Sheraton hotel was filled to capacity, roughly 165 seats, on April 18. The event that brought architects, engineers, building officials, manufacturers, building contractors and concerned consumers from all corners of the United States and Canada on this Sunday was a workshop sponsored by the American Society for Testing and Materials concerning exterior insulation and finish systems.

Though this workshop had been on the calendar for several months, its timing was almost serendipitous, considering that on March 22—only a few weeks earlier—a segment on television “newsmagazine” Dateline NBC portrayed EIFS as a building system rife with defects. Whether or not the issues raised during the Dateline segment had originally been intended as the focal point of the workshop, the air was charged with a tension that was certainly heightened by the coincidence.

The moderator, L. Douglas Mault, president of the Executive Advisory Institute, Yakima, Wash., began the program with a brief overview and history of the industry. He explained that post World War II Europe was ripe for a light-weight exterior finishing system that was relatively fast and simple to install. By the late 1940s, BASF in Germany had developed extended poly-strene, which eventually evolved into the insulating boards used in EIFS. By the late 1950s, EIF systems were widely used through much of Europe. In 1969, Frank Morsilli brought the system from Europe to the United States and founded Dryvit in New England. The oil embargo of the early 1970s cre-

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In this same time frame, the German EIFS manufacturer, Sto, set up operations in the United States. EIF systems have been used in North America ever since. As with any building system, EIF systems have had their share of problems, though many of the projects where these systems were first used are still in tact, testifying to their efficacy and durability when properly installed.

Mault then turned the program over to Douglas Watts, of Vancouver, British Columbia, for the keynote address. Watts is trained as an architect and is the building envelope specialist for Vancouver. His presentation included a slide show depicting some of British Columbia’s most recent and catastrophic failures of exterior cladding, including both EIFS and stucco. Several of these slides showed multistoried buildings, mostly condominiums, where entire sides of the cladding had fallen away, exposing the framing. The problem common to all these failures, regardless of the particular cladding system used, was that excessive moisture had penetrated the building envelope, saturated the exterior substrate, typically gypsum board, and resulted in its nearly complete deterioration. Watts explained that Vancouver has recently calculated more than $1 billion (Canadian) in damages from failing exterior cladding systems over the past decade.

**Studying the Problem**

To address the problem, the Canada Mortgage and Housing Corporation conducted a study in 1996 and determined that while the building standards in Canada are suitable for most of the country, Vancouver and the rest of the Pacific Northwest are subject to essentially rain forest conditions. Consequently, special considerations need to be taken when designing and constructing a building envelope in that region.

Vancouver has since implemented its own practice guidelines for designing and constructing building envelopes, including requirements for the application of EIFS. Those practices include the following:

- Special attention must be given to details and joints so that excessive moisture is channeled to a drainage channel and over a secondary barrier.
Materials to be used on an EIFS project must be reviewed to ensure they are adequate and appropriate.

Rain screens (systems employing the “4 D’s”: deflection, drainage, drying, durability) must be used.

Residential applications require pressure equalization to ensure that moisture is not drawn into the envelope.

Systems must carry a 10-year warranty.

After his presentation, Watts fielded questions that put the finer points on what constitutes proper drainage and drying, the proper use of sealants, and other “rain screen” design features.

Once the keynote address and the questions that followed had been completed (or at least had filled the time allotted), the program shifted to questions for five different panels.

The first panel consisted of experts on methods for investigating and reporting EIFS problems in the field. (The format for this and the succeeding panels was that after the introductions, moderator Mault would pose several predetermined questions to the panelists. Usually Mault would single out a panelist for a specific question, and then open the floor to the others if they sought to be heard. Once the predetermined questions were exhausted and time remained, the audience was invited to pose its questions.)

Questions for the Panels

The first panel was asked questions that included these: How is moisture intrusion best detected while in the field? Are intrusive or destructive inspections necessary? How much would building correctly cost versus the cost of a typical repair?

The consensus of the panel was that it is very useful and important to have as much background on the original construction of the building being investigated as possible. Knowing when the work was done, by whom, using what materials, having the plans and the shop drawings and materials lists, and the prevailing weather conditions would answer many of the questions before a physical investigation is conducted. Using better building materials and methods typically costs perhaps 1/100th of the cost of the structure, while repairs can run anywhere from a few hundred dollars to tens of thousands of dollars.

Moisture is most frequently allowed into a structure through improper building methods, lack of flashing, poor detailing, substandard sealant application, and poor design. It often goes undetected until water staining, rust stains, fungal growth, or actual visible damage appears. Moisture meters are useful in determining whether a substrate is still wet, but cannot always indicate where moisture has been and to what extent its presence damaged the structure.

Dry rot can be detected by checking the density of the substrate, but may not entirely show the extent of the damage. Often the only way to truly assess the extent of the damage is to take intrusive or destructive measures. Professional
contractors skilled in repair should be consulted for accurate estimates.

The second panel addressed methods for repairing EIFS problems in the field. The consensus of this panel was that damage done to a substrate in an EIF system is usually less than 5 percent of the total exterior area. Consequently, it is very rare that the whole EIF system needs to be removed.

Many of these damaged areas are confined to the wall below a window, which can be the result of improper or missing window flashing installation, improper application or missing sealant, or poorly constructed windows. Silicone sealants, properly installed, generally last longer than other sealants.

Certain substrates are more resilient than others: Plywood generally fares better than either gypsum board or oriented strand board if moisture has intruded.

Vinyl windows outperform aluminum windows; but, if windows are properly flashed and sealed, it does not matter.

The third panel discussed various EIFS products. Since this panel included several manufacturers with competing systems, consensus was not always reached.

Some of the major points that were raised centered on barrier vs. drainage EIF systems.

A barrier EIF system essentially consists of a layer of extended polystyrene boards attached to a suitable substrate, which is then coated with one or more layers of a base coat that contains an embedded reinforcing mesh. This is then finished with an acrylic polymer topcoat. This system is intended to be water-tight. A drainage system incorporates methods that route intruding moisture back to the surface, preventing moisture damage to the substrate. Barrier systems have a long history of success where meticulous construction methods are used.

Drainage systems provide a second line of defense to water intrusion; however, they too must be properly installed to work correctly.

The fourth panel briefly discussed building regulations and standards and how they affect EIFS.

At the moment the only standard completed is ASTM C-1397, with several others currently in the development stage. Because EIF systems are considered proprietary, there are almost no building code provisions specifically pertinent to them.

The fifth and final panel addressed quality assurance, training and education. Members of this panel explained the real need for owners, the design community and building inspection officials to ensure that contractors use correct products and application methods. Much of this can be accomplished by requiring product evaluation reports, product specification data or having an independent inspector evaluate the construction.