

Maintaining a Façade

Keeping historically significant facilities weatherproof and energy-efficient while preserving architectural features takes care and planning.

BY SCOTT BERMAN

THE IMPORTANCE OF campus building envelopes is more than skin deep. That fact is becoming increasingly evident when it is time for repairs and renovations. Indeed, elements such as façades, windows, and roofs can importantly aid efforts to improve building performance.

Such efforts can be integrated. Upgrades to a building's mechanical systems, for example, need to be accompanied by a close look at the building envelope because the latter can greatly impact the former. Craig Schwitter and Erik Verboon of Buro Happold, an engineering consulting firm, put it this way: "We are no longer in an age where we can pump energy into a building without the right envelope."

Across the country, there are municipal requirements and campus policies to inspect façades and maintain them; in order to guard against falling bricks, for example. Yet, as Schwitter says, "façades are about more than just holding out water and heat. They are your first defense against energy inefficiency. Clients are much more aware of this than in the past."

Historic Aspects

Such awareness spurs exacting methods. A telling instance was the work to restore the brick and limestone of the Mather Memorial Building on the campus of Case Western Reserve University in Cleveland, OH (seen here). Ed Taylor, president of Technical Assurance, a building envelope consulting firm, describes a detailed process that speaks to the need for aesthetic as well as environmental sensitivity when it comes to building envelopes. According to Taylor, "Prior



PHOTO COURTESY OF CASE WESTERN RESERVE UNIVERSITY

to repairing any of the limestone, stone patching mockups were reviewed, tested, and sampled until a near perfect texture and color patch material match was main-

tained. In order to protect the limestone and achieve the most environmentally friendly way to clean stone, water racks were placed over stone sections and a

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MAINTAINING A FAÇADE



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FORMER GLORY. The deterioration of a building's façade can have a variety of causes, from flawed materials and/or original detailing and ill-advised or deferred maintenance to harsh environmental conditions. When repairs are required, today's experts are finding the balance between improving energy efficiency and restoring the building's exterior to its original architectural beauty.

continuous water mist was applied prior to light pressure washing. This allowed the limestone to be cleaned without any chemical use, or harsh abrasives."

In other words, sensitivity to what's already there is a fundamental part of the multi-pronged building envelope solution. It hasn't always been the case.

Take windows, for example. Structural and building engineering firm Klein and Hoffman's Robert Hotes points out that

recent decades have seen many historic wood and steel windows replaced with low-quality aluminum and vinyl. It was unfortunate. Those decision makers were unaware that old fenestration could be maintained, with their sealant replaced regularly, in order to reduce energy loss, which happens through air infiltration.

If historic windows are intact and energy savings is your goal, those windows "can be retrofitted with interior storm windows that preserve the exterior appearance of the building," Hotes adds. However, if such windows are beyond restoration, then consider new replacement windows, which can replicate historic ones while providing good insulation, says Alice L. Sloan, a preservation specialist with Klein and Hoffman. Incidentally, she reports that the related window technology has come a long way in recent years.

On a wider note, as Sloan points out, "universities generally are very sensitive to maintaining the existing aesthetics in terms of the overall character of the building."

Exterior masonry undergoing preservation and restoration, for example, requires gentle cleaning and repairs with such methods as stone patching preferable to replacement, says Sloan. Still, "when replacement is required, new materials must match the old in terms of size, color, texture," and more.

EXPERT ADVICE

Planning for Success

Among the things to consider when renovating a building envelope on your campus:

- **Be consistent.** Maintain an organized approach to maintenance and improvements, says Klein and Hoffman's Pete Power. Your facility manager is an important part of the equation.
- **Keep the big picture in mind.** Do you see water penetration? It may be a marker of broader, underlying issues, such as structural life safety and sustainability, points out Robert Hotes of Klein and Hoffman.
- **Remember that "being an expert in everything isn't necessary,"** says Klein and Hoffman's Pete Power. Instead, keep up your relationships with the experts. Staying in touch with "product manufacturers, specialized contractors, and engineers/architects" is likely to boost service and maintenance. [ENR](#)

Solutions and Options

It's an approach that applies to masonry, windows, and roofing, she explains, and often so across projects on a campus. For example, Sloan describes a gathering trend on campuses: "Moving from addressing individual buildings in separate restoration projects towards a more holistic approach."

That's what Kutztown University of Pennsylvania did in 2012, when Sloan's firm, along with Caretti Restoration and Preservation Services, LLC, worked on masonry and other envelope problems at various buildings on its campus. These problems included "deep mortar loss, spalled and cracked masonry, corroded unprotected steel" as well as roofing and window issues, Sloan says. The approach meant that repair work "could be phased over time to best utilize available budgets and balance this against use requirements," she explains.

In another sign of the times, Klein and Hoffman — in an integrated project, this time for the University of Pennsylvania — completed a phase of façade ordinance inspections to comply with the requirements of the city of Philadelphia, says Sloan. The findings are being incorporated "within campus care planning." She

explains, "Inspection findings are entered into a campus database system to keep track of identified conditions, causes, and dates of interventions and treatments."

As each component of a building envelope, problems with roofs need to be considered in relation to others. Peter Power, a principal at Klein and Hoffman, says his firm typically encounters building envelope failures involving roofs and façades due to incorrect repairs and modifications over the years. Also not uncommon: "failures in brand-new roof flashing systems due to deteriorated masonry conditions behind them." The key, in his view, when making repairs to a roofing/masonry junction: "address both components as a single system."

RADCLIFFE COLLEGE



PHOTO COURTESY OF V&B, LLC

Fay House Renovation

LOCATION:
CAMBRIDGE, MA

ARCHITECT:
VENTURI, SCOTT BROWN AND ASSOCIATES, INC.

Fay House, the first permanent home of Radcliffe College and now part of the Radcliffe Institute for Advanced Study at Harvard University, was built as a private residence in 1807 and expanded both horizontally and vertically over the years. Consequently, the building envelope included masonry, windows, and trim from many periods of the building's history. Its recent LEED Gold-certified renovation, completed in June 2012, sought to maintain this character-giving palimpsest while improving accessibility and updating structural, mechanical, building, data, and life-safety systems.

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Significant renovations to building envelopes work in concert with a range of project types. To take one example, Schwitter and Erik Verboon describe how their firm worked with project architect Kennedy & Violich Architecture and Harvard University, which is renovating and expanding its Tozzer Library while targeting LEED Gold. According to Buro Happold, improvements to the façade “will increase the building’s energy performance and provide improved thermal

comfort” through high-performance features, a “double-skin box window, metal siding over a highly insulated thermal enclosure for the roof,” a skylight, and a glass box entrance.

Broadly speaking, Schwitter sees a fundamental change in how building

owners across sectors are seeing and going about their façade and other building envelope repairs. The trend in the past 10 to 15 years, he says, is “a shift from brick and mortar to energy and performance.” It’s an encouraging sign that’s more than skin deep. **PHOTO**

Exterior fire escapes — made obsolete by the insertion of an interior exit stair — were removed and masonry was repaired, repointed, and cleaned.

Working closely with the Cambridge Historical Commission, the design team devised a window repair and replacement strategy that balanced preservation, energy efficiency, sustainability, and maintenance. For example, in areas of the building dating to 1807, windows were repaired and restored and exterior storm windows were added. Decorative windows in the building’s major public space were also repaired, but deteriorated sashes elsewhere in the building were replaced with high-quality insulated glass replacements. This approach maintains Fay’s most historic elements and helps differentiate the oldest residential section from the institutional additions made after Radcliffe acquired the building in 1855.

To preserve interior finishes and especially maintain the longevity of the existing masonry, the design strategy focused on reducing energy loss by reducing air infiltration, rather than by insulating exterior walls (which can, over time, cause deterioration of historic masonry). **PHOTO**

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