

Historic roofing: half art and half science

Roofing can be an important part of a renovation or restoration project. The designer and contractor must work together to preserve the original aesthetics of the old roof while adding the durability and energy efficiency today's materials can provide.

The following four examples detail projects that were enhanced both aesthetically and structurally by the addition of a new roof system.

Contractor at Bay uses urethane insulation

Joining the ranks of Boston's Faneuil Hall and Baltimore's Harborplace as a major restoration and revitalization project is Bay Street Landing, a new residential and commercial community on New York City's Staten Island.

The project involves converting seven turn-of-the-century warehouses into open-space apartments and a commercial pavilion. A marina, hotel, and health and racquet club will be among the amenities featured. Bay Street Landing's location will offer breathtaking views of New York harbor and the Manhattan skyline.

Like its predecessors, Bay Street was designed to preserve existing industrial and seaport elements. Exposed wood and concrete slab ceilings, brick, hand-hewn timber and authentic bollards will add to the building's rustic charm.

To bring the commercial pavilion up to today's energy efficiency standards without covering its handsome tongue-and-groove wood ceiling with insulation, nailable urethane board is being applied to the existing roof deck's exterior and then covered with shingles.

Blending new materials with old buildings

The nailable insulation, manufactured by NRG Barriers, Inc., of Sanford, Maine, is made from urethane chemicals produced by the Mobay Chemical Corp. of Pittsburgh. The rigid, closed-cell, urethane foam is bonded to waferboard on one side and to asphalt-coated fiber glass facers on the other. The 3-inch thick insulation provides a thermal resistance of about R-21.

The roof insulation, coupled with an efficient R-19 wall insulation system, provides an effective thermal envelope that resists the passage of heat and cold, according to the project's designer James E. Nealand, AIA, of New York City. Thermal efficiency is important to the project because its location exposes the 45,000-square-foot building to the cold winter winds that sweep off the harbor. In the summer, temperatures often climb to the 80s.

"Our primary design objective was to leave the existing timber roof exposed. But we also needed to insulate the roof to meet local energy code requirements and to keep heating and cooling costs down," Nealand explained.

"In addition," he continued, "we wanted to be able to shingle the sloped roofs for aesthetic reasons. The nailable urethane board allowed us to achieve all of these objectives."

To install the 47-inch-by-96-inch insulation board, workers had to remove and repair the deteriorated and uneven areas of the decades-old built-up roof. The insulation boards were then secured to the wood deck with common nails that penetrated 1½ inches into the deck and were placed every 8 inches along the width and every 24 inches along the length. The boards were laid with the longer dimension parallel to the eaves. End joints were staggered at least 12 inches apart.

The artistry of a 23-year-old roofing contractor has helped restore a 100-year-old national landmark.

This octagonal roof was no obstacle for Phil Hogan Roofing and Sheet Metal, Portland, Ore. Hogan's metal reroofing work on Portland's Pioneer Courthouse has been hailed a "mastery of hands-on roofing creativity."

At points where the composite boards intersected with structural members, 7-inch nails were used to penetrate through the roof deck and 1½ inches into members for reinforcement. Wood nailing strips equal to the thickness of the board were installed along eave and rake edges. Then, roofing tarpaper and asphalt shingles were applied to cover each day's insulation work.

Complex roof renovation is a terne-coated work of art

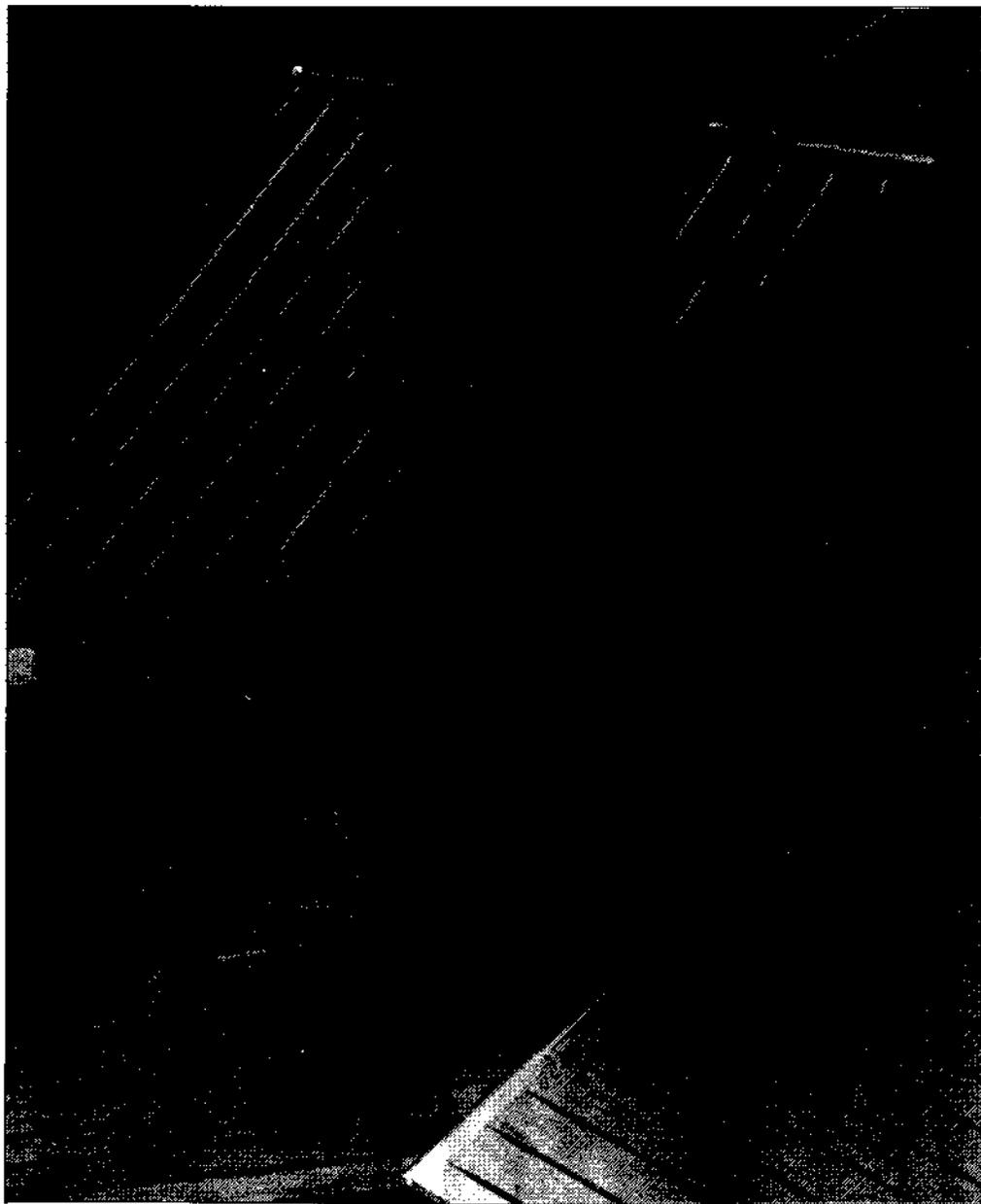
On the West Coast, the artistry of a 23-year-old roofing contractor has helped restore a 100-year-old national landmark.

Phil Hogan of Phil Hogan Roofing and Sheet Metal, Portland, Ore., has built his reputation on restoring historical structures. His new dome on the Pioneer Courthouse in Portland is what *Portland*

Magazine referred to in a recent article as a "mastery of hands-on roofing creativity."

Using 22,000 square feet of 28-gauge, .015 terne-coated stainless steel (TCS), Hogan and his team spent three months replacing the original terne that had been put on the building more than 100 years ago. Hogan chose TCS for the project because it doesn't crack, peel or flake. It is the ultimate metal for use in weather sealing applications because the terne coating enhances soldering, he explained.

Expansion and contraction damaged the Courthouse's original roof. The joints, while pieced together with great care, were soldered tight, leaving the roof rigid. Also, the dome's copper and roof's terne were nailed directly to the wood beneath. "They didn't know about expansion joints in those days," laughs the affable artisan.



One of the main obstacles Hogan faced was the roof's shape—an eight-sided dome. Because of the job's complexity, Hogan installed a direct telephone line to the manufacturer in the attic under the roof. This allowed the manufacturer to "talk us through technical problems as they came up," he said.

Hogan's company has done churches, post offices, a train depot and several historical monuments. "This kind of work is a profitable labor of love," he explains. "Since the roof should last 200 years, it's really a monument to the city."

CSPE roof renovated under deadline

When Brattleboro, Vt., decided to reroof its historic municipal center, it faced a challenge. The work had to be completed in 240 days. The roof was the first step in renovating the building. The eight-month deadline was necessary for the town to qualify for a federal grant under the Emergency Jobs Bill.

The municipal center, which was built in 1884, is listed in the National Register of Historic Buildings. Repair of the mansard-style roof, with its numerous angles and valleys, required work on badly rotted wooden air shafts, a terminally corroded skylight and other penetrations.

The 35-year-old roof on the facility had been leaking badly. On rainy days at least 25 buckets were needed to catch the drips, recalls general contractor Art Greenbaum, president of GPI Construction.

After the old built-up roof was torn off and a slate section repaired, a new Hi-Tuff single-ply membrane system from J.P. Stevens & Co., Inc., of Easthampton, Mass., was installed on the roof's flat portion.

The town awarded the roofing contract to Brattleboro Roofing & Sheet Metal Co., Inc., whose president, George "Ed" Bedard, has used Stevens Hi-Tuff since its introduction and recommends it for its durability, ease of installation and aesthetic quality. "It's a trouble-free system—one I feel secure with," Bedard said.

The OJR-H architectural firm of Putney, Vt., submitted plans to the State Historic Preservation Bureau for materials approval, said Thomas Lynch, director of community development.



In four weeks, Bedard had stripped the 5-ply pitch and gravel roof to the board. He then installed 9,000 square feet of single-ply Hi-Tuff membrane. The new watertight roof was mechanically attached and field-seamed with a self-propelled automatic hot-air welding unit to produce seams as strong as the material itself.

A unique blend of old and new was accomplished by adding special touches such as copper flashing, slate restoration and refurbished finials to the ultramodern roof. The steep pitch of the roof's slate portions made the detail work difficult. Elaborate scaffolding was used to help repair the mansard features, which included wooden louvers, marble sills and a 96-square-foot glass skylight built to duplicate the original.

Even with the added attention to detail, the roof was completed a month before the federal deadline, said Greenbaum. A prompt inspection by Stevens helped the process.

The Brattleboro municipal center's mansard-style roof receives a blend of old and new as it is reroofed with a single-ply roofing system and finished with copper flashing and slate refurbished finials.

A unique blend of old and new was accomplished by adding special touches such as copper flashing, slate restoration and refurbished lintels to the ultramodern roof.

"It's a quality roof. I've used Stevens for the last three years and never had a failure," Bedard said. Hi-Tuff also withstands the effects of ozone, sunlight, chemicals and industrial pollutants, while retaining its flexibility and elasticity over a wide range of temperatures.

The new historic municipal center is now a source of pride for the town. "The roof looks like a sculpture—just beautiful," said Bedard. Additional renovation can now follow. On its 100th anniversary, the old Victorian building has a new image—one that can stand up to rainy days.

Concrete tile makes a significant contribution

When the decision was made to restore the Broadmoor and Greenwood housing areas at Fort Lewis, Tacoma, Wash., the project was complicated by the military facility's historical significance to Tacoma and Washington.

Fort Lewis, or Camp Lewis as it was first known, was the first military installation constructed on land donated by private citizens. Washington's Pierce County citizens voted to tax themselves for 20 years in order to purchase 70,000 acres and donate the land to the federal government for the construction of a military base.

No effort was spared in the design and construction of Fort Lewis, which was built in the late 1920s and early 1930s. Under the direction of George B. Ford and Frederik Olmstead, two prominent urban designers, the Fort symbolized the very best in urban planning. The design provided unity to groups of buildings, creating a harmonious composition. The way the buildings were laid out also patterned well from the air.

When plans for refurbishing the Broadmoor and Greenwood areas began, the roofs were given first priority. The existing Ludowici-fired clay tile, which complements and enhances the overall building design, had been in place over 50 years and was considered to have historic value.

However, the tile fastening system was rapidly deteriorating, and the subroofs were leaking. In order to protect the structures, the clay had to be replaced. The mandate was, however, to replace it with an identical or less expensive material that had the same aesthetic appeal.

At first the renovators planned to simply install new Ludowici tiles. In considering this possibility, a joint committee composed of the Washington State Preservation Office, the Advisory Council on Historic Preservation of Washington, D.C., and Fort Lewis' own Facility Engineering Department concluded that clay tile was too expensive to warrant serious consideration. Slate was also discarded because of cost and longevity concerns.

The Fort Lewis development team turned to Monier's Northwestern Region office in Tacoma for help in solving the Broadmoor and Greenwood dilemma. Facility Engineering was already familiar with Monier because they had previously used the company's 400 Flat Tile series on the roof of a general's quarters at the Fort. This information was turned over to the U.S. Corps of Engineers in Seattle, which was responsible for the project.

The Corps decided that, while Monier's flat tile was priced within budget, its aesthetic characteristics were inappropriate. Monier then made a presentation of its new satin mat finish Classic profile tile, which the Corps agreed met all the established standards.

The International Roofing Co. was chosen to reroof the buildings. The workers began by stripping the old clay tile and replacing it with new Monier tile this summer. More than 4,000 squares of Monier Classic roof tile will be used to reroof the 200 buildings that comprise Broadmoor and Greenwood.