

THE WHATCOM MUSEUM OF HISTORY AND ART

BELLINGHAM, WASHINGTON

By David A. Rash, RRC

During the late nineteenth century, the Pacific Northwest region of the United States experienced a significant influx of population due to the long-anticipated completion of the Northern Pacific transcontinental railroad in the 1880s and the subsequent completion of the Great Northern Railroad in the 1890s. This triggered rampant real estate development in almost any town that anticipated being a railroad terminus. Along with the rampant development came civic competition, which on Bellingham Bay meant not only other cities on Puget Sound, but also the four distinct communities adjacent to the bay. The city of New Whatcom on Bellingham Bay sought to achieve prominence amongst its older siblings by constructing a munificent city hall in keeping with its anticipated stature as the pre-eminent municipality on the bay.

New Whatcom wanted its city hall to be a monument to local talent and a showcase for local products. The four competing building designs of 1891 were produced by local architects, with Alfred Lee ultimately winning the commission. The general construction contract to Long & Merritt was awarded on December 12, 1891, based on the firm's willingness to accept municipal script rather than gold coin and with the understanding that local materials would be incorporated into the structure as much as possible.¹ Work on the Victorian Romanesque brick structure – with Chuckanut sandstone trim and an elaborate Second Empire mansard roof with corner cupolas and crowning central clock tower – was not completed on the nearly \$50,000 structure until early 1893. This was partially the result of the city's decision to change building sites after construction had begun.

Regardless of any pretensions that New

Whatcom might have had about its future municipal greatness, one of the first pieces of legislation passed by the city council on May 8, 1893, its first day in the new building, was an ordinance prohibiting cattle and other animals from running free within the

city limits between 7:30 p.m. and 6:00 a.m.²

After a series of consolidations, the city of Bellingham was created in 1903 with the merger of Fairhaven and Whatcom (the latter had dropped the "New" from its moniker in 1901, having absorbed the earlier com-



As the New Whatcom City Hall approached completion in 1893, the elaborate metal roof received its first coat of paint with the painters at work on the west side of the central clock tower in this first ever photograph of the building. (Courtesy, Whatcom Museum of History and Art, Bellingham, WA, 1893.)



Charred framing members from the 1962 fire were still evident underneath the roof. Here, they had been supplemented by new framing members immediately adjacent. The underside of the wood roof decking had numerous water stains indicative of the metal roof failing.

munity of Whatcom), and the New Whatcom City Hall continued to house the municipal government of the consolidated city. After municipal offices were relocated to a new city hall in 1939, the building was converted to use by the Bellingham Public Society (now the Whatcom Museum of History & Art), which opened on January 23, 1941.

Over the years, the former city hall building remained a beloved civic monument, despite scarcity of funds to maintain it properly. A fire in 1962 destroyed the central clock tower and one corner cupola, but served more to galvanize local support for preserving the original building, rather than calls for its destruction. Initial repairs of the fire-ravaged roof included reconstruction of the destroyed corner cupola under the supervision of architect George R. Bartholick. Even so, roughly ten years passed before the central clock tower was reconstructed.

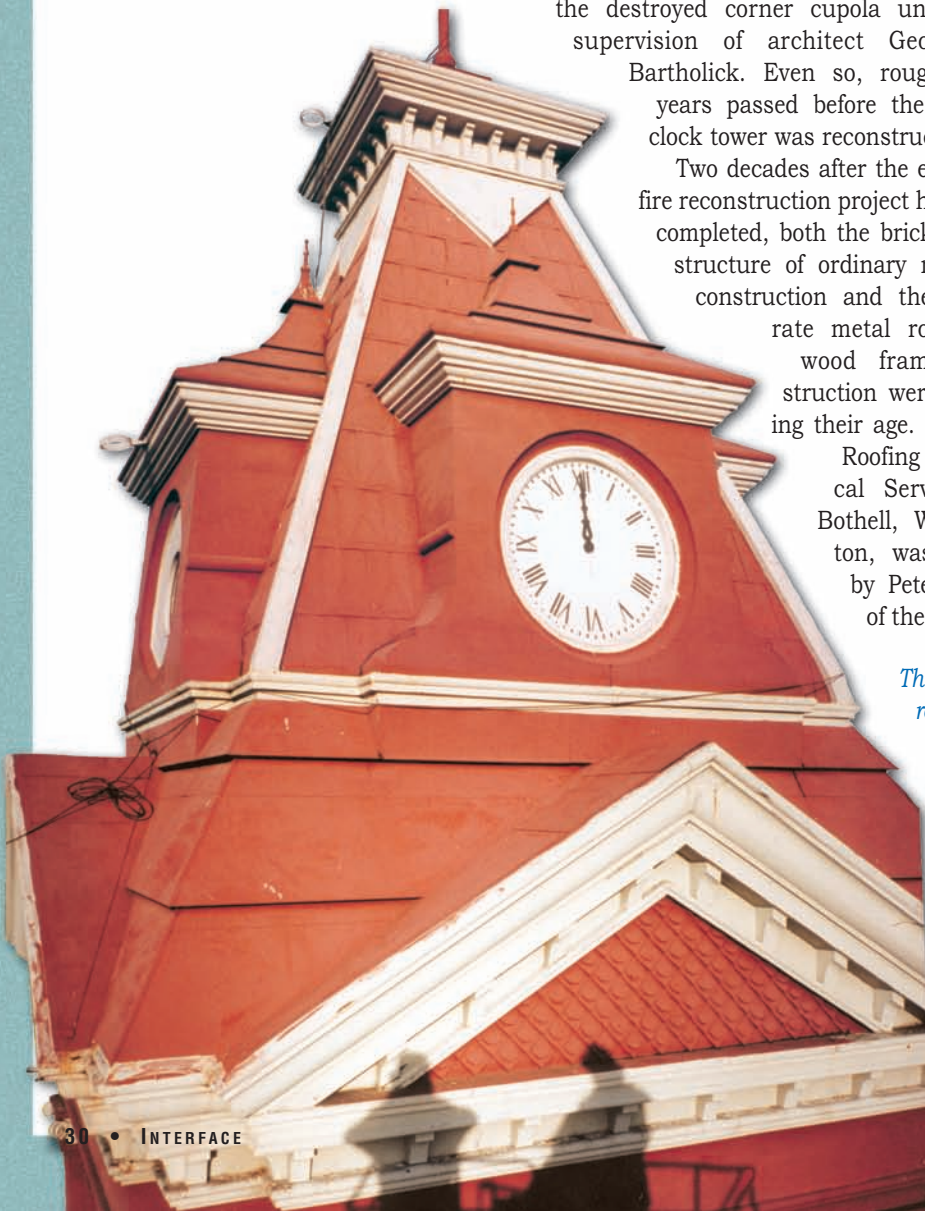
Two decades after the extended fire reconstruction project had been completed, both the brick superstructure of ordinary masonry construction and the elaborate metal roof over wood frame construction were showing their age. Initially, Roofing Technical Services of Bothell, Washington, was asked by Peter Stark of the Belling-

ham Purchasing Department to perform a roof survey to identify items of concern relating to the roof.

Preliminary Investigations

Dick Unrue, RRC, of Roofing Technical Services, performed the roof survey in two phases. The first phase occurred on August 8, 1994, and provided an initial assessment of the general condition of the roof, as well as determining what equipment might be needed to perform a more thorough assessment of the roof.

The former city hall is located near the historic downtown of New Whatcom, and Bellingham's current downtown. The building is close to the Prospect Street sidewalk, partially due to the steep grade change on the west side of the site facing Bellingham Bay. Although a parking lot exists on the south side of the building, mature landscaping is present on the south and east sides immediately adjacent to the building, impeding easy access. The north side is closely bounded by a former fire station of 1926, which now houses the Sayre Education Center of the museum complex. This, combined with the height of the overall building and the extreme complexity of the roof structure, suggested the use of a mobile



The lower section of the central clock tower roof had gable roofs clad with flat seam panels that intersected with a three-coursed Bermuda-type roof. The end gables themselves featured pediments with "fish-scale" infill and cornices supported by concave corbels. The upper section of the central clock tower roof had metal-clad dormers housing the clock faces, each capped with an attenuated Bermuda-type roof. The dormers intersected with a steeply pitched hip roof clad with metal shingles which was capped by a corbelled cornice that in turn was capped with yet another Bermuda-type hip roof. The clocks were removed and reinstalled by the owner.

Rust stains on the leading edges of virtually every white-painted trim surface were another indication of significant failure of various metal roofs and cladding.



manlift to survey the exterior of the roof.

The basic roof is a mansard with multiple hips and valleys that reflect the receding planes of the main facades. Two gables crown the central entrance pavilions on the east and west sides, and repeat on the north and south sides. Each corner features a short, freestanding tower capped with a cornice of oversized dentils and a hipped Bermuda roof with a concave profile. The Bermuda roofs, in turn, are crowned by shorter towers that are capped with pyramidal roofs clad with metal shingles.

The central clock tower is even more elaborate. It rises from a short platform with a corbelled cornice that supports an oversized, one-story, pilastered tower with corbelled pediments on all four sides. Atop the gables sits a steeply pitched hip roof clad with metal shingles, each face having a dormer with a hipped Bermuda roof housing one part of the tower's four-faced clock. The central tower is finally capped by a small-hipped Bermuda roof supporting the building's flagpole.

The metal roof is easily as tall as the brick superstructure that supports it – three stories over a partially exposed stone masonry basement. The building rises 146 feet above the Prospect Street grade. The roof is also far more ornate, being a showcase of late nineteenth century sheet metal work. Indeed, it is the most distinctive aspect of the building's design and makes the building readily identifiable as a landmark structure specific to Bellingham.

The second phase of the roof survey occurred on December 12, 1994, with the assistance of Brent Nelson, general sheet metal superintendent of Pacific Rainier Roofing, Inc., of Seattle, Washington. A



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Below: The existing paint finishes were lead-based, requiring the use of polyethylene sheeting to catch and allow for the proper disposal of the removed paint.

Inadequate paint adhesion was first noticed on the corbels of the central clock tower lower cornice on August 25, 1998. Within a week, the problem manifested itself in larger areas, as seen in the photograph of the gable cornice on September 3, 1998.

visual record of conditions was made with both a 35-mm camera and a video camera. The video recording proved useful in allowing other experts, such as John Bonar of Follansbee Steel of Follansbee, West Virginia, to have a better understanding of existing conditions without having been physically present at the time of the survey.

The survey itself revealed that most of the metal roof had been fabricated from terne-coated steel with the remainder from galvanized steel. Surprisingly, no protective undercoat had been applied to the under-

side of the terne-coated steel. Also, no asphalt-saturated felt underlayment was installed under the rosin-sized sheathing paper, and in some locations, no sheathing paper.

The installer of the metal roof was also apparently unaware of the need to provide a separator between the terne-coated steel and galvanized steel to prevent galvanic reaction. The batten covers of the roof

lacked end caps and were installed in a manner that invited water penetration. Numerous soldered seams of the sheet metal ornamentation (some of which dated from the original nineteenth-century construction) were no longer watertight. Previous sealant repairs at these locations had also failed. Paint was peeling in multiple locations. Rust rash, a sure precursor to subsequent peeling, was present at random locations. There was a significant amount of bird dung in the cornice work and other locations, and the strong ammonia content was contributing to the rust failure of the terne-coated and galvanized steels.

In addition, a number of wood-framed windows were weather checked, with sills and sashes significantly split. The down-

This detail view of the metal cladding at the southeast corner cupola clearly revealed the failed seams, multiple small repairs (some of which had also failed), and the accumulated bird excrement to be dealt with.



spouts of the terne-coated steel had also split, allowing water to splash onto the brick walls and migrate into the building. There were also individual occurrences of missing bricks.

Based upon the recommendations of the completed report in April 1995 and the estimated cost for replacement of the roof, the City of Bellingham began planning to secure funds for the project and to select an architect with expertise in historic preservation to prepare the needed construction documents. Replacement of the metal roof alone, without addressing potential structural issues, was estimated at \$530,000.³

Design Phase

By 1997, Cardwell/Thomas & Associates of Seattle, Washington, was selected as the architectural firm for directing the historic preservation work for the Whatcom Museum of History & Art, with David Strauss, AIA, as project



Severe water staining is evident on the brick masonry where the former downspouts had broken open. The replacement downspouts were fabricated from TIG-welded 16 ga. stainless steel. The water stains themselves are awaiting later building envelope work.



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The foreground cupola is being shingled, while the background cupola has only the self-adhering waterproofing underlayment in place and breathable underlayment is being installed at the central clock tower.

architect. A more comprehensive condition assessment was completed to complement the original roof survey report. It also more directly addressed building envelope issues as they related to the masonry construction and windows, in order to help the museum prioritize its future construction needs and funding for the entire building.

Not surprisingly for an ordinary masonry structure with unreinforced brick walls, the most significant and potentially expensive life-safety issue was a need to provide shear walls to reinforce the building during a significant earthquake. The presence of dry rot suggested that condensation resulting from inadequate ventilation should also be addressed while rehabilitating the roof. Among the more challenging needs identified by Cardwell/Thomas' report of the building was the overall condition of the Chuckanut sandstone masonry and trim. This was due in part to the topical application of a cementitious coating in the 1970s.

The museum ultimately decided to proceed on the basis of addressing the roofing needs first. Repairs to the brick walls and wooden windows would be included as funds allowed. Reinforcement of the building with shear walls would await later funding, as would addressing the problems with

the Chuckanut stone work.

Using FEMA-178 to evaluate seismic life safety issues,⁴ the design strategy was to begin a phased improvement by addressing discrete issues over time. For the roof, this entailed a new plywood roof diaphragm anchored to the tops of the masonry walls. This work was developed by

Swenson Say Fagét of Seattle, with Dan Say, PE, as the principal structural engineer. The improvements to the walls themselves were not initially economically feasible, and were deferred to a later date.

For the metal roof itself, alternatives to the failed terne-coated steel were researched. Pigmented stainless steel was considered, but there were problems with cost and availability. Prefinished Galvalume steel with a fluoropolymer coating was chosen for its ability to replicate traditional paint colors cost effectively while minimizing future maintenance.

Although the 1974 roof had battens on the mansard portion, this did not reflect original construction, which had been metal shingles.⁵ The metal shingles had failed less than two decades after installation and were replaced around 1910.⁶ The replace-



Above: Where the corbelled cornices at the corner cupolas were reconstructed, drainage slots were provided at the bottom of the corbels.

Right: The building's two chimneys were functionally abandoned long ago. When the sheet metal cap of the southeast chimney was removed for replacement, portions of upper brick courses were found to be missing. Even though upper courses of brick would be concealed beneath a new sheet metal cap, the missing bricks were replaced to allow the construction of a new wood substrate prior to installing the new cap. The southeast cupola in the background is basically complete, lacking only the "drooping leaf" ornaments at the peaks of each face of the pyramid roof.

ment roof was consequently as historic as the failed shingles and had been present for a longer period of time; however, there was no definitive evidence as to whether the replacement mansard roof had battens or standing seams. A standing seam configuration offered an advantage with its ease of installation. Concerns regarding the impermeability of self-adhering waterproofing membranes restricted the use of this material to locations under valleys and step flashings and along roof edges. The field of the roof received "RoofShield," a breathable, spun-bonded, polypropylene fabric manufactured by A. Proctor Group, as the primary roof underlayment. For the metal shingles, the "Classic Shingle" by Berridge Manufacturing Company closely matched the existing metal shingles in regards to size and appearance.

Ventilation of the roof was handled fairly conventionally. Louvered screen vents were provided in the soffits, with screen vents at the ridges and a portion of the hips. The latter location did require cutting of venting slots in the existing wood decking prior to installing the new plywood diaphragm sheathing. One of the two abandoned chimneys was also incorporated into the ventilation system.

Part of the funding for the project was an historic preservation grant from the state, which put the production of the construction documents on a short schedule. The original schedule called for the final draft of the condition assessment

survey report, base drawings, and preliminary cost estimate to be completed by December 24, 1997. Schematic design was due five weeks later with complete construction drawings and final cost estimates on March 27, 1998. This schedule proved to be overly optimistic; however, the originally anticipated bid date of April 10, 1998 slipped only four days.

Construction Phase

Impero Construction Company, Inc., of Bellingham was awarded the general construction contract. Impero, in turn, subcontracted installation of the metal roofing to Andgar Corporation of Lynden, Washington. Given the complexity of the project, a construction budget of \$1.4 million, and expected completion date of October 19, 1998, the selection through the public bidding process of a local contractor with strong ties to the community was a highly fortuitous occurrence.

Even though very little work occurred in conjunction with the exterior walls, the project required full scaffolding of the building, as this was the most feasible means for supporting the scaffolding needed for the roof.

This also allowed flexibility in providing access to the roof while

minimizing the impact of the work on the interior. The building's elevator was utilized for the delivery of some materials in addition to the onsite crane.

Reuse of much of the original ornamental sheet metal work was one of the challenging goals of the project, both in regards to historic preservation by retaining as



Although some work on the building envelope occurred below the roof line at the main building cornice, full scaffolding was erected, primarily for the replacement of the roof.



Above: The back side of a cupola "fish scale" panel reveals the polyurea resin coating that was applied to stabilize the panel. In addition, the panel edges were reinforced with galvanized steel formed angles.

Right: "Fish scale" panels are being reinstalled at the northeast cupola with new wood blocking at panel perimeters. Note the use of breathable underlayment at the cupola wall and waterproofing underlayment at the pyramidal hipped roof above.





Left: Where paint removal revealed deteriorated metal where decorative sheet metal had been intended for retention, the sheet metal was repaired in situ.

Below: A typical in situ repair of a retained corbel at the main building cornice.



much of the original fabric as possible and to help keep costs within the project's budget. When the "fish-scale" panels on the corner turrets were removed, most were more deteriorated than anticipated. These panels were scheduled to be cleaned to their base metal, resoldered where needed, repainted, and then reinstalled. When removed, the back sides of the panels were significantly pitted from corrosion and concerns were raised that the cleaning process might further erode the existing soldered seams and leave insufficient material for attempting new soldered seams. The contractors proposed to apply to the back sides of these panels a polyurea resin coating that had been successfully used to create truck bed liners; otherwise, the intricate fish-scale pattern would have to be replicated by hand. The

initial mock-up of coating a prepared panel proved successful in stabilizing the panels sufficiently to allow all of them to be reused. The "fish-scale" in-fill panels at other locations were not affected by this change, as they were scheduled for replication or to be refinished *in situ*.

A problem with the specified paint finish for the ornamental sheet metal work developed later in the project. The original specification anticipated that only 30% of the existing paint on retained sheet metal work would need to be removed prior to repainting with Tnemec "Stranlok" fiber-reinforced epoxy paint. Unfortunately, the application of the epoxy paint over the existing paint finish tended to result in a loss of adhesion by the existing paint from the base metal through no fault of the painting subcontractor, Swinburnson Painting. Ultimately, the abatement subcontractor, Welch Enterprises, had to either resrape or use "peel away" paint remover (depending on the complexity of the sheet metal work) to remove as much of the existing lead-based paint as possible prior to the application of the epoxy paint.⁷

In general, the workmanship accomplished by the work crews of both Impero Construction and Andgar Corporation was exemplary. As the pro-

Below: One of the two "dragon-crest" ornaments, here installed at the north gable.



Left: One of the two eagle ornaments, here installed at the east gable.

ject progressed, the workers exhibited increasing pride with each completed turret, tower, and roof segment. The project managers, Albert Timmer for Impero and Gord Nonhoff for Andgar, worked in cooperation with the architect, owner, and roof consultant. Problems in the field were typically resolved expeditiously, although the accompanying paperwork occasionally lagged.

Perhaps the greatest challenge for the contractors was the construction schedule. The museum had arrangements to reopen to the public on October 11, 1998, with a traveling exhibit and a gala reception the prior evening, neither of which could be delayed. The original date for substantial completion was scheduled for October 14, 1998, with final completion by November 20, 1998. The various problems that developed during construction, however, resulted in the scaffolding remaining in place until November 4, 1998. This disappointing development was compounded by an unexpected and somewhat daring construction theft.

Retention or restoration of historic ornaments on the building was a historic preservation goal of the project, as already mentioned. The roof had originally been adorned with eagle ornaments on the primary east and west gables, while the north and south gables had "dragon-crest" ornaments that had disappeared over time. After new brass ornaments had been located and installed and while the scaffolding was still in place to the roofline, the west gable eagle was removed from its perch during the night around

Halloween. The lost eagle had to be reordered and was reinstalled after the scaffolding was removed. This gave the contractors an opportunity to demonstrate the usefulness of the fall protection system that had been incorporated into the new roof.

As the project approached completion, John T. Tawes, facilities manager for the Bellingham Department of Public Works, expressed appreciation for the assignment of a knowledgeable roof consultant to perform the observation work during construction of the new roof.⁸

Summation

As previously indicated, the new metal

roof was only the initial phase of preserving this extraordinary building. During 2003, an emergency repair contract was completed for some of the brickwork of the south walls. The bids for this work came in low enough to allow for a change order to anchor the brickwork over the primary exits. As with the metal roof, the project architect was David Strauss, now a principal with SHKS Architects of Seattle. The firm has also recently conducted a complete survey of the windows in support of a grant application for capital spending.


Although the City of Bellingham and the Whatcom Museum of History & Art do not have a set schedule for completion of the rehabilitation of this landmark building,



A particular highlight of the work was the completion of the uppermost Bermuda-style roof with its raised central panels that caps the central clock tower.



Recent completion of the Maritime Heritage Park to the immediate west of the old City Hall allows the building and its rehabilitated roof to be seen to good effect from the waterfront as envisioned by the city fathers in 1892. Also, note that the west eagle has not gone missing a second time.

completion of the metal roof clearly established their intent to preserve the building to the highest quality possible. Miraculously, the building has already survived more than eleven decades. Hopefully, it will survive for at least another eleven decades into the future, and continue to be “a beacon to all vessels coming into our harbor, and a sure index to all new comers, tourists, and travelers of our taste, thrift, enterprise and intelligence,” as envisioned in 1892 by the city fathers of the future Bellingham.⁹ The new roof is a remarkable milestone in this endeavor. 

Acknowledgements

The author would like to acknowledge the assistance of David Strauss of SHKS Architects in providing information regarding the design phase and subsequent rehabilitation efforts related to this project.

References

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- 2 “In The New City Hall,” *Bellingham Bay Express*, May 9, 1893, page 1.
- 3 D. K. Unrue, “Roof Survey Report – Whatcom Museum,” April 12, 1995.

- 4 *National Earthquake Hazard Reduction Program Handbook for the Seismic Evaluation of Existing Buildings* (Washington, D.C.: The Building Seismic Safety Council for the Federal Emergency Management Agency), June 1992.
- 5 Both the *New Whatcom, Whatcom Co., Washington* (New York, N. Y.: Sanborn-Perris Map Company), April 1897, Sheet 14, and *Insurance Maps of Bellingham* (formerly *Whatcom & Fairhaven*), *Washington* (New York, N. Y.: Sanborn Map Company), 1904, Sheet 11, indicate that the building had a “metal shingle clad mansard roof,” which is confirmed by some historic photographs in the archives of the Whatcom Museum of History and Art.
- 6 “Council Will Make Repairs On City Hall,” *The Bellingham Herald*, June 28, 1910, page 8. Jeff Jewell of the Whatcom Museum of History and Art brought this article to the author’s attention, and indicated that this occurred in conjunction with other interior alterations under the general supervision of Alfred Lee, the original architect.
- 7 Cardwell/Thomas & Associates, “Progress Meeting Report No. 12” for September 1, 1998, and “Progress Meeting Report No. 13” for September 8, 1998.
- 8 John T. Tawes letter to Roofing Technical Services, LLC, September 19, 1998.
- 9 “A Startling Change – The New Council Proposes to Change the Site of the City Hall,” *The Daily Reveille* (New Whatcom), January 16, 1892, page 1.

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