

History of Metal Roofing

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4 PRESERVATION BRIEFS

Roofing for Historic Buildings

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Heritage Preservation Services

Significance of the Roof

A weather-tight roof is basic in the preservation of a structure, regardless of its age, size, or design. In the system that allows a building to work as a shelter, the roof sheds the rain, shades from the sun, and buffers the weather.

During some periods in the history of architecture, the roof imparts much of the architectural character. It defines the style and contributes to the building's aesthetics. The hipped roofs of Georgian architecture, the turrets of Queen Anne, the Mansard roofs, and the graceful slopes of the Shingle Style and Bungalow designs are examples of the use of roofing as a major design feature.

But no matter how decorative the patterning or how compelling the form, the roof is a highly vulnerable element of a shelter that will inevitably fail. A poor roof will permit the accelerated deterioration of historic building materials—masonry, wood, plaster, paint—and will cause general disintegration of the basic structure. Furthermore, there is an urgency involved in repairing a leaky roof since such repair costs will quickly become prohibitive. Although such action is desirable as soon as a failure is discovered, temporary patching methods should be carefully chosen to prevent inadvertent damage to sound or historic roofing materials and related features. Before any repair work is performed, the historic value of the materials used on the roof should be understood. Then a complete internal and external inspection of the roof should be planned to determine all the causes of failure and to identify the alternatives for repair or replacement of the roofing.

Historic Roofing Materials in America

Clay Tile: European settlers used clay tile for roofing as early as the mid-17th century; many pantiles (S-curved tiles), as well as flat roofing tiles, were used in Jamestown, Virginia. In some cities such as New York and Boston, clay was popularly used as a precaution against such fire as those that engulfed London in 1666 and scorched Boston in 1679.

Tiles roofs found in the mid-18th century Moravian settlements in Pennsylvania closely resembled those found in Germany. Typically, the tiles were 14–15" long, 6–7" wide with a curved butt. A lug on the back allowed the tiles to hang on the lathing without nails or pegs. The tile surface was usually scored with finger marks to promote drainage. In the Southwest, the tile roofs of the Spanish missionaries (mission tiles) were first manufactured (ca. 1780) at the Mission San Antonio de Padua in California. These semicircular tiles were



HABS



Repairs on this pantile roof were made with new tiles held in place with metal hangers. (Main Building, Ellis Island, New York)

made by molding clay over sections of logs, and they were generally 22" long and tapered in width.

The plain or flat rectangular tiles most commonly used from the 17th through the beginning of the 19th century measured about 10" by 6" by 1/2", and had two holes at one end for a nail or peg fastener. Sometimes mortar was applied between the courses to secure the tiles in a heavy wind.

In the mid-19th century, tile roofs were often replaced by sheet-metal roofs, which were lighter and easier to install and maintain. However, by the turn of the century, the Romanesque Revival and Mission style buildings created a new demand and popularity for this picturesque roofing material.

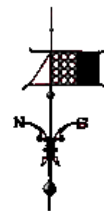
Slate: Another practice settlers brought to the New World was slate roofing. Evidence of roofing slates have been found also among the ruins of mid-17th-century Jamestown. But because of the cost and the time required to obtain the material, which was mostly imported from Wales, the use of slate was initially limited. Even in Philadelphia (the second largest city in the English-speaking world at the time of the Revolution) slates were so rare that "The Slate Roof House" distinctly referred to William Penn's home built late in the 1600s. Sources of native slate were known to exist along the eastern seaboard from Maine to Virginia, but difficulties in inland transportation limited its availability to the cities, and contributed to its expense. Welsh slate continued to be imported until the development of canals and railroads in the mid-19th century made American slate more accessible and economical.

Slate was popular for its durability, fireproof qualities, and

From Asbestos to Zinc ROOFING FOR HISTORIC BUILDINGS

Roofs are perhaps the most critical features of a building. They protect not only the structure itself, but the interior spaces, furnishings, and human occupants. This web feature is a facsimile of an exhibit on roofing for historic buildings entitled: "From Asbestos to Zinc", prepared for roofing professionals attending the 1999 Roofing Conference and Exposition for Historic Buildings in Philadelphia, Pennsylvania. Navigate through the sidebar to learn more about the appearance, composition, manufacture and application of roofing materials and systems. Click your mouse on thumbnail images to view many of the drawings and photographs in greater detail.

Throughout history, roofing materials and installation practices have reflected both advances in technology and shifting tastes in architectural styles. Understanding something of the history of this critical building component is an important starting point for decisions about treatments that are the focus of several of the [Preservation Briefs](#), easy to read guides on preserving, rehabilitating and restoring historic buildings. The Technical Services Branch of the National Park Service produces and publishes this information in order to foster a greater understanding and appreciation of roofing in historic buildings and to stimulate public efforts for more sensitive preservation and rehabilitation work.



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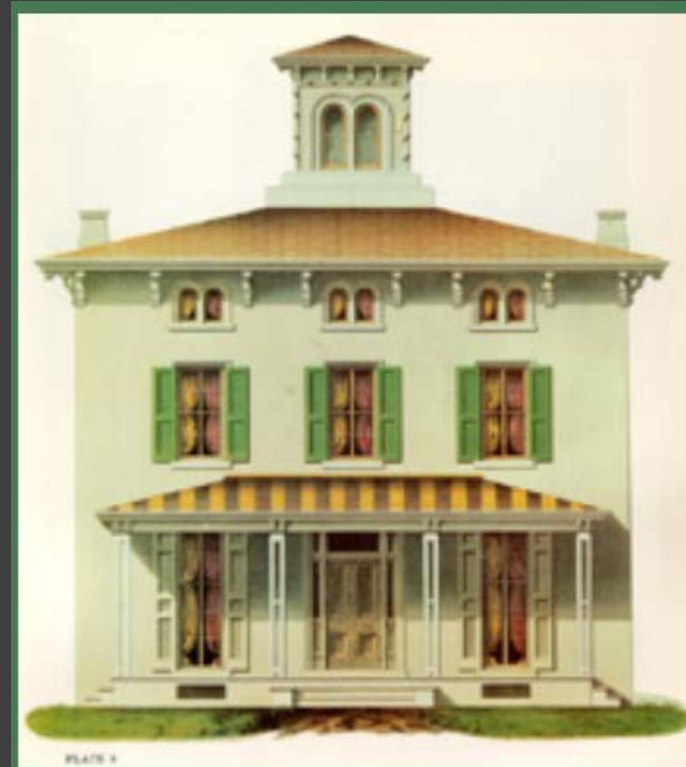
[Credits](#)



- Pre-19th Century
 - Rare
 - Lead & copper
 - Sheet & standing seam
- Corrugated Iron
 - Invented in England, 1829
 - William Strickland proposed for Philadelphia public market in 1834
- Iron galvanized with zinc
 - Corrugated
 - Standing seam
 - New Orleans US Mint, 1857

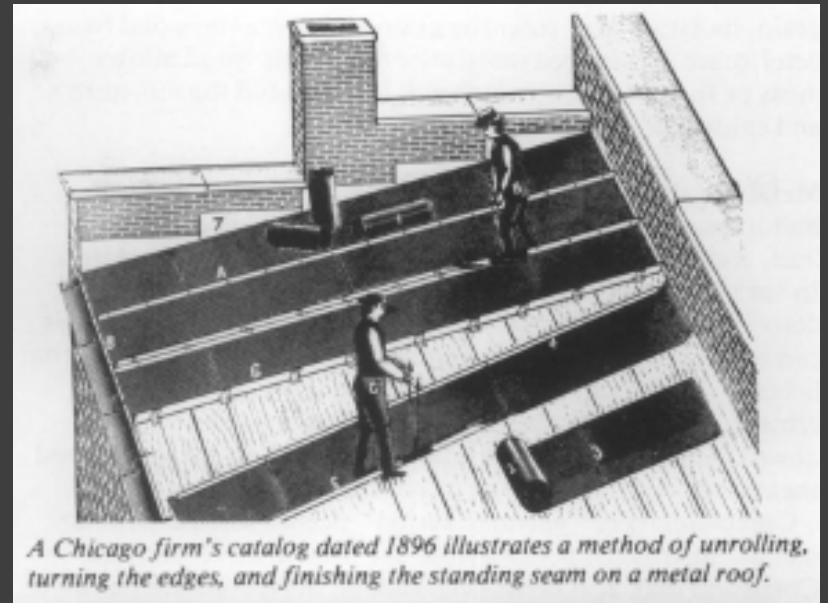


Repeated repair with asphalt, which cracks as it hardens, has created a blistered surface on this sheet-metal roof and built-in gutter, which will retain water. Repairs could be made by carefully heating and scraping the surface clean, repairing the holes in the metal with a flexible mastic compound or a metal patch, and coating the surface with a fibre paint. (Roane County Courthouse, Kingston, Tennessee, photo courtesy of Building Conservation Technology, Inc.)

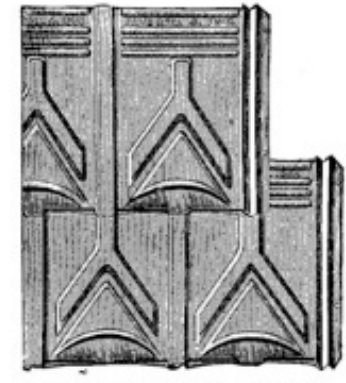


Painting the verandah roof in stripes following the seams in the metal was a fashionable treatment before the Civil War. Manufacturers and technical manuals recommended painting the underside of the metal as well as applying two or three coats to the top. Paints of iron oxide in linseed oil and white lead paint were variously recommended. Since the iron oxide produced a red or brown color, the stripes depicted would have required a tinted white lead paint. (Courtesy of The Athenaeum of Philadelphia)

- Tin-plated iron/Tin roof
 - Monticello
 - Late 19th C, rolling mills made product widely available
- Terne Plate
 - Iron roof plated in lead & tin alloy
 - Duller finish



- Zinc
 - 1820s
 - Pressed sheets for shingle appearance
 - Rare



Fac-simile of beginning of first two courses.



IF YOU ARE INTERESTED IN ROOFING, send for our price list and discount sheet, which is special to the trade. We are pioneers in the introduction of practical metal shingles, and no imitator has yet produced their equal. Our goods are largely used throughout the United States and Canadas; are used by the Government and railroads, approved by the fire-insurance companies and many leading architects and builders. They are lighter than slate, and will last longer without repairs; and the low rate of insurance on our roofing will, in a short time, more than balance the difference in price where wood shingles are cheaper.

As seen by the cut, our shingles are the same to-day as when first introduced. Remember, no cleats or springs are necessary in using our shingles. The lock is simple and perfect, with corrugations across the top, and bracing corrugations across the exposed end of the shingles, which stiffen and hold the shingles firmly to the underlying courses. They are easily applied, and any one who can lay a wood shingle can lay these. We furnish them in four sizes, made from charcoal roofing-tin, painted both sides, and unpainted; galvanized tin plate, which is superior to galvanized iron; cold rolled copper and steel plates. We keep on hand a full line of roofing sundries.

Our shingles received the highest and only award for metal shingles at the American Institute, held in this city, October, 1886, and New Orleans Exposition, 1885.

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- Enameled
 - Introduced from Germany, late 19th C.
 - 1893 World's Fair
 - Popular in commercial applications
 - Rare in residential
 - Lustrons



Emphasizing its two trademark components this enameled shingle was described in the 1929 **Sweet's Architectural Catalogue**: "The base Armco ingot iron and the two coats of Pemco glass fused together at 1600 degrees F., produce a roofing tile extremely durable and of permanent beauty." (**Sweet's Architectural Catalogue**, 1929. Courtesy of The Sweet's Group, The McGraw-Hill Companies, Inc.)

- 20th Century applications
 - Decorative sheet metal
 - Replaced by cheaper asphalt & asbestos



Galvanized sheet-metal shingles imitating the appearance of pantiles remained popular from the second half of the 19th century into the 20th century. (Episcopal Church, now the Jerome Historical Society Building, Jerome, Arizona, 1927)