Coated Ferrous Metals

Plating protected the base metal from rust and allowed the material to be soldered.

Iron

Both iron and steel without any plating were used for roofing. The Philadelphia home of the mill owner who rolled the first sheet iron in the United States was roofed in the material around 1794. Iron replaced slate on the White House in 1804. Because it was available in large sheets, rather than the small sheets used for plated material, it required fewer joints. Some manufacturers produced factory painted material, but late19th century accounts indicate that paint was an inadequate defense against the corrosive effects of the atmosphere in industrial regions.

Lead

The earliest use of lead for roofing in this country may have been at Rosewell, an 18th-century plantation house at Whitemarsh, Virginia. It was widely used before the American Revolution for flashings, downspouts and gutters on the best buildings. In the United States, lead never achieved the popularity it had in Europe. Installed on early Federal buildings in Washington, D.C., it failed to perform well. Expansion and contraction due to temperature changes produced fatigue, and on steep roofs the effect of gravity caused creep.In the 20th century lead found additional application as a coating for both steel and copper.

Zinc

Rolled sheet zinc appeared in the United States in 1816, as roofing in New York and as downspouts and gutters in Baltimore. Though more than seventy houses in New York had zinc roofs by 1837, it was out of favor by 1840. The popularity of the material was cyclical in the next decades, never matching iron and steel with their various coatings.

Tin and Terne

Tin-plated iron appeared as a roof covering in the United States at the beginning of the 19th century. Thomas Jefferson chose it for Monticello in 1800. Tin was often referred to as "bright tin" to distinguish it from the lead-tin mixture, terne (meaning "dull"in French). Because the plating process required that the base iron be dipped into molten tin, it could only be produced in small sheets. The sheets measured 10 by 14 inches in the 1830s, but by the 1870s, advances in manufacturing increased the size to 20 by 28 inches. Tin's availability and reasonable cost made it a very common roofing through much of the 19th century. It could be quite durable, but only if kept well painted.

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) [click image for larger view]

Galvanized

Iron or steel are galvanized by coating them with zinc. Rather than producing the simple coating created by tinplating, a rust resistant alloy of the two metals forms on the surface. In 1839, two years after galvanizing was patented in Europe, the material was used on the roof of the Merchants Exchange in Manhattan. Though the sheet iron was hand dipped in the zinc, much as it was in tin, larger sheets were used (24 by 72 inches in the 1850s). This meant fewer joints, and when used as corrugated sheets, less supporting framing. Even as the production of galvanized iron and steel roofing products increased, the price remained higher than that of other metals. The price differential did not shrink sufficiently for galvanized roofing to exceed tin and terneplate in popularity until the 20th century.

Enameled

Enameled steel as a building component came to this country by way of Germany at the end of the 19th century. Shingles of enameled steel were exhibited by a German industrialist at the 1893 World's Columbian Exposition. The first American production was in 1924 by the Columbian Enameling and Stamping Company, which roofed a house in Terra Haute, Indiana, with enameled shingles. Commercial markets developed by 1930, and enameled shingles became popular for use on service stations and chain restaurants. Except for the 2500 Lustron houses manufactured in the late 1940s, the material was rarely used in residential applications.

Downing describes the chevron patterned roof of his Design XXXI, "Villa in the Pointed Style," from **The Architecture of Country Houses** published in 1850: "The roof may be covered with zinc laid on a ribbed sheathing, without soldering so as to allow it to expand and contract without detriment." (Courtesy of The Athenaeum of Philadelphia) [click image for larger view]

Terneplate was first produced in United States in New York in 1825. Joseph Truman of Philadelphia patented the lead coating of tinplate in 1831. Later production combined the lead and tin into a single coating. Called variously "leaded plate," "roofing tin", and "roofing plate," terne was cheaper than a pure tin coating, but its properties were very similar. Domestic production of terne was twice that of tin when it was chosen to roof the buildings of the 1893 World's Columbian Exposition. In the next few decades terne replaced tin completely in American production as steel replaced iron as the base metal.

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.) [click image for larger view]

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