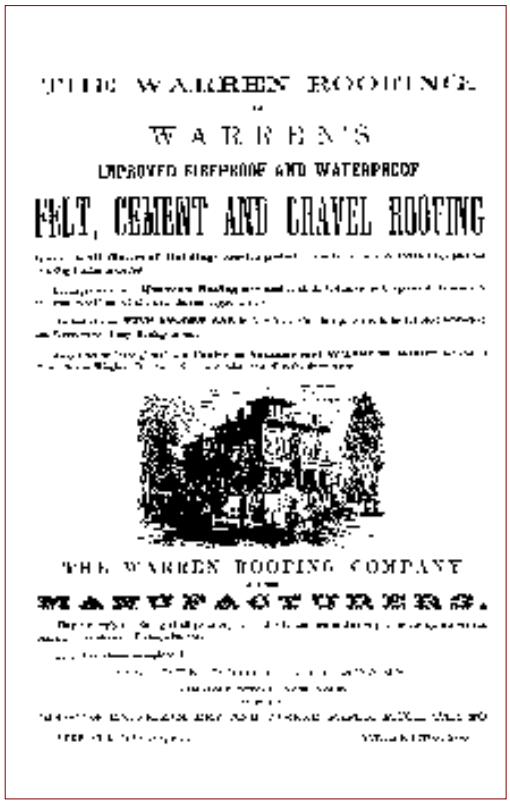
ROOFING FOR HISTORIC BUILDINGS

Composition

Composition or built-up roofing is a multi-ply system of fabric or paper, a viscous waterproofing substance, and a mineral aggregate. Historically, various materials have been used for each of these components. Paper, pasteboard, canvas, burlap, and felt have all served as the base membrane. These materials were often dipped in the waterproofing coating before being applied to the roof. The availability of felt in rolls facilitated the mechanization of this saturation process, and felt became the standard base. Pine tar, natural asphalt, coal tar and asphalt were the major materials to be effective as the waterproofing that saturated the base sheets and adhered the layers. Sand, gravel or slag provided the top surface. Though there is no evidence of their success, numerous other materials were tried as components, many as part of patented formulas: woven strips of paper or twine, sawdust, china clay, plaster of Paris, cattle hair, gum shellac, boiled linseed oil, boiled fish oil, and blood.

Pine tar and gravel were combined for roofing both in Europe and the United States in the 1870s. In 1800 pine tar was applied to canvas at the Octagon House in Washington, D. C., where it provided the roof covering for seventeen years. Evidence of similar systems used elsewhere in the early 19th century is very limited. In the 1840s a method learned from a roofer in Newark became the basis for a roofing business begun in Cincinnati by Samuel M. and Cyrus M. Warren. They met with success, as did others in the northeast, applying roofs of heavy paper, covered with pine tar and sprinkled with sand. The significance of the Warrens was the innovation they brought to the system. From experiments begun in 1847, they successfully replaced increasingly costly pine pitch with coal tar, a by-product of manufacturing illuminating gas from coal. Their continued development of the product and expansion to other cities assured the Warrens' status as leaders in the industry. They were the first in the 1850s to distill coal tar, producing a superior refined tar. Later they found that natural asphalt from Pitch Lake in Trinidad could produce an easy-to-mix roofing pitch when combined with petroleum tar, a by-product of oil refining.


THE WARREN ROOFING
&
WARREN'S
IMPROVED FIREPROOF AND WATERPROOF
FELT, CEMENT AND GRAVEL ROOFING
THE WARREN ROOFING COMPANY

This advertisement offering both roofing materials and installation appeared in the late 1860s. It touted the many advanatages of a composition roof. [click image for larger view]

The potential of composite roofing was apparent to many, and the number of related patent applications exploded in the 1860s and 1870s. The developments in composition roofing were well timed to meet the mid-19th century increase in the use of flat and low-sloped roofs. The only alternative

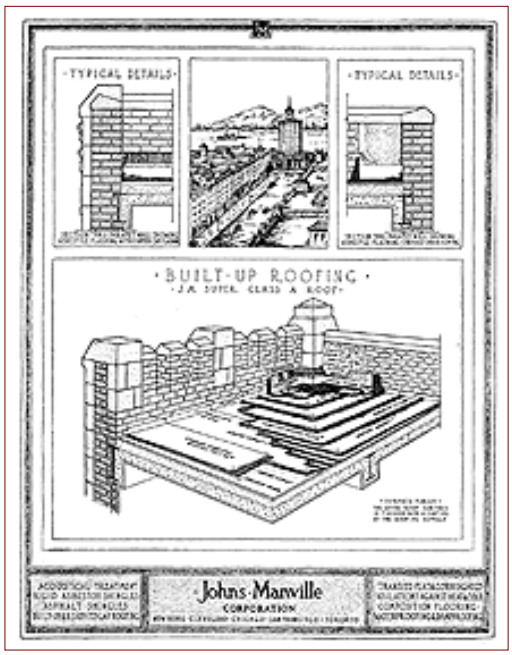
Standards

As the materials and technology of composition roofing evolved, the number of manufacturers and installers proliferated. There was little done in the 19th century to assure the quality delivered by either. Making matters worse, many companies asserted that their products could be applied by anyone. As a result, many roofs performed poorly. Because composition roofing was a multi-component system of varied materials and methods, successful performance was hard to predict.

Samual Barrett, a Chicago roofing product manufacturer, made the first significant effort to set standards for the industry. "Barrett Specifications" were compiled in 1906, providing minimal guidelines for the materials and application of a gravel or slag roof. His generic

(**Sweet's Architectural Catalogue**, 1929. Courtesy of The Sweet's Group, The McGraw-Hill Companies, Inc.) [click image for larger view]

for such roofs at that time was metal, which depended on the performance of the many fabricated seams that joined the small sheets. The relative merits of metal and composition roofing were constantly debated. Henry Hudson Holly writes in 1878: "Metals are the best covering for roofs that are inclined to be flat...composition - such as tar or other materials - we would not advise on good work, as its only merit is its cheapness." Ignition and spread of fire were important issues in the debate. A 1911 test by Underwriters Laboratories rated the fire retardant qualities of "good slag and gravel roofs" in a class with inferior roofing materials. Nevertheless, in 1912 the National Board of Fire Underwriters considered approved composition roofs together with metal, slate and tile the best for fireproof construction. The issue seems to have been settled in1916 when composition roofs met the requirements of both fireproof and fire retarding classes of the Board's rating system. Built-up roofing came to dominate the commercial roofing market and remains in use today.



The specification for this built-up roof being advertised in 1929 called for it to be: "Applied only by the manufacturer or by approved roofing contractors." The materials consisted of asphalt-impregnated asbestos-based roofing felt and asphalt-based roofing cement. "No slag or gravel is ever used or needed on a Johns-Manville Roof." [click image for larger view]

specifications were later made specific to a system of Barrett products, the whole of which he backed up with a bond. Other manufacturers followed his lead promoting their products with brand-specific specifications. In 1916 Barrett tightened his quality control by offering the guaranty bond only on roofs applied by contractors whom he approved. Other companies went further and only bonded installations that their own inspectors oversaw. By the1920's, detailed, lengthy texts of brand specific specifications filled manufacturers' product information. Manufacturers' specifications and approved contractors continue to be a part of the commercial roofing industry.

Home Page Top Next

Heritage Preservation Services

ks