

Metal Roofs Prove Mettle for...

The standing seam metal roof is one of the most exciting breakthroughs in roofing technology in the last 25 years. It fulfills the building owner's need for durable, puncture-resistant protection against the weather, while working in concert with the forces of nature.

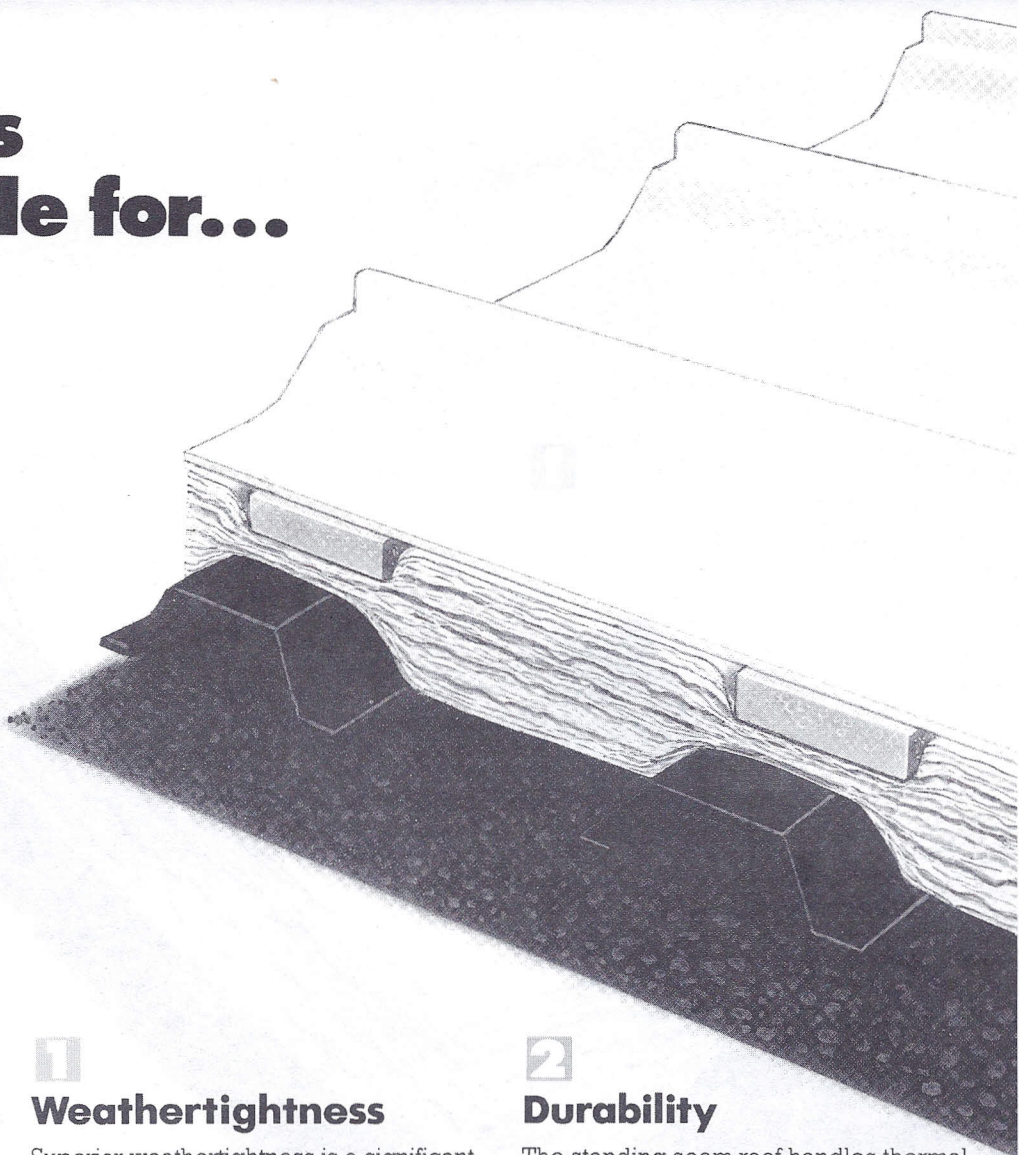
Metal roofing has an established track record in new construction where it has been used in some 50% of all low-rise commercial and industrial buildings erected in the last several years. This acceptance has carried over to the re-roofing market where the standing seam roof has been used successfully as a replacement for built-up and single ply systems. Leading applications for standing seam metal roofs in the retro-fit market are schools, factories, warehouses, distribution centers and military facilities.

The standing seam roof is made of steel, one of man's oldest and most durable building materials. And yet, the lightweight metal roof panels weigh a relatively modest 1½ pounds per square foot.

Unlike flat built-up roofs, which require frequent maintenance, the standing seam metal roof will offer 20 years and beyond of trouble-free performance with little or no maintenance time or expense.

The standing seam metal roof assures adequate drainage from rain and snow, effectively solving ponded water problems, leaks and other related troubles commonly associated with flat built-up roofs. In retro-fit projects, a sub-framing system is attached to the existing roof surface to provide a minimum 1/4:12 pitch for the new metal roof.

The panel fastening system is uniquely designed to handle the potentially damaging effects of thermal movement. Precisely-formed, factory-made metal panels are locked in place by clips inside a raised seam standing two to three inches above the roof surface. The clips have a moveable feature allowing the panels to expand and contract with temperature changes. The concealed clip system means fewer through roof fasteners, reducing the chances of leaks. It also makes the standing seam roof an attractive appearing system for almost any building.



1

Weathertightness

Superior weathertightness is a significant advantage of the standing seam roof. It is designed as a water barrier. The raised seam assists drainage. Organic sealants are factory-applied inside the seams. Automatic field seaming machines produce weathertight connections between the metal roof panels.

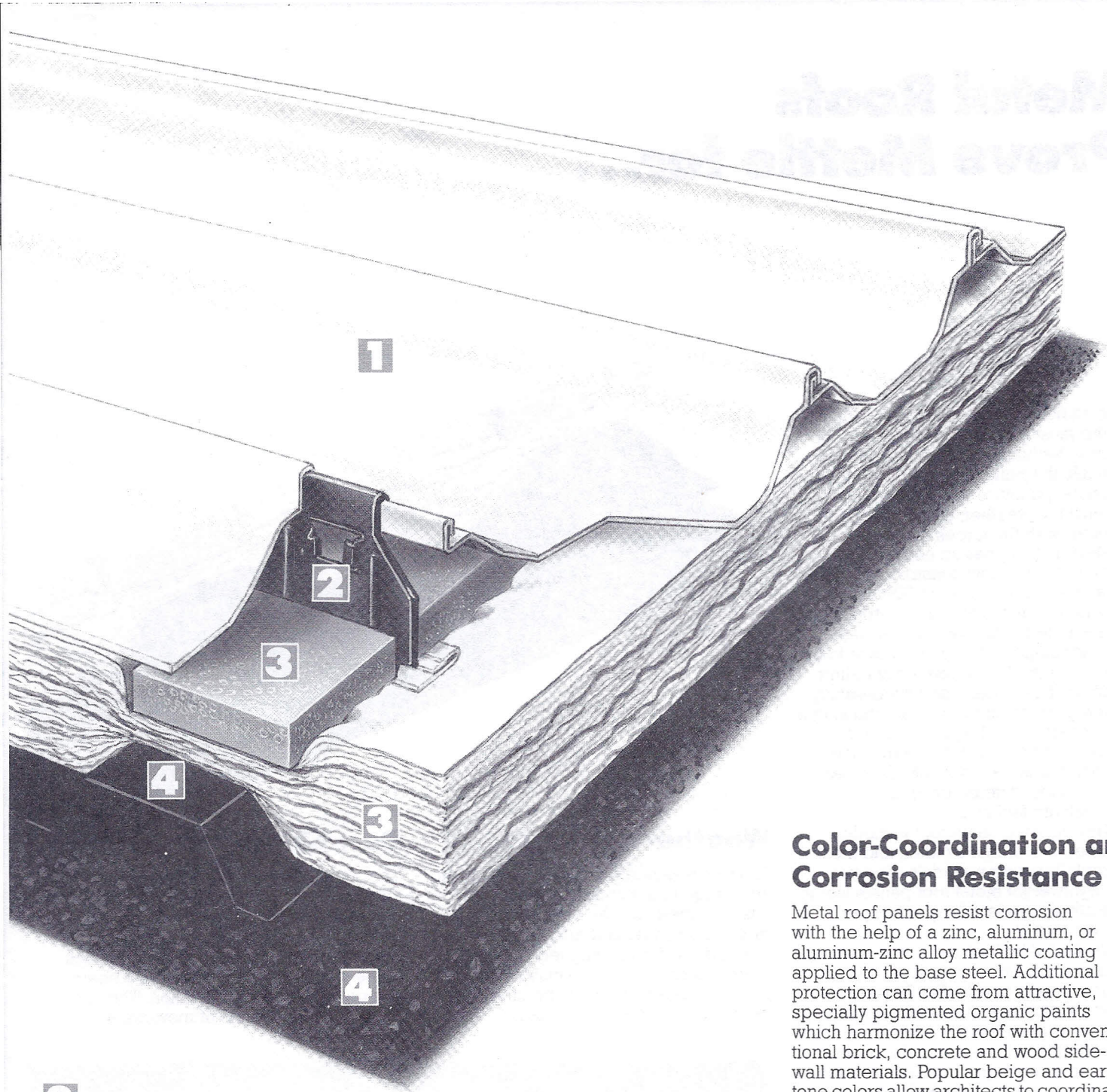
2

Durability

The standing seam roof handles thermal shock through its concealed, sliding clip system. The clip assembly uses a rigid base attached to the building's structural members. An upper part clips to the roof panel and forms into a seam during the seaming operation. The clip allows equal amounts of movement in either direction.



Parkside School, Monroe, Wisconsin



3

Energy Efficiency

Fiberglass blankets are the most common insulation material in standing seam metal re-roofing projects. On some projects, un-faced fiberglass insulation is simply laid directly on the existing roof surface before installation of the new standing seam roof. For other projects, the insulation blankets are installed directly under the metal panels and stretched over the supporting structural members. Foam insulation blocks are often used to separate the panels from the purlins to prevent thermal short circuiting and condensation from forming. The roof expands and contracts independent of the insulation, giving the roof surface a "floating" action.

4

Low-Slope Solution To Flat Built-Up Roofs

In most retro-fit projects, the standing seam roof can be installed right over an existing built-up roof, eliminating costly and time-consuming tear-offs. The metal panels are attached to a steel sub-assembly to provide the necessary slope for ice and water to drain.

Color-Coordination and Corrosion Resistance

Metal roof panels resist corrosion with the help of a zinc, aluminum, or aluminum-zinc alloy metallic coating applied to the base steel. Additional protection can come from attractive, specially pigmented organic paints which harmonize the roof with conventional brick, concrete and wood side-wall materials. Popular beige and earth-tone colors allow architects to coordinate the roof attractively with other design elements of the building.

Design Flexibility

Steep slopes and flat roof profiles can be designed with the standing seam roof. The **structural** roof is the industry's alternative to flat built-up and single-ply systems. The roof spans from support structural to support structural in new construction with slopes of 1/4:12 or more. The **architectural** standing seam roof is used for visually exposed roofs, mansards, facia, and similar applications. It is a **water shedder** and needs slopes of 3:12 or greater. Like wood shakes, tile and slate, this application needs some form of decking for support and a base felt for added protection against moisture penetration.

Make Weather An Ally

Metal roofs can be installed year-round. Heavy rain, extremely cold weather or high winds are about the only conditions that prevent metal roof installers from working. Owners won't have to close the building area being re-roofed if the work has to be done while occupants are inside. In most projects, the metal roof can be installed right over the existing roof, eliminating costly and time-consuming tear-offs. Occupants continue their normal activities, even in the immediate area being re-roofed.

Long-Term Warranties

Twenty year material warranties are customary for metal roofing systems, considerably longer than the standard protection for built-up and single-ply systems. Long-term warranties are sometimes offered for weathertightness on metal roofs, including those with a 1/4:12 slope. The standing seam roof can qualify for the UL-90 wind-uplift rating—the highest in the industry—which can substantially reduce insurance rates in high wind areas. It must be combined with the roof manufacturer's UL-90 system, which includes the panels, concealed clips, sealants and structural supports. The standing seam metal roof can also carry a Factory Mutual Class A fire rating.

Reference Material

For additional information on standing seam metal roof systems, readers may write or call the following organizations.

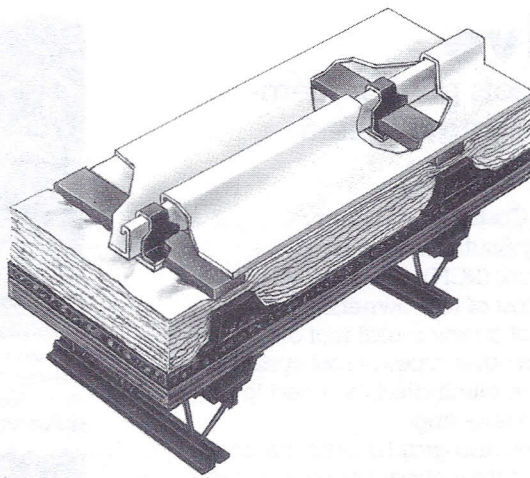
American Iron & Steel Institute
(Association of North American Steel Producers)
1101 17th Street N.W.
Washington, D.C. 20036-4700
Richard B. Haws, Program Manager
202-452-7100

Metal Building Manufacturers Association
(Metal building and roof system manufacturers)
1300 Sumner Avenue
Cleveland, OH 44115-2851
Charles M. Stockinger, General Manager
216-241-7333

Metal Construction Association
(Roofing and other metal construction industry representatives)
1101 14th Street N.W.
Suite 1100
Washington, D.C. 20005
David Barrack, Executive Director
202-371-1243

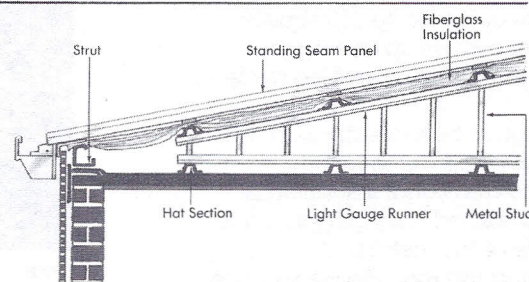
Roofing Communications Network
(Computerized life cycle costing & energy analysis)
3690 Bohicket Road
Suite 1D
Johns Island, S.C. 29455
Anne Keenan, President
803-768-1333

Roofing Industry Educational Institute
(Institute of non-profit roof training seminars)
14 Inverness Drive East
Building H, Suite 110
Englewood, CO 80112-5608
Richard L. Fricklas, Director
303-790-7200



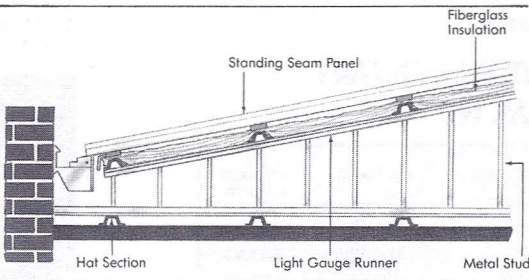
To Re-Roof A Sloped, Built-Up Roof:

To re-roof over a sloped built-up roof, a hat channel is placed perpendicular to the slope of the roof and screwed into the existing structural system. Blanket insulation can be added before the roof panels are installed to increase thermal efficiency.



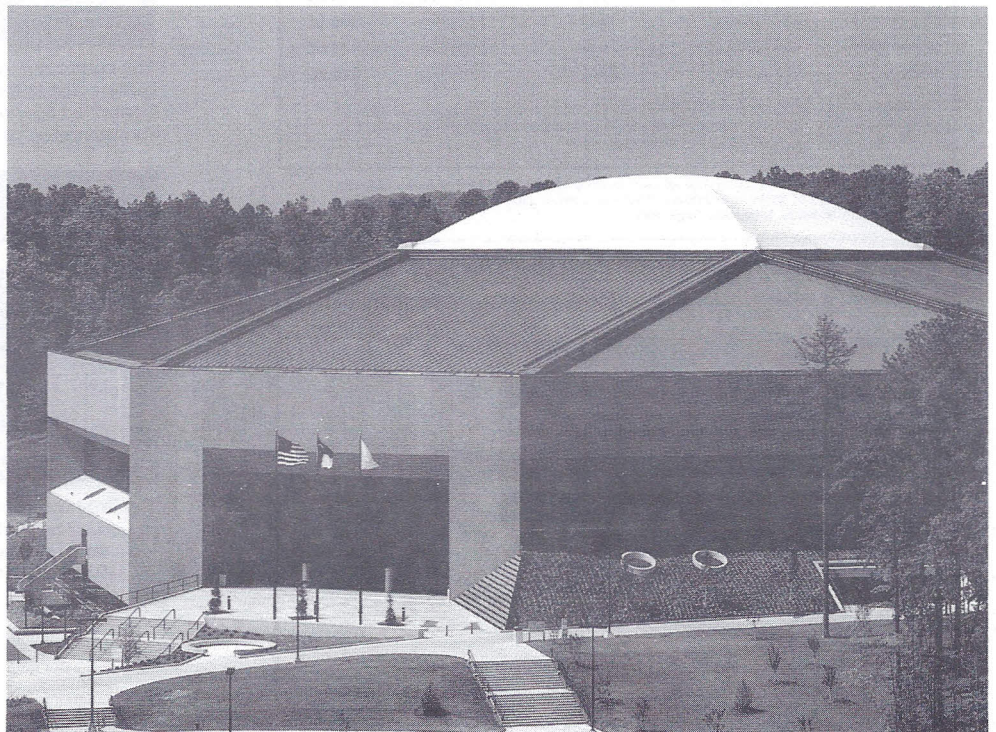
To Re-Roof A Flat Built-Up Roof:

A slope must be created to assure adequate drainage when re-roofing a flat built-up roof. A light gauge steel sub-framing system creates the required slope, usually a minimum of 1/4:12. Insulation may be added on top of the existing roof or beneath the roofing panels (as shown) to improve the roof's thermal efficiency. The roof panels are then attached to the sub-framing system by concealed fastener clips. The cavity between the old roof membrane and new standing seam roof may have to be ventilated to remove all moisture from the existing built-up roof.



To Re-Roof A Flat Built-Up Roof With A Parapet Wall:

The specifier can design a framing system to get the final elevation of the new roof above the parapet wall. Another option is to design an interior gutter system (as shown) that allows for the parapet wall to conceal the new roof. Light gauge structural steel can be used as illustrated for the sub-assembly. After the framework is installed, the contractor screws a hat channel section to the rafter. The standing seam roof then attaches to the sub-structurals with concealed clips.



Dean E. Smith Center, University of North Carolina

Cost Effective

Standing seam metal roofs pay for themselves from the day they are installed. And, they are cost competitive.

Utilizing the Roof Life-Cycle Costing and Energy Analysis Program developed by South Carolina-based Roofing Communications Network (RCN), the Alamance County Schools compared the cost of roof ownership, including the energy payback of a new metal roof over an existing built-up roof, with seven other types of roof systems. The standing seam retrofit system eliminated the need to tear off two existing roofs prior to reroofing.

As the accompanying charts and graphs illustrate, the standing seam metal roof system they chose had the lowest life cycle cost of any system. The new metal roof at Pleasant Grove Elementary School covers 40,329 square feet of roof area. The cost of roof ownership averages \$25.82 per square per year for the metal, lowest life cycle cost among the eight systems.

By adding 6 inches of fiberglass batt directly over the old roof, the ownership cost was predicted to be only \$15.52 per square per year. The additional insulation is paid for in 9.3 years, and the predicted savings generated is \$93,047 over the 22.4 year life of the metal roof.

Under the cost of maintaining this roof, Pleasant Grove school officials would simply clean the gutters periodically and inspect roof-top units regularly.

PLEASANT GROVE ELEMENTARY GRAHAM, NC

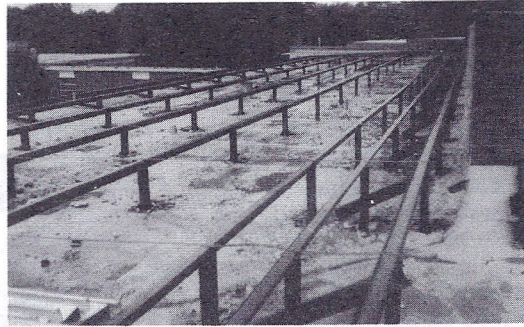
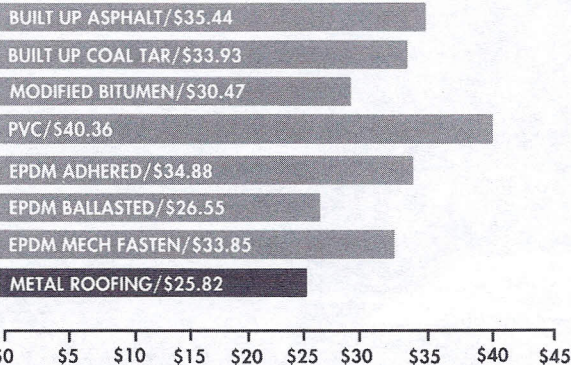
ROOF SYSTEMS	INITIAL COST	LIFE CYCLE YEARS	LCC MAINT	LCC COST (\$/SQ/YR)
BUR-ASP	\$74,819	13.6	\$14,489	\$35.44
BUR-CTP	\$99,361	18.1	\$14,420	\$33.93
MOD-BIT	\$76,374	17.2	\$20,714	\$30.47
PVC	\$55,486	9.4	\$14,804	\$40.36
EPDM-AD	\$92,477	17.9	\$23,216	\$34.88
EPDM-BAL	\$74,066	18.3	\$15,834	\$26.55
EPDM-MA	\$79,531	16.8	\$25,835	\$33.85
METAL	\$93,326	22.4	\$13,820	\$25.82

Total Roof Surface: 40,329 sq. ft. Initial cost includes roofing components, R-19 batt insulation materials and labor. Roof life cycle cost figures (\$/SQ/YR) include initial installation costs, maintenance and energy savings based on present value.

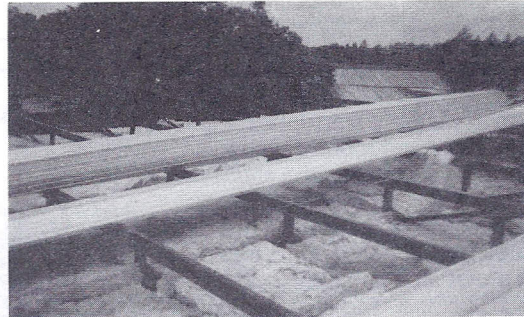
Roof types include: The asphalt and coal tar pitch built-up systems, modified bitumen; polyvinyl chloride; and the EPDM adhered, ballasted and mechanically attached roofs. Source: Roofing Communications Network, Nashville, Tennessee.

LIFE-CYCLE COST COMPARISONS

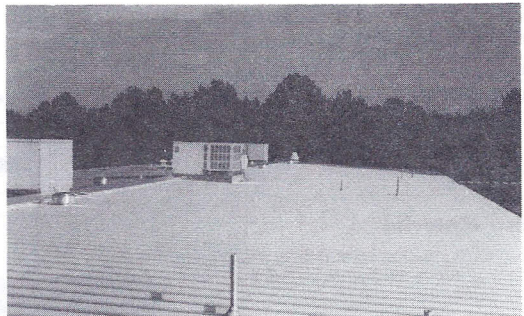
STANDING SEAM METAL ROOF VS. BUR/MODIFIED BITUMEN/PVC/EPDM SYSTEMS



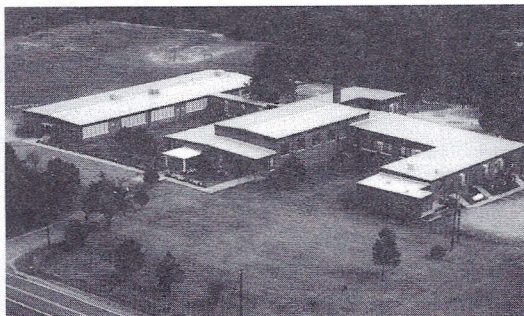
Pleasant Grove (N.C.) Elementary School re-roofed its deteriorated built-up roof with a standing seam metal roof. The sub framing system created a 1/2:12 pitch to assure adequate drainage of the new roof.



Existing gravel was removed from the built-up roof before the new roof was installed. 6 inch fiberglass batt insulation was placed on top of the existing roof to boost its energy efficiency. The sloped roof effectively directs all water off of the building.



The contractor installed some 910 linear feet of exterior gutter. The standing seam metal roof provides controlled flow of water and weathertight, low-maintenance performance.



The finished roof enhanced the building's aesthetic appearance while providing the school district with a long-term, functional roof solution. The project covered 40,329 square feet of roof surface.

"Class Solutions To Roofing Problems."

Durability, life expectancy and appearance were all factors in the decision by the Duplin County school board and their architects to top the B.F. Grady Elementary School with a standing seam metal roof. Located near Kenansville, N.C., the school was completed in December, 1994 and features approximately 70,000 sq. ft. of Royal Blue colored metal panels.

According to Kermit Holland, Maintenance Director for the Duplin County School System, the School Board chose metal because it wanted a sloped roof that required little maintenance and had a low life-cycle cost. Holland said he welcomed the use of metal on the new building because of the product's reputation for durability and long life, and because it had been successfully used on other schools in the community.

Using the Roof Life-Cycle Costing and Energy Analysis program, Duplin officials could calculate the cost of owning their 70,000 square foot roof to average \$27.74 per square per year. The highest life-cycle cost could be \$43.09 a year for a PVC system. It's life expectancy would be 10 years.

B.F. GRADY ELEMENTARY SCHOOL KENANSVILLE, NC

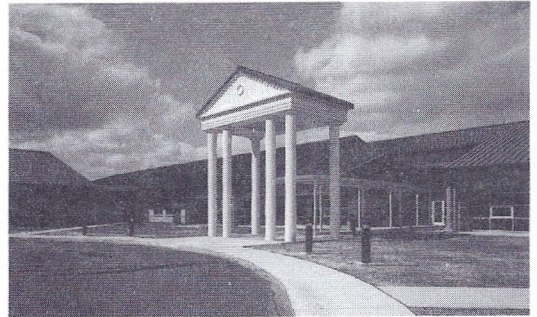
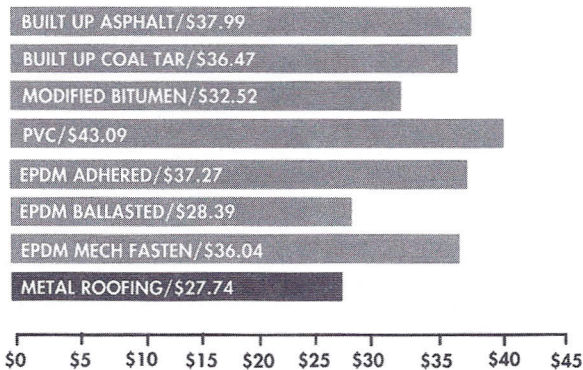
ROOF SYSTEMS	INITIAL COST	LIFE CYCLE YEARS	LCC MAINT	LCC COST (\$/SQ/YR)
BUR-ASP	\$401,155	13.6	\$71,553	\$37.99
BUR-CTP	\$532,739	18.1	\$71,214	\$36.47
MOD-BIT	\$409,492	17.2	\$102,297	\$32.52
PVC	\$297,500	9.4	\$73,109	\$43.09
EPDM-AD	\$495,833	17.9	\$114,650	\$37.27
EPDM-BAL	\$397,117	18.3	\$78,197	\$28.39
EPDM-MA	\$426,416	16.8	\$127,588	\$36.04
METAL	\$500,380	22.4	\$68,252	\$27.74

Total Roof Surface: 70,000 sq. ft. Initial cost includes roofing components, R-22 Polyisocyanurate board insulation materials and labor. Roof life cycle cost figures (\$/SQ/YR) include initial installation costs, maintenance and energy savings based on present value.

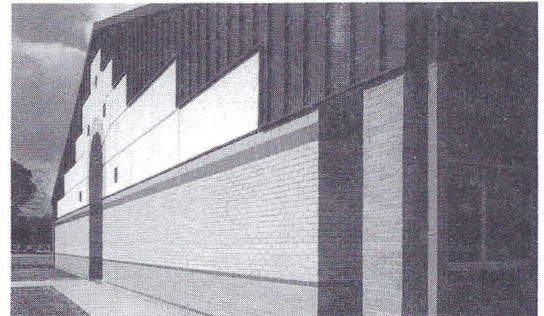
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LIFE-CYCLE COST COMPARISONS

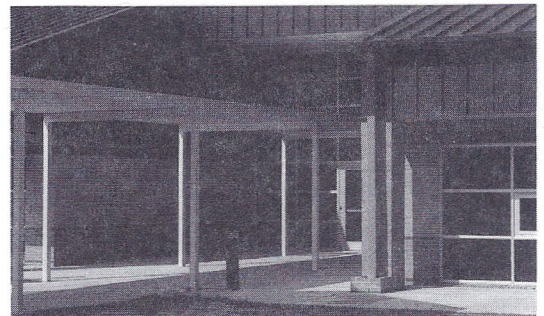
STANDING SEAM METAL ROOF VS. BUR/MODIFIED BITUMEN/PVC/EPDM SYSTEMS



The architectural standing seam roof panels were formed from 24-gauge coated steel with a Royal Blue fluorocarbon paint system. The panels were placed over 3 inches of rigid insulation and were attached directly to a 22 gauge metal roof deck with concealed clips.



On the 4:12-pitched main roof sections, the metal panels were installed over 3-inch thick polyisocyanurate boards on a structural metal deck. All trim and gutter sections were fabricated to match the roofing.



The use of concealed clips with a slotted base allows the roof panels to float while resisting UL-90 uplift pressures at the same time. The concealed clips eliminate fasteners through the roof panels except at the end of roof sheets.



Color, clean lines, rhythm of the standing seams, durability and long life all were factors in Duplin County's selection of a standing seam metal roof system.



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