# Metal Roofing and Schools:
# QUALITY CONTROL

**By Robert Stanford, RRO**

The construction of American schools has likely provided the single greatest source of growth in the metal roofing industry over the past ten years. The advantages of using metal roofing for school buildings have proven to be numerous. When problems occur, however, they can be troublesome, costly, and sometimes catastrophic.

In the acquisition, installation, and repair of metal roofing, school districts need to ask the question, "Who is looking out for our interests and providing quality control?"

School districts all across America are under the assumption and expectation that their architects and general contractors are providing quality control in regard to the overall projects and, by extension, the metal roofing systems. The architect and general contractor are the primary, and often the only, entities who are signatory by contract to the school district.

Faced with a failed metal roof, however, school board members, directors, superintendents, and staff experience an epiphany when they realize that neither the general contractor nor the architect accepts the responsibility or liability for improper installation of the metal roofing system. The courts may identify the general contractor as "the construction expert" and the architect as "the design expert." Neither accepts the responsibility of certifying, validating, or verifying that the installation of the metal roofing system is in compliance with industry standards, manufacturers' installation instructions, wind uplift or code requirements, or proper, long-term waterproofing.

*Figure 1 — Removal of ridge cap metal flashing. Metal roofing closures are not properly waterproofed, as evidenced by the severe amount of wind-driven dirt and debris visible in the photograph. This is a source of water penetration into the building for more than 1,000 l.f. along the ridgeline of this project. This school project is less than two years old.*

In defense of the architect and general contractor, neither usually professes to have the skills or experience to qualify as metal roofing experts. Quality control issues are often left to the subcontractor/installer or the manufacturer, neither of whom has a contract with the school district. Assigning quality control responsibility to either the subcontractor or manufacturer, therefore, may be tantamount to putting the fox in charge of the henhouse.

School districts need qualified third-party metal roofing consultants to act in their interests and provide quality control. There are millions of square feet of improperly installed metal roofing systems currently in place on schools all across America.

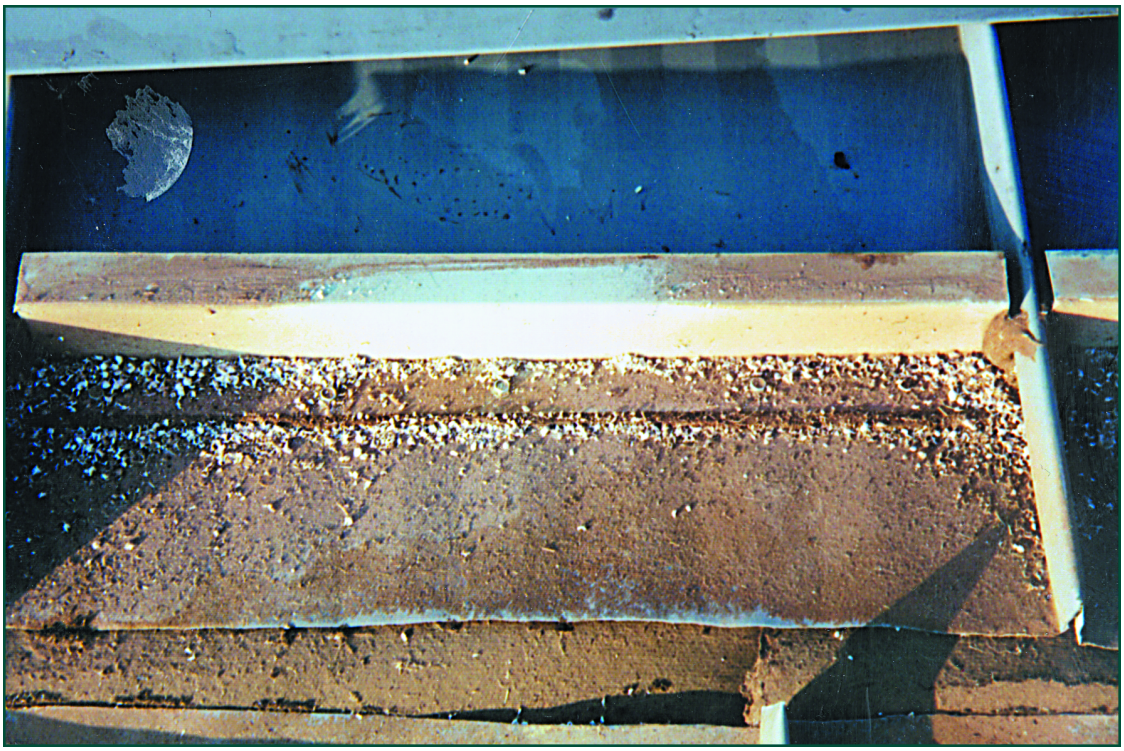

*Figure 2 — Close-up view of the metal roofing panel and closure and ridge cap flashing. Water and debris stains are clearly visible. Areas showing debris are supposed to be watertight.*



Five common causes of metal roofing failures are:

1. Improper selection of product or profile or improper building design.
2. Improper waterproofing and installation details.
3. Lack of skill, training, and experience by persons installing the roof.
4. Installation that is noncompliant with wind uplift requirements, contract documents, and proper waterproofing methods and procedures.
5. Failure to provide quality control inspections, direction, and oversight.

All of these problems can lead to leaks, damages, and lawsuits. Water penetration through an improperly installed roof system may also contribute to the dreaded microbial growth and mold spore proliferation. There are currently hundreds of civil lawsuits related to mold spore and microbial growth problems in school buildings, and the roof is the culprit in many of these.

Installation that does not meet wind uplift requirements has the potential for overwhelming liability to the school district. As an example, suppose there is a "blow-off" of a metal roof. If the insurance carrier is sagacious enough to ascertain that the roof was installed in a manner that does not comply with code or wind uplift standards and

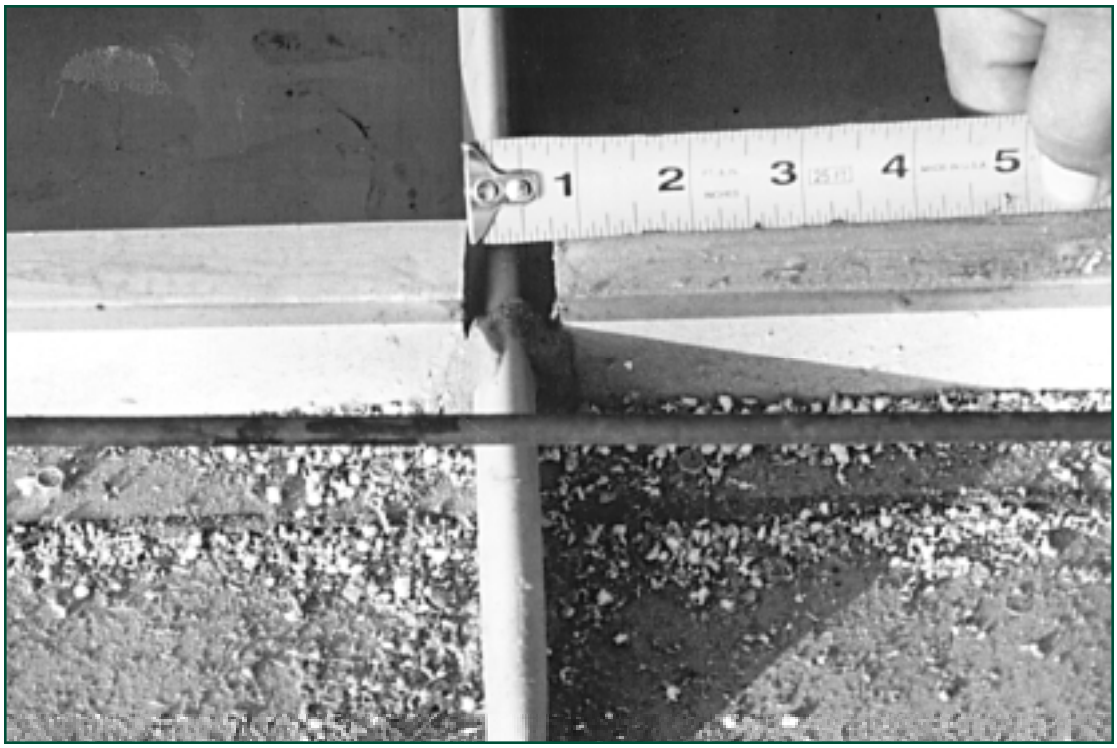


*Figure 3 — Open gap at standing seam rib at metal roofing panel and metal closure. Wind-driven water and debris easily penetrate the hundreds of substandard closures on this project.*

requirements, he may recognize that as a basis for rejection of any and all claims related to damages or replacement of the roof, leaving the school district in a potentially serious financial position. An infinitely worse possibility is that during the "blow-off" there is an injury or even death to one or more of the school children. A roof, installed in a non-compliant manner as outlined above, then becomes a source of potential civil lawsuits against the school district. General contractors, architects, sub-contractors, suppliers, and school districts themselves may be forced into financial collapse and bankruptcy by "blow-offs" or other metal roofing failures.

Many of the installation details in use today were drawn by people who have never installed any metal roofing. These ambiguous, incomplete "failure" details (those that will not provide long-term waterproofing) are routinely reviewed and approved by architects and general contractors who are often unfamiliar with metal roofing and therefore pass the contaminated details on through the submittal process without realizing the gravity of their nonperformance.

The photographs illustrating this article depict graphic examples of "failure" details on installations of metal roofing systems currently in place. As of the writing of this article, some of the projects depicted are not even completed, yet all work and installation methods, procedures, and details were approved by the architect, general contractor, and manufacturer of the metal roofing systems shown.

The proliferation and issuance of so-called "Weathertightness Warranties" provided by manufacturers is now in vogue in the metal roofing industry. Names such as "standard," "silver," "gold," "platinum," "single source," "level I, II, or III" are all used in describing warranties offered by manufacturers. While providing a profit center and revenue source to the manufacturers, many of the warranties provide little or no benefit to the owner. There are common threads in almost all of the manufacturers' "Weathertightness Warranties":

- They require the participation of the installer for the first two years after completion and extend the installer's responsibility and liability for additional two-year incremental periods if any roof leaks occur within any of the two-year periods. (In essence, the 20-year Weathertightness Warranty is the responsibility of the installer, not the manufacturer.)
- They are limited to "leak repair" only and do not contain provisions for consequential damages caused by roof leaks or failures.
- The warranties are prepared and drawn by the legal departments of the manufacturers, not the building owner or representative.
- They limit warranty coverage to repairs for roof leaks or



  

failures that relate to improper installation, and they make the installer liable and responsible for fixing his own mistakes. (A logical extension is: "Is the school paying warranty fees so that the manufacturer can tell the installer to repair what he improperly installed during the original construction process?")

- Many of the warranties are filled with caveats and restrictions imposed upon the school district or building owner. Such warranty language may include an extensive list of reasons or causations for voiding the warranty, making compliance by the school virtually impossible.
- The popular NDL warranties (No Dollar Limit) are in reality limited to roof or leak repairs. The NDL means "No Dollar Limit" for roof repairs and does not cover or include any interior, substrate, or consequential damages from roof leaks or even total roof failures. (School districts paying five figure fees for NDL warranties may find that it cost the installer $100 to repair a roof leak that caused thousands of dollars in damage to walls, carpet, computers, electrical or phone lines, furniture, etc.)
- The classic "Catch 22" is the automatic voiding of warranties if the roof or components are improperly installed. The school district finds that it has a warranty that is invalid because the installer did not properly install the roof.

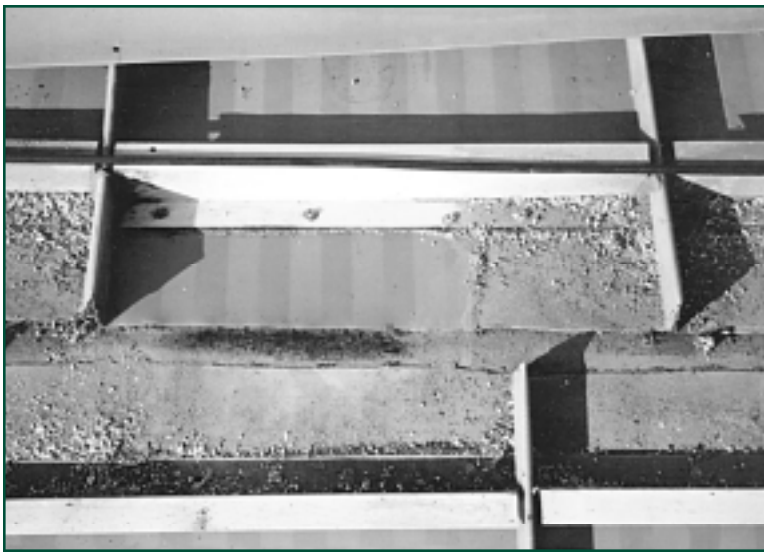

*Figure 4 — A portion of the metal roofing panel has been cleaned to illustrate the severe intrusion of water-borne debris above the ridge cap and closure.*

The solution to these disastrous situations is to prevent them from occurring. When a school district engages an architect or general contractor, that same architect or general contractor should contact the school district in writing, advising it to engage the services of a qualified metal roofing consultant to provide quality control for the project. Architects and general contractors should advise school districts that they are not metal roofing experts and that they do not provide quality control ser-

vices related to the inspection and oversight of the installation of the metal roofing system. Such letters and recommendations provide multiple benefits — the GC or architect is on record to the school district as to his recommendations, which, if accepted, can only benefit the quality of the project and may serve as powerful testimony to his concern for quality control. The cost of prevention is much less than the cost of repair.

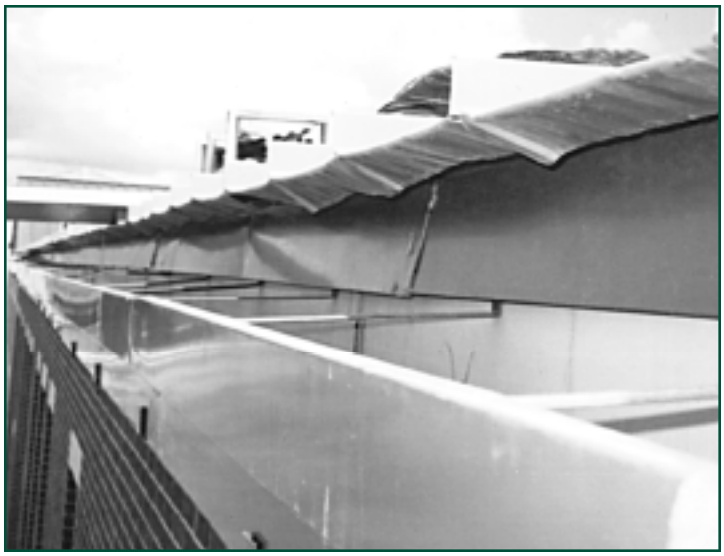

*Figure 5 — View along eave/gutter line of metal roof. The edge is open to water intrusion under the panels and into the building. Building design is zero overhang at eave/gutter and brick wall.*

*Figure 6 — Close-up view of open, unsealed metal roofing panel edges at eave/gutter and wall connections. This is a total waterproofing failure.*

It is estimated that roofing costs in commercial construction represent 5% to 10% of the total project cost. However, it is also estimated that lawsuits related to roof failures represent 70% to 80% of all construction litigation.

Furthermore, since 90% of improper installation procedures are covered and closed to view upon completion, identifying problems can be accomplished only by a qualified metal roofing



  

consultant or by intrusive and destructive disassembly of the installed system. The cost of remedial repairs or replacement of metal roofing systems on occupied buildings can be several times the cost of the original construction. Structural or interior damage due to leaking roofs may result in substantial added costs as well.

It is certainly in the best interest of all parties that the original installation is the right product, the right profile, properly installed and waterproofed, and in compliance with wind uplift and code requirements. Quality control creates a "win-win" situation for everyone associated with the project.

The advice that your grandfather gave you still stands…"Do it right the first time." n

## More reading:

See "The High Cost of Remedial Repairs on Metal Roofing...Why?" by Robert Stanford, reprinted in *Interface* in September 1998 (also on Stanford's website, www.metal-roofs.com).

## About the Author

Robert Stanford

**Robert Stanford** is President of Robert Stanford & Associates, Inc., Metal Roofing Consultants (www.metal-roofs.com), which provides consulting services before and during construction as well as post-construction remedial and litigation support. Mr. Stanford has over 32 years experience in the metal roofing industry, including 25 years experience in the installation of metal roofing systems. He has been engaged as a metal roofing consultant and has testified as an expert witness on projects all across the U.S. He has traveled to Mexico, Puerto Rico, and Korea on consulting and training assignments. Clients include school districts, USACE (United States Army Corps of Engineers), attorneys, building owners, architects, general contractors, surety and bonding companies, insurance companies, and metal roofing manufacturers and installers.

## Court Says Membrane is a "Product"

An Ohio Court of Appeals recently overturned a lower court ruling that a roofing membrane that failed was not a "product" under the state's product liability statute. The Trocal membrane, manufactured by Dynamit Nobel of America Inc., was installed on a Columbus, Ohio, roof in 1983 and "shattered…(due to a)…loss of plasticizer component in its formulation, which resulted in a decrease of elasticity" in 1997, according to the building owner's insurer, because of "a product defect." A judge in 1999 ruled for HPG, agreeing that the membrane was a "fixture" and not a "product," but that ruling was overturned recently (Federal Insurance co. v. HPG International Inc., 758 N.E. 2d 261 [Ohio app.2001)]. The Appeals ruling said the roof was a product because it was "an object that constitutes tangible personal property [and] was delivered…and assembled in a combined state."