



Robert Stanford

Metal Roofing: How Hard Can It Be?

Robert Stanford is a professional metal roof consultant and principal of his firm Robert Stanford & Associates, located in Missouri City, Texas. He has 25 years construction experience in architectural metal roofing systems as well as substantial experience in commercial real estate, property management, sales, and income property analysis. Robert is a licensed contractor in both Texas and Florida, has obtained certification from several manufacturers, and is a member of RCI.

Abstract

The champions and proponents of metal roofing point with pride to great buildings in Europe that have stood for half a millennium or more under the protection and beauty of a metal roof. Boston, Philadelphia, and New Orleans also have buildings with metal roofs, some of which date back almost 200 years. Permanence and beauty proclaim the virtues of metal roofing. From Quonset huts in the South Pacific during World War II to architectural metal roofing systems on domed stadiums in the 1990's, metal roofing has become an international business with annual sales in the billions of dollars. Where does metal roofing fit in the overall roofing industry? What are some of the nuances that impact and control metal roofing? In which ways is the metal roofing industry weak? How does metal roofing affect RCI members? The following perspective provides an overview.

The pre-engineered metal building industry stands alone as a singular construction methodology. High tensile strength steel (100,000 psi and more) is shaped into metal roofs and wall panels. Measured not by the square foot but in tons, this can only be adduced as the metal building and component business. These face-fastened, structural panel systems are by their nature expected to allow water penetration at some point in their life. That's an anticipated trade-off for enjoying the fastest, most inexpensive method of construction available in America.

There is a plethora of metal roofing materials:

sheet lead, stainless steel, steel, zinc alloys, aluminum, copper, lead-coated copper, terne, terne coated stainless, bronze, and gold.



Health facility in Woodlands, Texas. MBCI, Craftsman series standing seam roof was completed in May of 1995. Photos courtesy of Robert Stanford & Associates.



Standing seam roof on architect's home in Houston, Texas, was completed in May of 1995.

All have different properties, thicknesses (gauges), weights, melting temperatures, and thermal and fire spread characteristics. Protective coatings and finishes range from non-coated "black iron" and mill-finished aluminum to metal coatings such as:

red oxide paint primer, G-60 or G-90 galvanized, paint grip, Galvalume, primer paint, 1- 20 year paint finishes, Dexstar 850, Kynar 500, Plastisol, Hylar 5000, Silconized Polyester, Ceramcoat EP-90, Metallic paints, 1- 4 mil paint thickness finishes, one side only coating, . . . and more.

Tensile strengths may range from

40,000 psi or less to 125,000 psi or more for steel. Copper, lead, and gold are soft and malleable with low melting temperatures. Aluminum won't rust but it will corrode. You can't put copper with galvanized, or Galvalume with lead, and there are other no-no's regarding dissimilar materials that include, but are not limited to, such items as paper underlayment under the metal roof, fastener selection and choices, and the sealant or waterproofing materials.

Profiles for metal roof panels include:

horizontal "Bermuda Shake" design, sheet-stamped metal tiles and shingles, snap-on standing

seams, low profile and high profile panels, commercial standing seams produced as structural panels made to span open framing, trapezoidal shapes, residential standing seam profiles that require solid decking substrate, agricultural "barn metal" in another dozen corrugations and profiles, mechanically-seamed systems with profiles that have been appearing in drawings and on buildings for hundreds of years, "flat seams", "double locks".....believe it or not, the list goes on.

Copper is sold by weight per square foot, aluminum is measured in thickness by thousandths of an inch, and steel is produced in different gauges (a measuring system wherein the higher the gauge number, the thinner the metal. Thirty gauge steel can be torn by hand; 22 gauge is thick enough to be used in structural applications). Face-fastened systems, concealed fastener systems, metal roofing with structural holding clips, floating clips, and thermal blocks are all available. Seam height may range from one to four inches. Standing seam systems that clip, zip, and pop are all part of the industry. Some profiles can be removed and re-installed without damage; others would be destroyed and rendered unusable if removed following original installation. Some profiles and installation methods produce UL rated systems; others are non-UL rated systems. There are systems designed for low slope roofs (3 inches per foot or less), while others are designed and used in mansard or near-vertical applications. Some systems have no seam sealant or inserts. Others employ rubber, vinyl, mastic, and butyl tape seal or caulking as waterproofing methods. Sealants may be acrylic, silicone, urethane, or other depending on the metal roof manufacturer, panel profile, and application. Some persons argue that these are dissimilar materials and will not survive or function as designed (or desired) for the life of the metal roof system. They point out that vinyl dries up and becomes brittle, cracks, and shrinks. Sealants may lose elasticity and the ability to be a long-term solution for weathertight applications. These become powerful arguments during summertime when the surface temperature of a metal roof can



Commercial standing seam roofing system on an elementary school in Alief (Houston area) was completed in November of 1993.

reach 170 degrees F or more. Each of these profiles, metals, and gauges, may have its own array of accessories and instructions for installation. Fasteners, sealants, closures, flashing details and accessories, and a dozen or more other items may be required for a single system. Manufacturers produce installation manuals and conduct schools to provide the industry with qualified contractors who can and will properly install their metal roof systems.

It has been difficult for the metal roofing industry even to know its place. Architects use as their reference Bible and "final word" the *Architectural Sheet Metal Manual*, published by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA). This wonderful and highly professional work, first published in 1965, has almost 400 pages of metal roofing and sheet metal profiles. It features drawings with such

artistic form that they are called "plates". (SMACNA also makes available a reprint of the *1929 Standard Practice in Sheet Metal Work* publication.)

The construction business is dollar driven. Qualifications, training, skill, and experience are often sacrificed in the environment of competitive pricing. Frequently, inexperienced workers are taken from performing hard manual labor on the ground and moved to positions requiring skilled labor on the metal roof. When this happens, roofing systems that require competent levels of experience are installed by persons lacking the necessary skills. The result? Quality products that *should* serve the building well for a lifetime fall short of intended performance and lose credibility for the industry.

I believe this can mean opportunity for RCI members. Qualified metal roof

consultants should have a bright future. Many commercial metal roof projects are involved in litigation that can take years for resolution. Quality-minded manufacturers, large and small, yearn to see their product properly installed and used. Some persons feel that architects have sold their birthright and have given up job inspection and control in order to compete with lower fees. Even so, the architects still get named in litigation when the "low bidder" does a poor or incomplete job installing a metal roof. Insurance and bonding companies sometimes rush into bad, troubled jobs, and may want to do a band-aid repair ("Let's get 50 guys with caulking guns so we can stop the leaks") when the only real solution may be to tear it off and put it back on properly.

Summary

Every commercial metal roof job should have a qualified, third party metal roof consultant to inspect, observe, and report construction activities. Quality manufacturers are willing to offer a 20-year weathertightness warranty if they can be assured that their system is properly installed. Most problems found in metal roofing occur in that portion of the system that is no longer available for visual inspection after it has been installed. By using an ongoing inspection process and working with the contractor, owner, architect, and manufacturer in close knit teamwork during the installation period, the consultant can help achieve better jobs and brighter days for all parties. Isn't that a worthwhile goal? Metal roofing: how hard can it be?

Member-Add-a-Member Contest

Time is running out! Since last April, RCI Headquarters has been keeping a tally to see who brings in the most new members during 1995-1996. The winner will be announced at our convention in Richmond, Virginia, April 13-18, 1996.

Each regional winner will receive a full year of free meetings in his or her region. Plus, the grand winner will be entitled to free registration for next year's convention.

But remember: in order to qualify, you **must** make sure the new member lists you as the referral on his/her membership application form!