

CASE STUDY

# ROOFING & SOLAR

**MBMA**

METAL BUILDING MANUFACTURERS ASSOCIATION®  
Research | Leadership | Education





Grand Valley State University • Allendale, Michigan



Anastasia Mosquito Control District • St. Augustine, Florida





## EXCELLENCE IN ROOFING SYSTEMS & SOLAR PANELS

One of the most important technological advances in building construction is the standing seam metal roof. This system is used on virtually all metal buildings and many traditional structures due to its long lifespan, aesthetic appeal, and ability to withstand extreme weather such as high winds, heavy snow, hailstorms, and wildfires.

Each metal roof provides a weathertight seal and accommodates expansion and contraction. As a result, the standing seam metal roof fulfills a building owner's need for durable, long-term protection against virtually any type of weather. Billions of square feet of standing seam metal roofing is installed annually, underscoring the system's popularity and performance. Used for both new roofs and re-roofing, studies confirm that standing seam metal roofs are among the most cost-effective roofing systems available.

Metal roofing has an exceptional track record in new construction, where it is used in about two-thirds

of low-rise commercial and industrial buildings. The roof system is lightweight (about 1-1/2 lbs. per square foot) and has characteristics only available from a metal roof solution:

- With interlocking seams, a standing seam roof can cover a building with minimal penetration by structural fasteners.
- Weathertight seams are raised above a roof's drainage plane and serve as a water barrier.
- Special sealants are factory-applied inside the seams during roll forming of the roof panels for increased protection from seepage.
- Automatic field seaming machines produce weathertight connections between the metal roof panels.

In addition, metal roofing provides pathways for drainage of rain and snow, and solves ponded water problems as well as leaks and related challenges



Stony Creek Brewery • Branford, Connecticut



sometimes associated with flat roof systems. The panels also provide a respected retrofit option for built-up and single-ply roof systems. Since the metal panels may be installed directly over an existing roof, this option eliminates costly and time-consuming tear-offs and product disposal.

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 is available from attractive specially pigmented fluoropolymer paints that aesthetically harmonize the roof with conventional brick, concrete and wood sidewall materials, as well as enhance other design elements used on the building exterior.

## THE SOLAR SOLUTION

Metal roofing provides a logical substrate for crystalline/silicon solar arrays. Racks are easily installed on a standing seam metal roof and the fasteners are hidden underneath the roof panels and lock directly onto the standing seams. The clips are especially beneficial because they do not require any penetration of the roof itself. Penetrations can lead to water seepage and reduce a roof's life cycle. Metal roofs also accommodate laminates that can adhere directly to them.

They also provide an installation advantage. Solar cells are easily broken and have delicate wiring, so they need solid support such as that provided by an aluminum and glass encasement. On most asphalt shingle roofs, a racking system is anchored to the





roof by drilling into its surface. Any roof penetration is, in the long run, a potential leak; and wind action on the panel can pull on the fasteners. This may widen the roof holes over time. Mounting to a standing seam metal roof is a better option. Panel mounts can be clamped directly to the standing seams of the roof panels, eliminating any penetrations as well as the need for a racking system.

Life expectancy is another reason why metal roofs are best suited for solar arrays. The expected service life of a metal roof—recently shown to be 60 years or more—is a better match for the service life of solar panels. The warranted life of today's solar

*Life expectancy is another reason why metal roofs are best suited for solar arrays. The expected service life of a metal roof—recently shown to be 60 years or more—is a better match for the service life of solar panels.*

panels is 20-25 years and many of them prove to remain functional well after that. Few commercial roofs – other than metal – will last as long as the solar panels. So, all solar panels must be removed and reinstalled each time a roof is replaced, adding time and cost and potentially causing damage to the system.



# CASE STUDIES IN ROOFING EXCELLENCE



Hawthorne Global Aviation • Prospect Heights, Illinois

## **HAWTHORNE GLOBAL AVIATION SERVICES**

Hawthorne Chicago Executive Airport's 30,000-sq.-ft. hangar accommodates a wide range of aircraft, with a 28-ft. by 160-ft. door. The bright and airy facility provides luxury amenities for executive travelers, including a conference room to accommodate 10 people, workstations, and an executive lounge. The metal building was chosen to offer architectural integrity. The standing seam roof, with a cool roof coating that includes R-30 installation, helped the airport developers achieve their aesthetic and environmental goals. Located in the Chicago, Illinois suburb of Prospect Heights, the metal roof withstands significant snow loads and the harsh, beating winds common to cities on the shoreline of Lake Michigan.

## **IMMACULATE CONCEPTION CATHOLIC CHURCH**

Vega, Texas is a small farming community in the panhandle of Texas, with its nearest big city, Amarillo, 40 miles away. The Catholic community in this town of less than 1,000 people needed an attractive new church—one the parishioners' budget could handle. The solution was a metal building system with an attractive brick exterior, topped with a standing seam metal roof. The roof, rated to 140-mile per hour winds, was a logical solution to withstand west Texas' harsh climate.



## DUNDEE TOWNSHIP FIRE STATION

In the southeast corner of Michigan, Dundee Township is home to just under 4,000 people. Though small, the community funded a fire station that was not only cost-effective but provided a strong architectural statement. The clearspan, open interior 8,250-sq.-ft. equipment bay provides for vehicle storage and includes a 1,280-sq.-ft. mezzanine. An additional 5,400 sq. ft. provides for offices, a conference room, a kitchen and pantry, and housing for firefighters. The design offers an attractive roof height elevation change, dormers, and cupola—all capped with a bright red metal roof to match the life-saving rescue equipment housed inside.



Immaculate Conception Catholic Church • Vega, Texas



Dundee Township • Dundee, Michigan

## WALMART

An average annual snowfall of 80 inches created problems at the Walmart in North Conway, New Hampshire. Dangerous snow slides occurred, requiring closure on areas around the front entrance to assure the safety of patrons and employees. Walmart's Construction Management group, in coordination with BRR Architecture of Bentonville, Arkansas, and general contractor, Bast Hatfield of Clifton Park, New York contacted metal roof contracting specialist Jottan-Jorel of Evans City, Pennsylvania. Jottan-Jorel completed installation of a high-quality snow retention system onto the existing metal roof in a matter of days that is guaranteed to perform for the life of the roof.

Walmart • North Conway, New Hampshire







Midway Market & Car Wash • Ostrander, Ohio

## MIDWAY MARKET & CAR WASH

This convenience store, car wash and Shell gas station in Ostrander, Ohio, is a prime example of how form and function blend beautifully within a metal building system. Here, one of the highlights is the detail in and around the roof area. Dormers, gables, soffits, canopies and a clearstory element accentuate the drama of the expansive and distinctive metal roof. The dormer details were particularly difficult, but working with the metal building manufacturer, the contractors were able to assure a leak-tight fit for this complicated construction challenge.

## ROCK CREEK CURLING CENTER

Calcon Constructors built this two-story, 32,598-square-foot curling center in Lafayette, Colorado, which features an inventive roof layout that accentuates the building's powerful design objective. Envisioned by the architectural team at Farnsworth Group, Inc., the building highlights include a curling rink, a two-story viewing area, an outdoor patio, a pro shop, a kitchen and a bar, indoor/outdoor fireplaces, and lockers and restrooms. As often happens with metal building technology, the contractors were able to expedite construction, adhering to a brief 13-month completion schedule.

Farnsworth's design solution marries the efficiency of a metal building system with upgraded exterior finishes to create both an expressive and efficient facility.



Rock Creek Curling Center • Lafayette, Colorado



Boeck Seed Services • Exeter, Nebraska

## BOECK SEED SERVICES

In Exeter, Nebraska, Schwisow Construction brought new life to Boeck Seed Services' facility by expanding it substantially and providing complex renovations. With the help of Davis Design, the construction team completed an addition to an existing metal building, enhancing the work environment by adding high-end interior finishes. Selective removal of the existing metal building wall system allowed seamless expansion into the existing office.

For the exterior, roof extensions, canopy overhangs, soffits and roof height changes were required to accommodate the upgraded design. This included 80 feet of roof height increase from the lower office addition to the higher common shop wall. Also, due to the 3:12 roof pitch, clearance at the low eave—where the main entrance is located—required special coordination.



## HAMSTRA HEATING & COOLING, INC.

Heating and cooling need not be boring. This statement is underscored in the beauty of this Tucson, Arizona structure. Separated into office and display areas, as well as warehousing, the building features a faux rust finish installed vertically on girts, with end walls installed horizontally on inset studs. The canopy is a metal standing seam roof, also with a faux rust finish. The structure is connected to a rainwater harvesting system that incorporates a tank and storage tower.



Hamstra Heating & Cooling, Inc. • Tucson, Arizona

## GLOBAL ARCHERY

Global Archery is headquartered in a 1980s-era metal building in Ashley, Indiana. With over 40 years of useful service, this facility's metal roof was in need of replacement. The solution was to place a new metal surface over the existing one. The re-roofing of more than 20,000 sq. ft. was accomplished using structural factory-notched sub-purlins and a 24-gauge, 180-degree roof panel system. The 4.5-inch height of the vintage roof allowed for 6 inches of unfaced fiberglass insulation to be installed between the old roof and the underside of the new one, adding energy efficiency to the facility. The metal-over-metal roofing provides a solution to serve the facility for decades to come.



Global Archery • Ashley, Indiana





## CASE STUDIES IN SOLAR: THE NEW NORMAL



### WORD OF LIFE CHRISTIAN CENTER

Utility costs in Hawaii are higher than those in other states in the U.S., so it's wise to install solar panels on large facilities and take advantage of the state's plentiful sunshine. After repairing a 30-year-old standing seam roof, the Word of Life Christian Center in Honolulu installed an 82-kW solar array. The panels were attached with approximately 450 clips that didn't require penetration of the roofing material since metal roofs are manufactured to be solar-ready.

The addition of the solar panels required no money down and allowed the congregation to save money by using their own solar power and by selling unused electricity back to their local power provider.



Word of Life Christian Center • Honolulu, Hawaii





Harvest Hill Golf Course • Orchard Park, New York

## HARVEST HILL GOLF COURSE

Harvest Hill Golf Course in Orchard Park, New York is a world-class, 18-hole facility. It was expanded to include a new clubhouse, two cart houses, and a tournament pavilion. Upon completion, the Harvest Hill staff contracted Frey Electric to install a solar harvesting system for the cart house structures with the goal of partially offsetting energy costs. Because the steep slope allows snow to shed quickly from the PV modules mounted on a metal roof system, the energy output is higher than the originally projected values and is anticipated to provide 20% of Harvest Hill's annual power requirements.













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