

## **STRETCHING YOUR ROOFING DOLLARS WITH METAL RETROFIT**

by

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Retrofitting flat roofs with sloped metal roofs is a concept that's tailor made for these declining economic times.

Interestingly, of the 40 billion square feet of roofing annually installed in the U.S., only a fraction of that amount entails retrofitting roofs with sloped metal systems.

Yet, replacement and repair continues to account for approximately 75 percent of all roofing work, and industry sources suggest that some 30 billion square feet of roofs will be in need of major repairs in 2009.

Adding slope to an existing flat roof can generate a strong return-on-investment in the form of lower energy costs and little or no maintenance for decades. In most circumstances, this can be accomplished without having to remove the existing flat roof.

A slope as low as ¼" per foot is sufficient to satisfy most metal roof warranties and can be achieved by installing light gauge steel columns in varying lengths. After the variable height columns are installed, steel purlins are positioned between each of the columns and the necessary bracing is installed. A new metal standing seam roof panel system is then placed on top of this sub-framing system. When the job is completed, it's almost like having a small metal building sitting on the original roof.

### **Sloped metal roof should last 30 to 50 years**

If properly maintained, the exterior surface should last at least 30 to 50 years. The exterior surface, whether painted or bare, can reflect up to approximately 80% of the solar energy that would normally penetrate the building. Adding un-faced fiberglass insulation in the newly created cavity can further increase the building's ability to conserve energy used to control temperatures in interior spaces.

In today's market, the cost of adding a sloped metal roof system over an existing roof is, in most cases, less than the cost of removing a flat roof, placing the removed materials in a landfill, and replacing it with a Built Up Roofing (BUR) or Modified Bitumen Roof with tapered insulation. (Tapered insulation is required by most code authorities to achieve a certain level of roof slope.)

Environmentally conscious building owners and managers will relish the fact that metal framing systems, roof panels and trim are manufactured from recycled materials and are themselves more than 80 percent recyclable. In essence, sloped metal roofs are the ultimate in "green" building products.

### **Retain old roof when retrofitting with metal**

Owners who may not be looking to add slope, but simply want to replace their existing sloped metal roof can do so, again without the expense and hassle of removing the original roof. It's simply a matter of positioning a light gauge structural member, notched to span over the original roof's ribs or corrugation, directly over the building's framing system. The member is attached to the roof purlins through the bottom flange of the member and the existing roof sheet. A new standing seam metal roof is then attached to the new member. The cavity between the old and new roofs can be used to add insulation, which should allow the retrofit process to begin paying for itself quickly.

Another reason to consider re-roofing over an existing sloped system is that the existing roof often fails to meet current code requirements for wind uplift. For metal roofs installed on pre-engineered buildings, the standard 5-foot purlin spacing often will not satisfy panel clip spacing requirements in edge and corner conditions necessary to satisfy design loads established in current building codes.

In metal roofs installed over solid metal decks, the panel's clips are often misplaced to satisfy uplift loads and panel capacities. Placing the new structural member properly can correct these deficiencies without the need to remove the existing roof.

A metal-over-sloped retrofit also introduces the possibility of utilizing the newly created cavity between the old and new metal roof surface to provide natural convective cooling. This phenomenon is known as Above Sheathing Ventilation (ASV). By providing a continuous air gap from the eave to a ridge and venting the warmer air, the energy efficiency of the new roof assembly can be improved. Tests at Oak Ridge National Laboratory have demonstrated that this natural ventilation can reduce heat flow into the building up to 30%. It costs practically nothing yet yields significant savings.

Other systems can be added to metal-over-sloped retrofits to reduce energy consumption. One system that works on a similar principle as ASV is Solar Thermal Heat Recovery. This uses air heating and ventilation collectors integrated into a photovoltaic system. They use air as the heat transfer circulating fluid. Building owners that install such systems are eligible for Federal solar energy tax credits up to 30% of the entire roof system, with no dollar limit. When combined with a special accelerated depreciation, the tax credits can pay for more than half of the retrofit improvements, which does not even include the energy cost savings from the system.

Another energy saving system that can be integrated into a metal-over-sloped retrofit is Solar Water Heating. This type of system can help to serve the hot water requirements of the building and thereby reduce energy consumption. In fact, solar water heating can be incorporated into a solar thermal heat recovery system. With either of these systems, the new metal roof can easily accommodate the necessary solar energy hardware.

**Professional engineer should provide structural calculations**

Whether adding slope to an existing flat roof or re-roofing an existing sloped metal roof, a professional engineer should be engaged to perform the necessary structural calculations. Choose someone who is familiar with light gauge framing and metal roof structural components and testing.

Adding a structural metal roof to an existing building is a smart decision because the system will last for decades. It is also an environmentally responsible choice since metal roofs are manufactured from recycled materials, and the system itself is considered almost 100% percent recyclable. Moreover, a metal roofing system allows the use of additional insulation and the installation of solar panels that reduce reliance on electric energy.

When taken together, these factors can enable a metal roof to pay for itself quickly and to continue generating a return on investment for the building owner well into the future. For most buildings, a new metal roof will be the last roof required.

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