

PROVEN RETROFIT SOLUTIONS



LSI GROUP^{INC.}
METAL BUILDING COMPONENTS

METAL-OVER-METAL RETROFIT SOLUTIONS

Millions of Square Feet Installed Since 1991
A Member of LSI Group, Inc.

ROOF HUGGER[®]

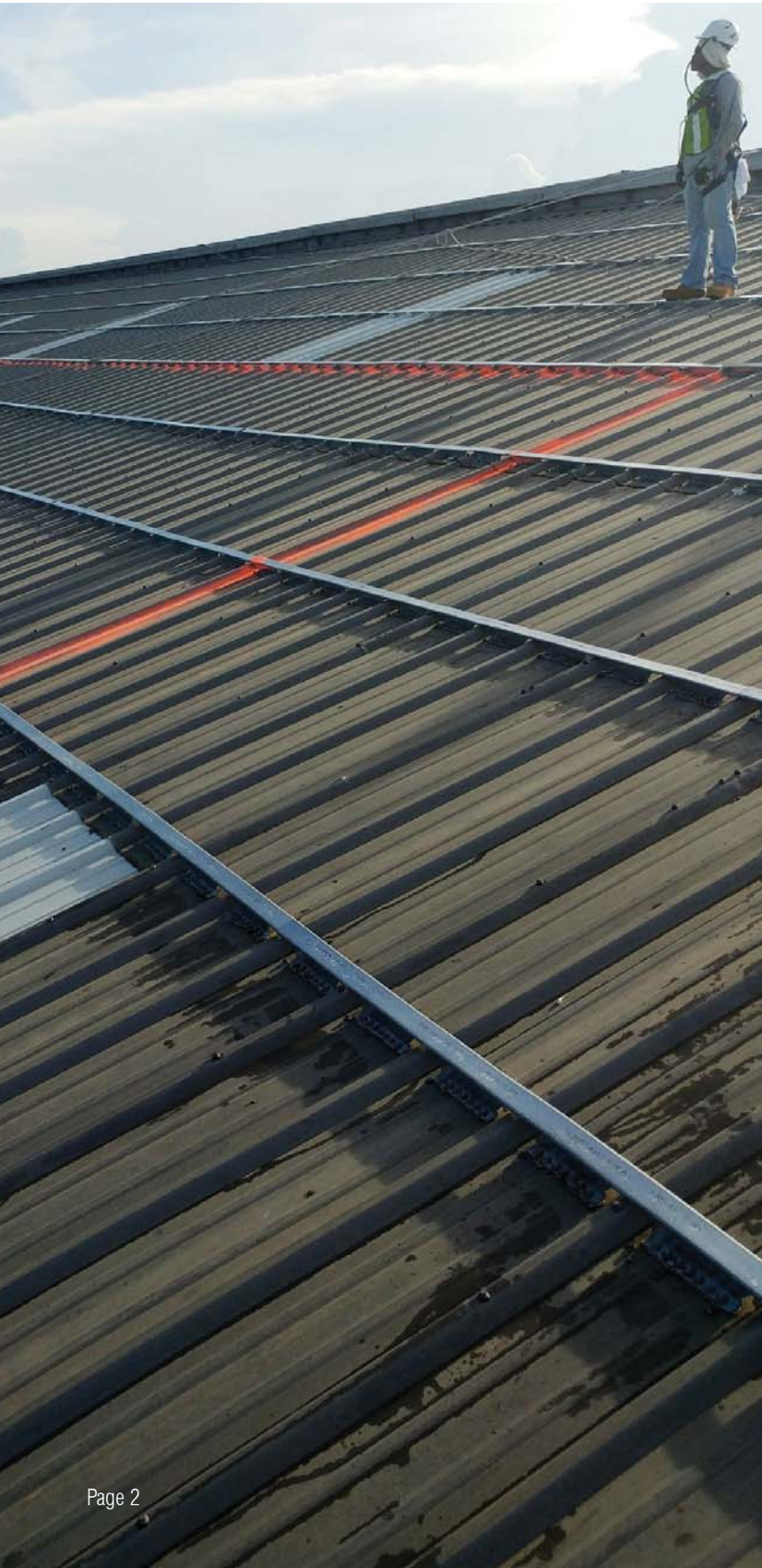


800-771-1711
www.RoofHugger.com

METAL-OVER-METAL RE-ROOFING

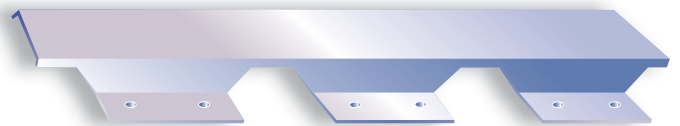
What is Metal-Over-Metal Re-roofing?

Metal-over-metal re-roofing or retrofitting is the installation of a new long-life metal roof over the existing metal roof in a structurally correct, non-disruptive, and cost effective manner.



BENEFITS:

- No more roof leaks
- No business interruption
- Significant time and money savings
- 60-Plus year new roof service life, lowest lifetime cost
- Allows easy upgrade from screw-down roof to standing seam roof
- Increased energy efficiency and reduced power consumption
- Comply with current and more stringent building codes
- Labor savings, fast project completion
- Perfect platform for adding renewable solar energy systems
- Tax Advantages:
 - IRS Section 179D tax deduction for qualified business property currently allows \$1 million deduction per qualified item up to \$2.5 million maximum per year.
 - This means the entire cost of retrofitting your old roof may be tax deductible. Check with your Tax Professional as these rules change annually.



Roof Hugger has "Hugged" over 90 Million square feet of existing metal roofs. With the multitude of available Hugger factory-notched profiles having grown to include virtually every old metal roof configuration, they have been installed throughout the United States, five foreign countries and elsewhere offshore. Our client list includes the Army, Navy, Air Force, Marines, Coast Guard, State and Private Schools, Departments of Transportation, Utility Companies, Car Dealerships, Mini Storage facilities, Port Facilities, Airports and more.

FACTORY-NOTCHED SUB-PURLIN SYSTEMS

Roof Hugger Retrofit Sub-Purlins are zee-shaped structural members that are typically 10 to 12 feet in length. They are made from 16 Ga., 0.060" Min., 50 KSI structural grade G-90 galvanized steel and specifically notched to fit over the ribs of the existing metal roof panels. **This factory notching provides a correct "structure to structure" connection with the least possible increase in assembly height.**

In addition, our systems can add strength to the existing roof system thus assisting in offsetting the added weight of the new Metal-over-Metal roof components. **Roof Hugger sub-purlins can be fabricated for almost any existing metal roof panel profile including screw-down and standing seams and custom heights to accommodate for added insulation between the old and new roofs.**

STANDARD PRODUCTS:

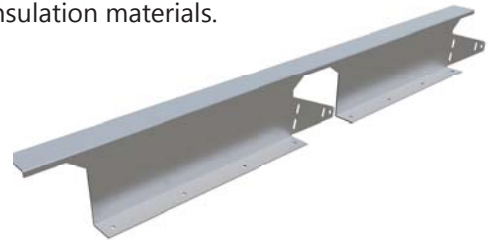
Model C

1.83" tall Model "C" for typical 12" on center rib PBR or other custom sizes for 6"-12" o.c. ribbed panels.



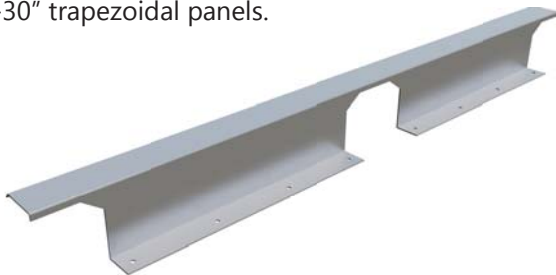
Model T

4.5" Tall Model T for typical 24" on center rib trapezoidal standing seam panel mounted on standoff clips or other custom standing seam panel sizes 12" to 30" mounted on standoff clips. This part employs a patented "anti-rotational" arm to stabilize the Roof Hugger Framing System that is attached over compressible insulation materials.



Model D

4.5" tall Model "D" for typical 24" on center rib Trapezoidal Standing Seams or other custom sizes for 12"-30" trapezoidal panels.



Vertical Rib Standing Seam

2.75 Roof Hugger Sub-Purlin for Vertical Rib Standing Seam Panels typically from 12"-30" o.c. Also available for Vertical Ribs Systems installed with "Standoff Clips". Custom Sizes Available.



Custom Sub-Purlin

Custom size Roof Hugger Sub-Purlin made to fit any specific corrugation and built to any specified height and flange dimensions (some limitations apply).

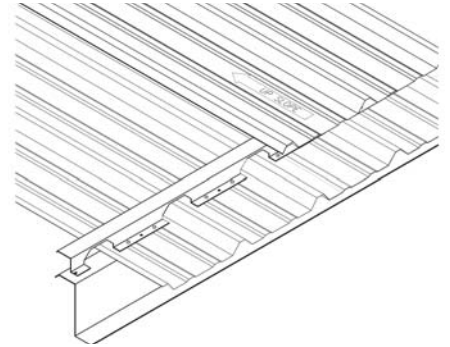


Our factory-notched sub-purlins can be fabricated to adapt to most panel rib spacing and height, special roof conditions or specific depths of new insulation. Refer to page 5 for more information.

ROOF HUGGER SUB-FRAMING SOLUTIONS FOR VIRTUALLY ANY METAL ROOF

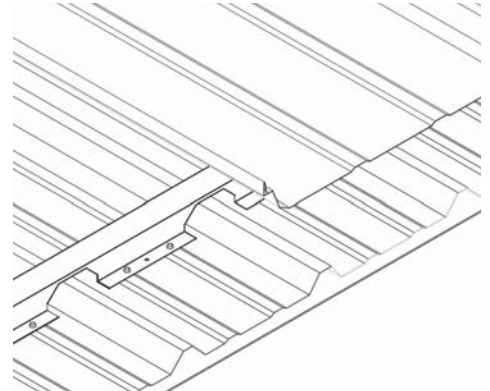
"R" PANEL OVER "R" PANEL

The 12" o.c. ribbed "R" Panel is the most common existing panel on older metal buildings. Roof Hugger mass-produces a part that will fit most but not all existing "R" panel roofs. This part is an inventory item ready for immediate shipment. Thermal efficiency can be increased by ventilating the new cavity and/or adding insulation. Taller Huggers can be custom-produced to accommodate any new insulation depth.



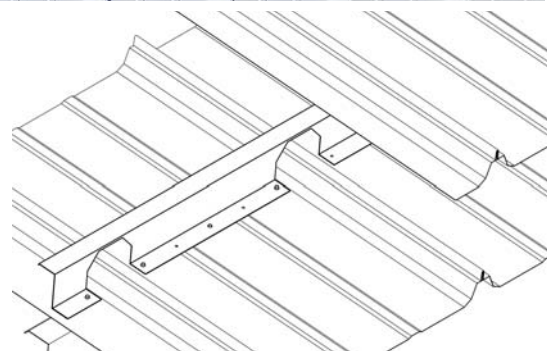
STANDING SEAM OVER "R" PANEL

Another typical installation is a new standing seam panel roof installed over an old screw-down roof system. This upgrade eliminates the problems inherent with thru-fastened panels. Leaving the existing roof in place also eliminates the need for major bracing modifications to the existing purlin system to make it suitable for installing a new standing seam roof.



STANDING SEAM OVER STANDING SEAM

Another common installation is a new standing seam panel installed over an existing standing seam roof system. Rib spacings vary from 12" to 30". Roof Hugger can produce a sub-purlin to fit any existing standing seam profile making retrofitting these roofs fast and easy.

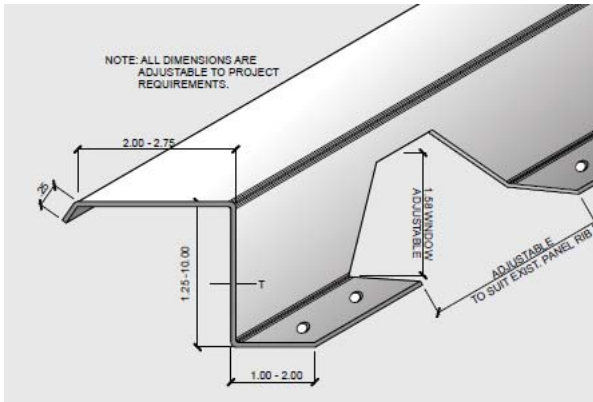
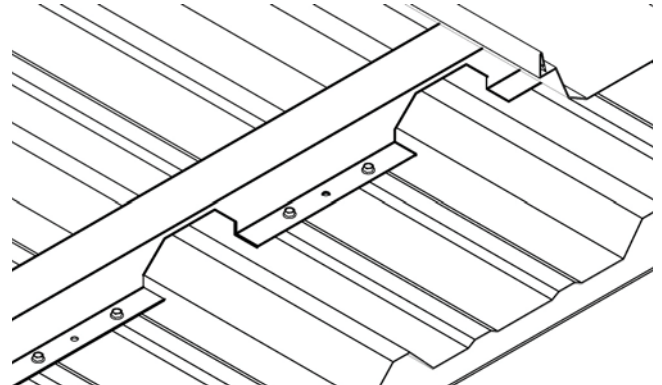


Special Size Roof Huggers are NEVER a Problem!

Roof Huggers are made from 16 Ga., 0.060" Min., high strength, 50 KSI galvanized steel and produced by automatic computer controlled punching equipment. This allows us to easily control the flange size, opening sizes and fastener spacing.

All dimensions can be specified individually to suit project needs.

If you have a special condition such as adding a specific depth of rigid or fiberglass insulation; or a larger top flange for a special panel clip... just let us know, we can produce exactly what you need!



Typically, the Huggers are over cut 3/4" to 1" wider and about 3/8" to 1" taller than the existing ribs to allow for some "run-out" of the existing panel. Some panels however may need more clearance. Roof Hugger recommends that you measure the existing panels over a 10' to 20' distance to confirm the actual "In-Place" module of the existing roof panel ribs to insure an accurate part fit. We will provide job information forms to make measuring easy.

Roof Huggers are typically shipped in 10' to 12' lengths, as based on existing panel rib spacing. Longer lengths may be available upon request.



Removing "Lean-To" Steps Made Easy

You can use TWO DIFFERENT SIZE Roof Huggers to remove troublesome roof steps created when a "lean-to" was added to an existing building. No more awkward flashings and closures. No more leaks and a beautiful roof, ALL ON ONE PLANE!

In the photo to the right, a 2" roof step was removed using 4-1/2" and 6-1/2" Roof Huggers



Using any 2 different height Roof Huggers to remove a roof step.

CORRUGATED ROOF PANELS



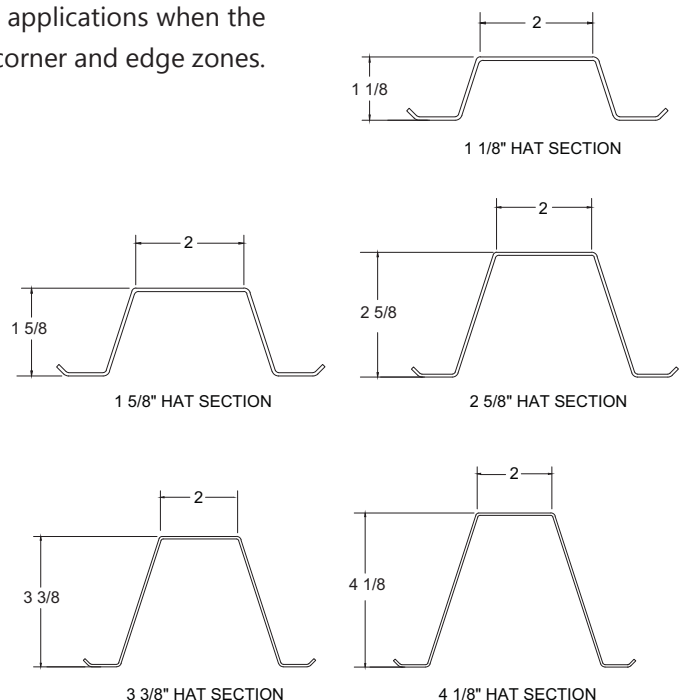
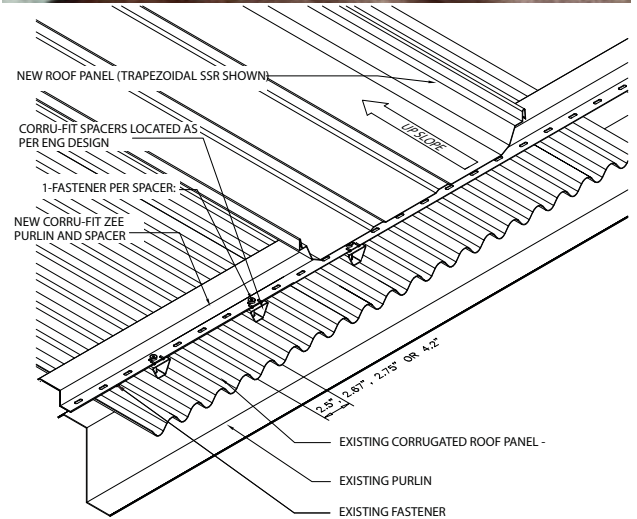
There are countless old corrugated roofs out there with 2.5", 2.67", 2.75" and 4.25" rib spacing as well as other ribbed type panels such as the 7.2 Industrial Rib roof panel. These roofs are commonly problematic because the rib spacing is typically inconsistent, thus not permitting a standard factory-notched Hugger sub-purlin to be used. With our CORRU-FIT sub-framing system, these roofs are easily retrofitted using a structural "Spacer" that is installed in the "Valley" of the corrugation or lowest part (pan) in order to receive a factory-slotted zee-shaped purlin. The best part is, only one special fastener is used to secure both the Spacer and the purlin to the existing roof purlin.

Height of the Spacer is subject to the depth of the existing roof panel rib. The Spacers are installed at intervals based on design requirements to meet wind uplift loads. All components of the system are made of structural grade, G-90 Galvanized steel. The special fastener is included with the system. CORRU-FIT has been laboratory tested for ASTM E-1592 wind uplift resistance.

16 GAUGE STRUCTURAL HATS

Our hat sections are structural grade framing members that can be used in a multitude of applications. They are used in some of our Metal-over-Metal applications when the new metal roof system requires additional framing at the roof's corner and edge zones.

- Lengths available from 6 to 21 feet
- 2-inch wide top flanges
- Available in five heights from 1-1/8" to 4-1/8"
- Roll-formed, structural grade, 16-Ga., 0.060" Min., 50 KSI, G-90 galvanized steel.



SPECIAL CONSTRUCTION SOLUTIONS

EXISTING FASTENERS

Typically the existing fasteners can remain. Most "R" panel roofs are installed with the fastener near the high rib of the panel. Even though the Roof Hugger may rest upon this fastener it will bend the base flange but not create a problem. Larger headed fasteners located in the center of the existing sheet pan can cause the Huggers' to roll or porpoise and those fasteners would need to be removed.



Existing fasteners usually do not have to be removed

Standing Seam Roofs with Standoff Clips and Thermal Blocks:

Roofs with standoff clips and/or thermal blocking require special Huggers with anti-rotational arms and custom fasteners. Tell Roof Hugger if you have that condition to assure correct design and pricing.



New Trapezoidal standing seam being installed over an old Vertical Rib standing seam with stand-off clips.



Roof Hugger has a special patented system to retrofit high-clip standing seam roofs.

These uniquely designed Roof Huggers represent the first and only re-roof sub-framing system specifically engineered to retrofit standing seam roofs originally installed with standoff attachment clips.

The Huggers employ unique fasteners that hold the part firmly on the pan of the existing panel but above the purlin while providing the needed structural attachment. The special patented "Anti-Rotational Arm" prevents the Huggers from pivoting on these fasteners and rolling up or down slope. The perfect solution to a difficult re-roofing project.

This system can also be useful in high snow load areas to help control drag loads on the panels.

Standoff Clip & Thermal Blocking



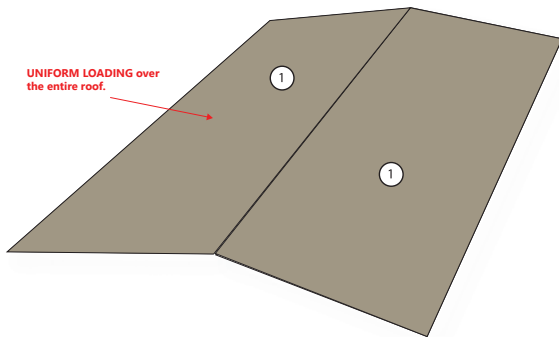
Typical standoff clip assembly for trapezoidal standing seam panel.

ROOF DESIGN BASICS/CORNER-EDGE STRENGTHENING

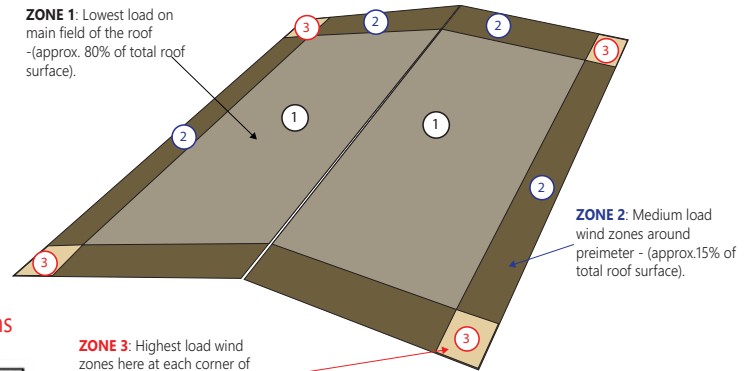
Ever wonder why it is necessary to add framing in the corners and the edges of an older metal buildings when reroofing?

It is because of the differences in the Pre-2002 building code and the new building code. Old code buildings have roofs designed with a uniform loads unlike today's buildings.

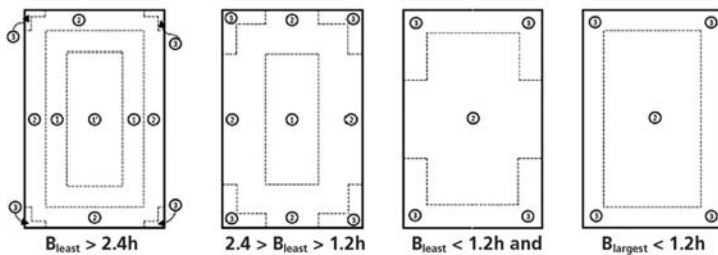
Older Building Code Roof Plan (1-1/2:12 Pitch or Less)



Current IBC 2015/ASCE 7-10 Building Code Roof Wind Zone Plan (1-1/2:12 Roof Pitch or Less), divides the roof into zones and each zone has its own design pressure.



Latest Version of IBC 2018/ASCE 7-16 Building Code Wind Zone Roof Plans



B_{least} – least horizontal building dimension
 $B_{largest}$ – largest horizontal building dimension
 h – mean roof height

ZONE 3: Highest load wind zones here at each corner of the roof - (approx. 5% of total roof surface).

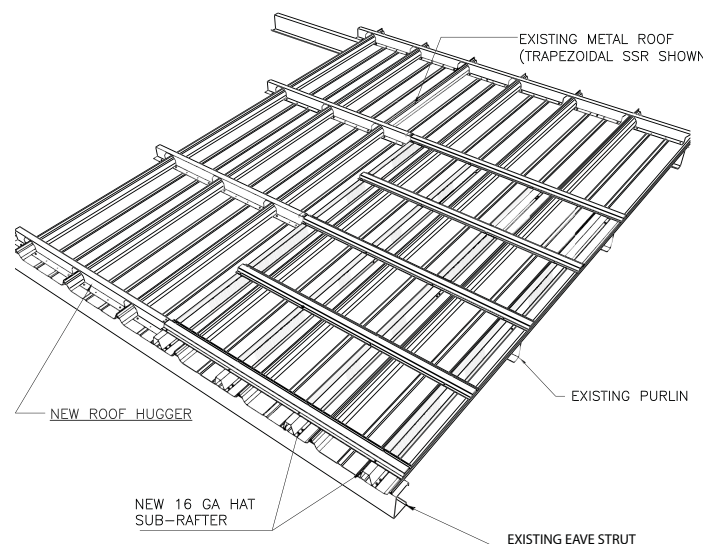
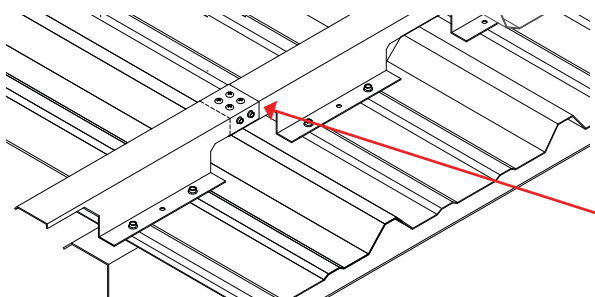
Although not widely adopted at this time, the 2018 IBC will further increase the number of roof zones for Wind and Snow loads. See drawings to the left.

NEED HELP? CALL Roof Hugger, we will review the current building code in your area and estimate the wind and snow loading requirements. Third-party engineering is available to produce permit drawings and confirm all loads.

Roof Hugger has designed corner and edge framing on top of the existing roof panels to reduce the purlin spacing and correctly support the new panels to meet the higher design loads.

By using a combination of structural members running upslope (Sub-Rafters) and parallel to the existing purlins (Sub-Purlins) spaced to provide proper panel support, the proper loading is achieved. Once out of the high load zone we transition back to the easy to install Roof Hugger Sub-Purlins. In many cases where we have tested assemblies, the Sub-Rafters can be made to fit inside the Roof Hugger cutouts lowering the overall framing height and project cost. We call this system "Integral Framing".

Roof Hugger sub-purlins have the ability to add strength to the existing purlins. This is important because most retrofit systems just add weight.



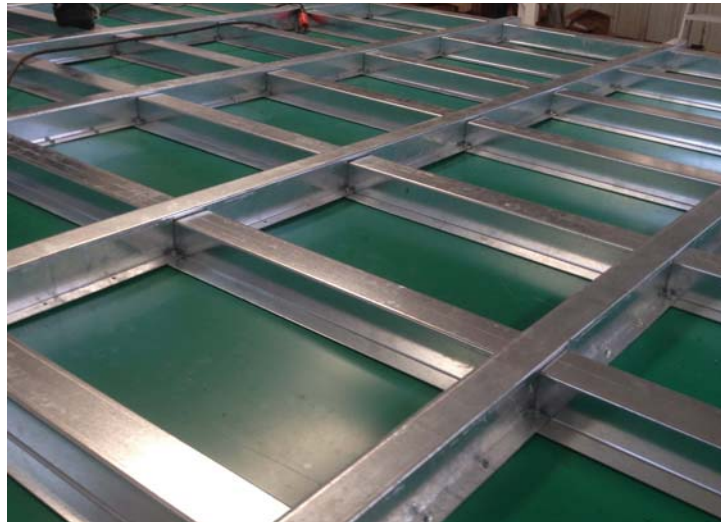
This drawing shows how the Roof Hugger assembly is secured with our unique attachment system which typically strengthens the existing purlins. Roof Huggers strengthen the purlins allowing them to easily handle the additional retrofit weight.

WHY ROOF HUGGER IS THE SUPERIOR SUB-FRAMING SOLUTION

TESTING - TESTING - AND MORE TESTING!



Prior to new panel installation for ASTM E1592 testing



Reinforced corner zone test assembly

E-1592 TESTING OF STANDING SEAM PANELS OVER ROOF HUGGERS



ATSM E 1592 test with pressure being applied.



Testing after panel failure.

OTHER ROOF HUGGER TESTING INCLUDES:

- Screw down over screw down panel systems
- Standing seam over standing seam systems
- Standing seam over screw down systems
- Reinforced gusseted systems
- Drag load testing
- Roll-over testing
- 9 Florida Product Approved Assemblies
- 1 Factory Mutual Tested Assembly
- Base load testing
- Diaphragm testing

ROOF HUGGER IS SPECIFIED AND USED BY:

- United States Air Force, Army, Coast Guard, Corps of Engineers, Marine Corps, Navy and NASA with over 3-Million Square Feet of Facility Roofs
- State and Local Governments
- Port Authorities and Warehousing
- National Airlines and Local Aircraft Hangar Facilities
- Mini-Storage Complexes
- Churches and Education Facilities
- Utility Companies
- Retail Sales and Auto Dealerships

When you compare retrofit framing systems, look at the test data. Calculated load capacity test data is not the same as ACTUAL laboratory test data for notched framing members.

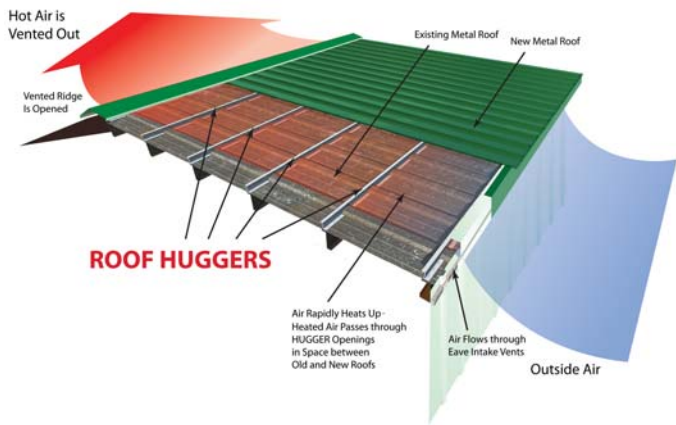
ADDING INSULATION

When you install ROOF HUGGERS, the air space between the existing old roof and the bottom side of the new roof is well suited to install insulation for increasing the building's thermal resistance. This is a very effective and inexpensive measure to save those energy dollars. Case studies have shown between 21% to 25% reduction in heating and cooling cost per year. (Each case is different and depends on the building's occupancy and locale.)

Typically, fiberglass blanket insulation of varying thicknesses is installed but many building owners and design professionals will opt for rigid insulation. Both examples shown.



HOW DOES ABOVE SHEATHING VENTILATION (ASV) SYSTEM DYNAMICS WORK?



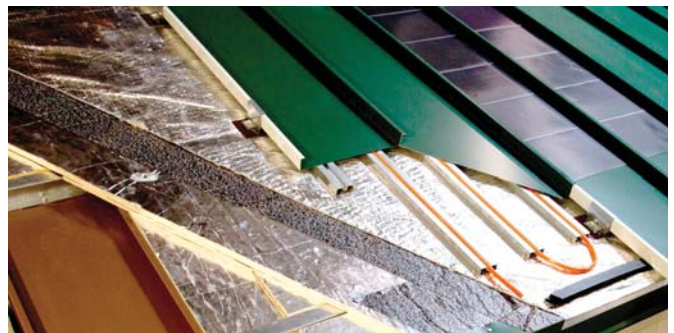
The above illustration represents a re-roofing assembly that employs both new insulation, radiant barrier and ASV dynamic ventilation for High-R systems with thermal resistance as much as R-50.

ENERGY EFFICIENT RETROFIT ASSEMBLIES

Retrofitting a roof with Roof Hugger creates any number of possibilities for improving the energy efficiency of an existing building. The height of the Roof Huggers can be specified to accommodate any thickness of fiberglass or rigid insulation. Above sheathing ventilation can be incorporated, glycol tube heat recovery coils can be added, high efficiency tall clip standing seam panels can be used and bracket or laminate photovoltaic panels can easily be added on the new panels without panel penetrations. If photovoltaic systems are to be added, typical 40-60 year life metal roofing is the only roof system that will outlast the useful life of the photovoltaic panels. This eliminates the huge cost of photovoltaic removal, re-roofing and reinstallation of the photovoltaic system typically required at the 15-20 year mark for conventional roofing materials.



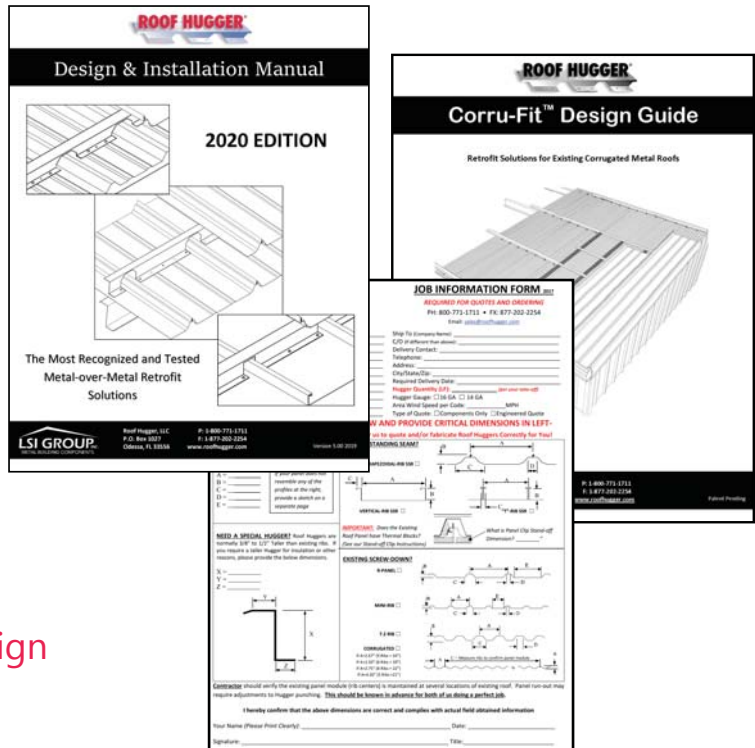
Above: Actual photo of Goodfellow AFB San Angelo, TX fully integrated retrofit roof system with mock-up photo shown below. The entire new roof assembly included a High R-Value insulation system (increased from R-19 to R-51.9), laminated solar photovoltaics for power generation and solar hot water system to furnish preheated water to building's boiler.



Expert Metal-Over-Metal Re-Roofing Information is at your Fingertips!

Download these to help you with your projects:

- Design and Installation Manuals
- Over 85 Auto CAD Construction Details
- Design Performance Specifications
- Videos and Past Project Photos
- Energy Efficient Retrofit Roofing
- Free AIA Accredited Webinars
- Free Sales & Installation Webinars
- Online Quote Requests
- Request a Budget Estimate
- Retrofit Do's & Don'ts
- Published News Articles
- Company specific sales programs and presentation



Request a Component or Preliminary Design Quote at www.RoofHugger.com

WHAT OUR CUSTOMERS ARE SAYING ABOUT ROOF HUGGER SOLUTIONS...



"Installing Roof Huggers saves us the liability of opening up the roof and exposing our crew to that hazardous situation."

Buddy Kaul
Metal Buildings and Supplies



"We have used Roof Hugger for many years and rely on their expertise for providing solutions when re-roofing over existing metal roofing"

Bill Chandler, Executive Vice-President
Drexel Metals/Met-Fab
Elkridge, Maryland





The Leader in Retrofit Re-Roofing Solutions

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