



## Design Basics

All roofs must satisfy basic design load principals regardless of building geometry. Two of these are resistance to uplift and gravity loads. Uplift loads are the loads acting away from the surface of the roof resulting from winds or gusts passing over the roof's surface creating a negative pressure (suction) that tries to pull the roof off the structure. Gravity loads are commonly referred to as "Live", "Snow" or "Equipment" loads that impose downward force on the panels, purlins and frames parallel to gravity.

Other re-roofing and roof replacement methods cannot address newly adopted building code requirements without extensive and very expensive remedial work being performed on the existing roof's structural support system.

The Roof Zone Plan illustration explains the various zones in a common gabled roof with each zone requiring a varying degree of uplift pressures to be satisfied. Please note that the zone locations and their dimensions are determined by roof size, shape, slope, height and code required design wind speed.

### Roof Huggers Help Satisfy Wind Uplift

Older building codes looked at roofs as being uniformly loaded in all areas with no consideration for corners and edges. Since the loads were applied on a uniform basis, the purlin spacing was typically the same throughout the building. Thus for several decades most metal buildings were designed using a 5'-0" o.c. purlin spacing.

Today's current building code requirements divide the roof into zones as shown above and apply specific design loads to each zone. The edge and corner load pressure requirements are now higher, meaning the new roof panels must be stronger or the purlin spacing must be reduced to meet the design loads.



Roof Hugger can provide a Preliminary Design Pressure Analysis, if requested. The preliminary analysis can then be cross-checked against any new roof panel's capacity to determine if additional reinforcement is needed. (There is no charge for the preliminary analysis, however it is subject to a fee based final 3rd party engineering review if certification is required.) When reinforcement is needed, Roof Hugger has two basic systems to address this condition. We refer to them as "Integral Hugger Framing" and "Hat Grid Framing".

The need for reinforcement is determined by the loads in each zone as compared to the new metal roof panel's tested strength. If the loads exceed the tested strength of the panel, then the purlin spacing must be reduced to provide more frequent panel or clip attachment. Roof Hugger can help guide you in the correct selection of reinforcement for your specific project and specific new roof panel.

### Integral Hugger Framing

This framing system is unique where it includes a structural support that fits tightly under the Roof Hugger. Its purpose is to span from purlin to purlin and to provide support of the Roof Huggers that are located between existing purlins. This exclusive framing method is typically used only on projects that the new metal roof system has been laboratory tested over the integral Hugger framing system.

Contact us to obtain a list of the applicable metal roof systems that have been tested with Roof Hugger systems. The real benefit of this framing method is standard height Roof Huggers are used, maintaining an economical, "low-profile" sub-framing system throughout the roof.



*Mock-up of roof retrofit at Goodfellows AFB utilizing multiple energy saving technologies.*