

## New AutoCeil™ Metal Building Erection Method

Metal buildings have successfully evolved into a preferred method of building construction for many uses due to the convenience of the pre-engineered structural system, the economics of the materials and the standardization as a manufactured system. One inherent problem with metal buildings has been the high conductivity of their metal components and the complexity of insulating them during the roofing and siding installation. With steel erection experience since 1977, Thermal Design previously developed the Simple Saver System® concept for pre-engineered metal building insulation systems which solved most thermal performance issues. The Simple Saver System is the basis for “Liner System” (Ls) in updated energy codes since 2007. While the Simple Saver System provides major improvements in thermal performance, provides OSHA compliant fall protection and many other benefits, the Simple Saver System design was intended for use with existing building erection methods.

To advance the state-of-the-art of erecting metal buildings, Thermal Design now has invented an easier, faster, safer and more cost effective system for erecting insulated metal buildings. With a minor change in the building bracing makes the entire building erection faster and much easier to insulate. Existing methods brace the rafter flanges to the webs of the lapped purlins (knee braces). This process is inherently difficult and installation of these lapped purlins and knee braces wastes valuable erection labor and crane time. The installation of the lapped purlins and rafter braces also create a safety hazard with workmen removing temporary lap bolts, lapping over purlins, using spud wrenches to align multiple lap bolt holes, reinstalling the lap bolts, aligning and installing flange brace bolts into to holes several feet out from the rafters. Rafters typically have a slight twist and come-a-longs are used to pull a rafter into alignment for brace bolting. Easier said than done! While each of these connections are made, a crane is typically just sitting there holding the leading rafter in position while other crew members are typically in a hold pattern as each purlin is lapped aligned and bolted in each bay. The rafter braces also cross through the bottom plane of the purlins and require special sealing at each brace penetration which also wastes valuable time.

## The New AutoCeil Solution

Our new AutoCeil™ Erection Method can eliminate hundreds of pieces and brace the rafters from web stiffener-to-web stiffener, using 'simple span' brace struts with a two bolt “moment” connections at each end. The “moment connections” can be engineered to provide both the full height rafter web stiffening and the rafter flange bracing functions, thereby eliminating the separate flange braces in many buildings. Beginning at a “brace bay”, the brace struts install between the rafters in a simple span configuration saving time over lapped purlins. A first strut end is double bolted at one web stiffener, then the other end is aligned and bolted to next adjacent rafter web stiffener. Then on to the next brace strut. The struts are typically 10 feet on-center from the ridge toward each of the eaves with any odd spacing made nearest the building eave. Typical knee braces may also be used if required but attach to the brace struts and not the purlins. The AutoCeil design leaves a clear, unobstructed pathway across the entire building from floor to floor!

Cross bracing in the brace bays may be attached at the strut end connections without the need to cut rod brace holes in the rafters webs, use half moon washers, etc. Cross braces can be spanned between every second-strut end, with the two braces crossing at mid-span on the middle strut. Using a loop hanger on the middle strut will allow the cross bracing to be supported at mid-span. This makes the cross brace installation much faster and easier. Once the bay is braced, the purlin bundles are positioned spanning between the bay rafters for follow-up workmen to walk them out, lap them in position and bolt them together. Since the brace bay is completely square, the purlins are much faster to lap and bolt.

## The Benefits of the AutoCeil Erection Methods

- The building erects faster with less labor and less expensive crane time.
- The AutoCeil ceiling sheet is pulled in using two electric winches in minutes.
- The AutoCeil ceiling sheet can be steered left or right using our two winch system.
- The AutoCeil ceiling sheet is permanently supported in tension on the brace struts.
- The AutoCeil ceiling sheet has no bottom side ceiling fasteners, strapping or banding.
- The AutoCeil ceiling sheet is winched in from floor at one wall to the floor on the other side.
- The brace struts create an unobstructed pathway across the entire building bay: rafter-to-rafter, sidewall-to-sidewall and down to the floor on each side at the inside plane of the girts.



- The brace struts are simple span between full height, rafter web stiffeners using two bolt “moment” connections **which eliminates the need for flange braces and welded hole brackets** and also may **result in web weight reductions**. Very deep rafter webs will likely require supplemental flange braces which then attach to the brace struts with a bolted clip connection.
- Moving the brace loads from purlins to the brace struts **may also result in purlin weight reductions**.
- Using uniform spaced rafter web stiffeners **may also result in rafter web thickness reductions**.
- The AutoCeil ceiling sheet passes tests for OSHA Through Fall Protection Compliance.
- The AutoCeil ceiling sheet may be used for a temporary weather enclosure for the building interior with additional retention hardware installed.
- The AutoCeil Ceiling sheet provides OSHA Protection From Falling Objects for workers below.
- The AutoCeil Ceiling sheet and blowing wool insulation may be completely installed from the building interior after the walls and roof are covered, immune from weather delays.
- Erection speed of a building can be increased up to 30% over existing insulation methods.

### AutoCeil Options for the Steel Erector and General Contractor

- Traditional topside installation with no bottom side ceiling strapping and fasteners. (*Erector - Blanket or blowing wool options*)
- Combination Top side/Bottom side Installation. (*Erector - Blanket or blowing wool options*)
- Bottom side Installation (*Erector - Blowing wool filled cavity*)
- Bottom side Installation (*Erector, Subcontracts - Blowing wool filled cavity*)
- Bottom side Installation (*Independent subcontractor; erector sheets building with thermal spacer blocks only - Blowing wool filled cavity*)

### For Additional Information Contact:

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