

# FRAMEBUILDING NEWS

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November 2021 • Vol. 33, Issue 5

## CORROSION RESISTANCE IN ANIMAL CONFINEMENT

SHOULD YOU USE  
NAILS OR SCREWS

LUMBER  
TYPES &  
PROPERTIES

VIEWS FROM  
BCMC 2021

FIND US INSIDE PAGE 10



TRUSSES  
DAMAGED?  
SAY SOMETHING!

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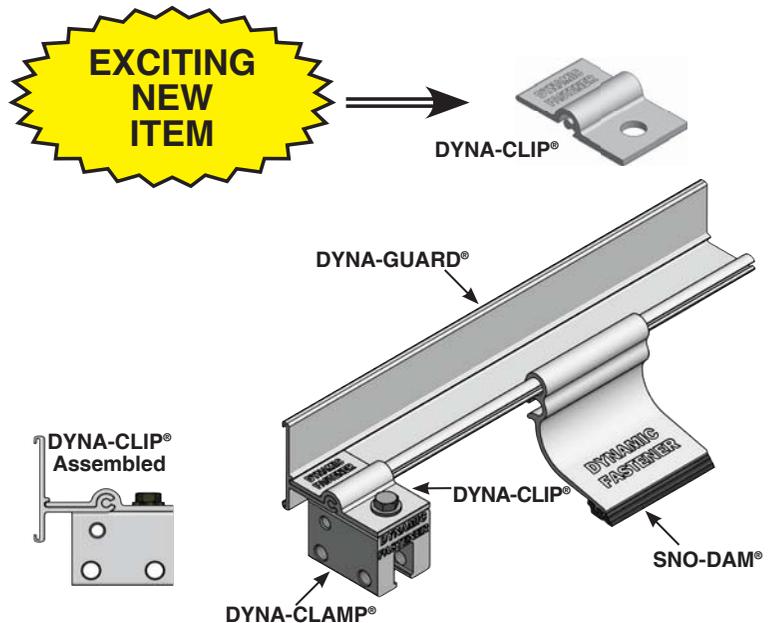


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# Small But Mighty

**A**t 44 pages, this is the shortest issue of the year. However, we've packed a lot into it!

We've kind of stripped post-frame building down to some of its components in this issue. Thanks to feedback from S-5! founder Rob Haddock (below), we were able to take a deeper dive into fastener compatibility by publishing (with permission) a technical paper from the MCA.

We've also included coverage about some of the materials that stand up to the

harsh environment caused by animal confinement. While researching, I read the test results for Dr!pStop. It was so compelling, I just had to share. You can read about the test — and see the results — on page 16.

Our next edition is the Frame Building Expo Preview. In February 2020, due to unforeseen circumstances, I was unable to attend the Expo in Des Moines. I'll admit: I've never been to this event ... I can't tell you how much I'm looking forward to it. I hope you're just as excited to gather in Nashville as I am. The January edition,

which is also our State of the Industry edition, should get you all the more ramped up for it.

By the way, if ever you see me cruising a trade show floor, please don't be shy — stop me and say "hello." I always enjoy a good one-on-one talk about what's going on in the trade!

Until next time - be well.



## LETTER TO THE EDITOR //

# Galvanic Scale Can Be Misleading

**I** got an email of *FBN* this morning and my eye was drawn to the piece on galvanic compatibility. It is something that I constantly run into controversy and mis-information about out there in the market place and often by folks who should know better. I gave it a read and offer comments here:

This article [*Frame Building News*, August 2021, pp. 38-39] has some good information, but in total is a bit misleading due to not expounding the complete story. (<https://framebuildingnews.com/?p=1236>)

It leaves one to rely 100% on the galvanic scale as the beginning, middle and end of the story. It isn't. It may be the beginning, but far from the end in many common applications. The bottom line is that while this scale is the first thing most people grab to rely upon as a technical resource — it does not tell the whole truth and therefore can be very misleading.

The galvanic scale gives the order of electro-chemical behavior and therefore compatibility — but of the parent (or base) metals only. It does not consider metal oxide layers, and because all metals form oxides — well, that's the rest of the story.

The oxide is a different material than the parent metal that created it and often behaves as an insulator, preventing (or retarding) electron exchange (galvanic action) and NOT necessarily reflecting galvanic compatibility of the parent metals.

The galvanic scale reflects electrolytic behavior solely of the parent metal, so it only tells the whole truth when oxide layers are not involved — and that only happens when the electrolyte is very aggressive (acetic — e.g. sea water). For these reasons, it should not be relied upon as a sole information source. In fact, one could say that it only tells the complete truth when in the presence of salt spray or other chlorides.

By way of example: Aluminum forms a durable oxide very rapidly in the presence of air and humidity. This is also sometimes induced by a chemical process (anodization), but it also happens naturally just with exposure. Aluminum oxide is a barrier material coating the aluminum — and it is electrically non-conductive, so electrons are impeded from passage through it from anode-to-cathode. One can use anodized or just aluminum that has oxides formed on a bare copper roof without incident in most environments. Those two metals are

very distant on the scale, but compatible owing to the aluminum oxide layers.

I also read in there that dissimilar metals in direct contact always result in corrosion. Not true. Moisture is needed to establish an electrolyte. If the connection is kept dry, there is no electrolytic contact and no corrosive effect. Understanding corrosive behaviors of metals requires a much deeper dive than the galvanic scale because various metal oxides in varying environments all behave differently.

Incidentally, the Metal Construction Association publishes a Fastener Compatibility Guide that takes into consideration oxide layers and also longevity/durability considerations. It is a metal roofing industry consensus document (as opposed to what one single company or another has to say on the subject) and therefore one of the best practical resources out there.

R.M. (Rob) Haddock  
The Metal Roof Advisory Group

**Editor's Note:** To address the shortcomings of the Galvanic Action article, the MCA Fastener Compatibility Guide is published (with permission) in this edition of *Frame Building News*. See pages 32-34. **FBN**

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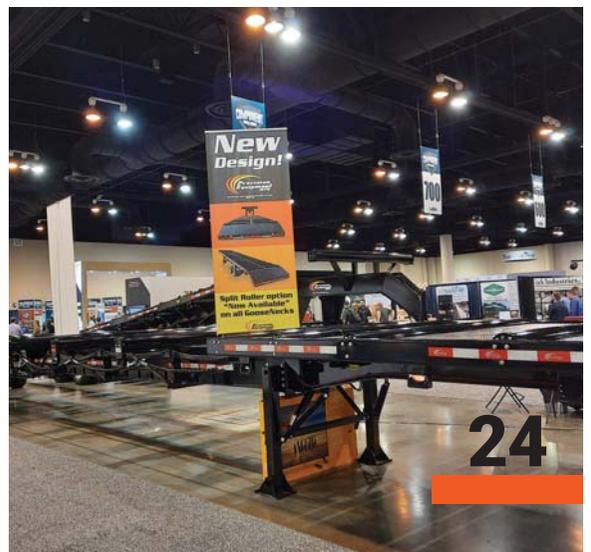
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Wick Buildings dairy barn.  
COURTESY OF WICK BUILDINGS

Cover design by Tom Nelsen

Frame Building News (ISSN 1079-0870) (Volume 33, Number 5) is published five times per year (January, April, June, August and November) by Shield Wall Media LLC, 150 Depot St., Iola, WI 54945. Periodical postage paid at Iola, WI, and at additional mailing offices. Canadian Agreement Number: 40665675. POSTMASTER: Send address changes to Frame Building News, Barb Prill, PO BOX 255, Iola, WI 54945. Copyright 2021 Shield Wall Media LLC. Frame Building News and its logo are registered trademarks. Other names and logos referred to or displayed in editorial or advertising content may be trademarked or copyright. Frame Building News assumes no responsibility for unsolicited materials sent to it. Publisher and advertisers are not liable for typographical errors that may appear in prices or descriptions in advertisements. Technical articles appearing in Frame Building News are reviewed for technical content by an advisory committee consisting of a select group of post-frame industry and related academic personnel. Opinions and/or recommendations included in columns by guest authors are solely those of the authors. Frame Building News, committee members, staff, consultants and contributing authors disclaim any responsibility or liability for contents or opinions expressed in any article contained in Frame Building News. Publication by Frame Building News in no way implies endorsement of contents. Mailed free to post-frame builders and their suppliers throughout North America. Others may subscribe: U.S. \$21.98 for 1 yr, \$39.98 for 2 yrs, \$58.98 for throughout North America. Others may subscribe: U.S. \$21.98 for 1 yr, \$39.98 for 2 yrs, \$58.98 for 3 yrs; Canada, \$29.98 1 yr, \$56.98 2 yrs, \$84.98 3 yrs.

## Industry Partners



SEE PAGE 11



SEE PAGE 23





**Panels at MPI bundled for delivery.**  
PHOTO COURTESY OF MPI.

### **Metal Panels, Inc. Sends Surplus Materials To Those In Need**

Since 2016, Metal Panels Inc. (MPI, [www.metalpanelsinc.com](http://www.metalpanelsinc.com)) has partnered with Cross Catholic Outreach ([www.crosscatholic.org](http://www.crosscatholic.org)) to get surplus materials such as metal panels, fasteners and accessories into the hands of struggling families impacted by hurricanes and floods in Central America and communities in the Caribbean.

So far, MPI, with the help of industry partners, has shipped 24 truckloads of materials to the needy, and according to MPI founder and president Mitchell Hentkowsky, the need is far greater.

“I believe there are many business owners like me who want to do something for those in need. However, the daunting task of moving materials from your business into countries that most need it, will cause them to decide that it can’t be done.”

That’s where Cross Catholic Outreach comes in. The nonprofit ministry includes dedicated specialists experienced with the ins and outs of international shipping. The charity also has an extensive network of in-country partners around the world who know local community needs and can distribute donated materials to those most in need.

Through the coordination of Cross Catholic Outreach, MPI and other manufacturers in the US have a way of offering a helping hand that can be an easy and straightforward process. When MPI has built up enough inventory for a truckload (by volume and weight) they simply con-

tact Cross Catholic Outreach to schedule a pick up. At the set time, the ministry’s flatbed tractor-trailer arrives and is loaded, and the responsibility for coordinating delivery – containers, travel, customs, taxes, and distribution – are transferred to Cross Catholic Outreach. Truckloads leaving Tulsa arrive at the international port of choice, where the loads are containerized, and shipped to destination ports in Central America or the Caribbean.

From humble beginnings in 2001, Cross Catholic Outreach has grown significantly, and is celebrating a \$3 billion-plus impact on poverty in this anniversary year. Its reach extends from Central and South America through the Caribbean to parts of Africa and Southeast Asia, touching thousands of lives by meeting basic needs for food, safe water, educational opportunities, adequate shelter, and spiritual support.

### **Cornerstone Building Brands Sells Insulated Metal Panels Business**

Cornerstone Building Brands, Inc. (NYSE: CNR), the largest manufacturer of exterior building products for residential and low-rise non-residential buildings in North America, announced August 9 that it completed the previously announced sale of its Insulated Metal Panels (“IMP”) business to Nucor Insulated Panel Group, Inc. and certain of its subsidiaries (collectively, “Nucor”) in a cash transaction for \$1 billion, subject to customary adjustments. Cornerstone expects post-tax transaction proceeds to be used to pay down a portion of its secured credit facilities, invest in organic growth and efficiency projects, and strategic acquisitions.

The company reported in the announcement that the transaction positions it for further growth “in large, deep markets” and strengthens its financial flexibility.

Headquartered in Cary, North Carolina, Cornerstone Building Brands [[www.cornerstonebuildingbrands.com](http://www.cornerstonebuildingbrands.com)] serves residential and commercial customers across the new construction and repair and remodel markets. The company’s portfolio of products spans vinyl windows,

vinyl siding, stone veneer, metal roofing, metal wall systems and accessories.



### **Generac Recalls Portable Generators Due To Injury Hazards**

Generac has recalled two types of portable generators due to finger amputation and crushing hazards. The Generac® and DR® 6500 Watt and 8000 Watt portable generators are recalled due to an unlocked handle that can pinch users’ fingers against the generator frame when the unit is moved.

Users are advised to stop using the recalled portable generators immediately unless the locking pin has been inserted to secure the handle in place before and after moving the generator. Users are also advised to contact Generac for a free repair kit.

Contact Generac toll-free at 844-242-3493 from 8 a.m. to 5 p.m. CT Monday through Friday, or online at [www.generac.com/handleguard](http://www.generac.com/handleguard) or [www.generac.com](http://www.generac.com) and click on Important Safety Information to learn more.

### **Georgia-Pacific Will Modernize Texas Lumber Complex**

Georgia-Pacific ([www.gp.com](http://www.gp.com)) has announced it is modernizing one of its premier sawmills in Texas. Pineland Lumber Complex, located in Pineland, Texas, will undergo \$120 million in additions and improvements in an overall modernization effort that will also increase the mills’ overall production.

“We couldn’t be more excited about this addition to the Pineland Lumber



**Georgia-Pacific has announced that it is modernizing one of its premier sawmills in Texas. Pineland Lumber Complex, located in Pineland, Texas, will undergo \$120 million in additions and improvements in an overall modernization effort that will also increase the mills' overall production.**

Complex,” said Darryl Melton, Sabine County Judge. “As the largest business in our county, this mill plays a critical role in our economic success. With Georgia-Pacific making this significant investment, we are confident that the mill will continue to be a part of our community for many years to come.”

The modifications include a new sawmill which will replace the existing stud mill that was built in the 1960s. Construction is expected to begin early next year and is scheduled to be completed in late 2022. Currently the mill has the capacity to produce 380 million board feet of dimensional lumber each year, but when the new mill is operational and running at full capacity the production will increase to 450 million board feet—which is equivalent to the amount of lumber needed to build 30,000 houses per year.

In order to meet increased capacity, Pineland Lumber Complex will also expand its log yard storage and incorporate a new debarking and log processing line. Additionally, a continuous dry kiln will help ensure production capacity while a new high-speed planer will replace the current vintage equipment that was installed in the 1960s.

“This is significant to our region’s economy, especially when you consider the direct and indirect jobs that it maintains and creates,” said Texas State Representative Chris Paddie. “This new investment will enhance the existing jobs within the facility and further stimulate the economy

by providing additional indirect jobs. Georgia-Pacific’s expansion is an excellent opportunity for Sabine County to grow its economy.”

When the new sawmill is operational,

it’s anticipated that the mill will increase the number of trucks delivering wood from 250 to 300 loads each day. “Logging has provided a good income for many families through the years and is one of

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our strongest industries in East Texas,” said Judge Melton. “By expanding the Pineland Lumber Complex, Georgia-Pacific is helping to ensure the longevity of this important industry.”

Georgia-Pacific operates 12 lumber mills throughout the country. According to Georgia-Pacific Lumber President Fritz Mason, Pineland was selected for the expansion for many reasons, including the area’s workforce and natural resources. “This mill has a long history in Sabine County, which dates back to 1910,” said Mason. “With the mill favorably located in the middle of the Southern Pine Forest of deep East Texas coupled with an experienced workforce that dates back to several generations, Pineland Lumber is well positioned to prosper for years to come.”

According to Mason, the same can be said for Georgia-Pacific’s lumber operations overall. “Lumber has a longstanding tradition within our company, we were founded as a lumber company over 90 years ago, — and we are recognized as one of the leading lumber producers in the country. The Pineland Lumber Complex capital improvement project is just one of many investments Georgia-Pacific is making at its lumber mills throughout the country. We are committed to this industry and providing our customers with quality products that they have come to know and trust since 1927.”

### **SPAX Manufacturer Welcomes regional sales managers**

Altenloh, Brinck & Co. US, Inc. (ABC US, [www.altenloh.us](http://www.altenloh.us)), manufacturers of SPAX® engineered fasteners, announced the addition of two new sales managers. Joseph Lovett and Garrett Joyner will serve to introduce the SPAX brand to independent lumber yards and building material and hardware stores.

Lovett joins ABC US as a regional sales manager. He brings more than 21 years of sales experience with retail lumber yards and wholesale building materials to the position. Prior to joining ABC US, he was a regional sales manager with Emery Jensen Distribution. He will cover the New

England area.

Joyner, a recent graduate of the University of North Carolina at Greensboro, will serve as a regional sales manager covering NC, SC, and VA. Prior to finishing his degree, Joyner worked at Fastenal.



### **Triangle Fastener Granted Patent Protection for BURR BUSTER**

The US Patent and Trademark Office has granted Triangle Fastener Corporation ([www.trianglefastener.com](http://www.trianglefastener.com)) patent protection on screws that utilize its BURR BUSTER® thread and point design like the PANEL-TITE® metal-to-wood self-piercing screws.

The company reports its patented design produces exceptional performance and value.

The point greatly reduces the amount of burrs/chips (swarfs) that are cause when the screw penetrates the steel. These chips can damage the sealing washer, and rust on the panel.

Also, the low-angle thread helps eliminate over-driving and improves the resistance to back-out.

Triangle Fastener Corporation, a member of SFS, has 24 locations servicing the commercial construction markets since 1977. The company provides a full line of high-performance fasteners, sealants, flashings, and tools used to construct the

building envelope, along with interior applications like steel framing and sheet metal.

### **Levi's Building Components Hires New National Sales Manager**

Levi's Building Components ([www.levisbuildingcomponents.com](http://www.levisbuildingcomponents.com)) has announced the hiring of Michael (Mike) O'Hara as the National Sales Manager. O'Hara joins Levi's with 25 years of experience selling and marketing to the construction trades across the USA. Born and raised in the Twin Cities of Minnesota, he grew up in St. Paul and now resides in downtown Minneapolis. Happily married for 21 years, he and his wife enjoy playing golf, biking, traveling, attending Minnesota Vikings games, and spending time with their extended family.

Levi's Building Components is a family owned, nationally recognized supplier of metal roofing products located in Ephrata, Pennsylvania. Known for great customer service, quality products, and efficient delivery, Levi's has remained true to its core values since the inception of the company in 1978.

### **Union Corrugating Company Announces Updated Website**

For 75 years, Union Corrugating Company (UCC, [www.unioncorrugating.com](http://www.unioncorrugating.com)) has been a leader in the metal roofing and building markets. In its decades of existence, UCC has seen many changes - especially in technology. However, one thing has remained the same: UCC's focus on delivering quality products, superior service and value to their customers.

In that tradition and reputation, after many months of hard work and dedication, UCC has announced the launch of its updated website and new visualizer tool.

UCC's primary goal during the redesign process was to create a more valuable, user-centric and responsive resource across all platforms and devices. Focusing on making it easier for its customers to learn and locate valuable information about their metal products, services and

offerings, the new UCC website allows users to browse metal options by a particular application or industry.

The new UCC website is located at [unioncorrugating.com](http://unioncorrugating.com) and features a state-of-the-art building visualizer tool. This visualizer tool allows users to upload their own picture to the website and see UCC's products and colors instantly on their project(s).

"We understand our customers have choices when it comes to purchasing metal roofing, wall panels and metal building solutions," said Keith Medick, President and CEO of Union Corrugating Company Holding, Inc. As a result, we want to provide the best options and the best service to our customers so there really isn't a choice other than UCC. Updating our website was a necessary step in providing our customers with excellent customer service."

**First ICC-ES ELC for Wood Screws to CSA O86 Issued to Simpson Strong-Tie®**

ICC Evaluation Service (ICC-ES) has issued the first Canadian listing report (ELC) to CSA O86 for Wood Screws to structural building product supplier Simpson Strong-Tie. The CSA O86 standard, referenced in the National Building Code of Canada (NBCC), provides criteria for the structural design and evaluation of wood structures or structural elements.

The Simpson Strong-Tie Strong-Drive® SDCF, SDCP and SDHR screws are manufactured using a standard cold-forming process and are heat-treated. The screws are alternative dowel-type self-drilling fasteners, and have met the testing requirements for fastener shear, tension, bending yield strength, withdrawal resistance, and lateral resistance, among others.

"Simpson Strong-Tie Strong-Drive screws are fasteners for cross-laminated timber and mass timber construction that do not require pre-drilling," said Simpson Strong-Tie Sr. Engineering Manager – Fastening, Robert Leichti, PhD. "Obtaining a Canadian listing report reflects our commitment to third-party product review, better ensuring code compliance and product performance. We appreciate the robust and timely review that ICC-ES provides that is facilitated by their publicly developed and publicly available Acceptance Criteria."

ICC-ES is one of only a few evaluation entities in the U.S. accredited by the Standards Council of Canada to evaluate building products to the NBCC. As a result, ICC-ES Canadian listing reports are accepted in all Canadian provinces and territories. **FBN**



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# Building to Last

Components Made To Withstand Corrosive Ag Environments

By Karen Knapstein

There's nothing unnatural about the harsh nature of animal confines. However, although natural, the interior environment is certainly not inert — it's quite destructive. Biogases, produced by the fermentation of organic matter, and moisture from waste, weather, and animal respiration all contribute to the corrosive environment that affects agricultural buildings. Thankfully, there are many building components that can be used to minimize the impact of the corrosive environment on a post-frame building, which will help assure the structure you build today will be around for generations to come.

## Panels & Fasteners: Protecting the Metal

The steel so commonly used on agricultural and animal confinement buildings is hardly immune to the effects of the corrosive environment. However, it is better prepared for the onslaught of corrosive elements than it once was. David Quehl, Director of Sales & Marketing, Direct Metals Inc., explains, "Roll-formed metal roofing panel quality has improved dramatically over the past 20 years. The combination of high-quality paint systems and protective substrate coatings allow panel manufacturers to offer 40-year warranties against red rust corrosion. This is especially important where agricultural building environments like animal confinement present challenges to those coatings and paint systems. The presence of fertilizers, pesticides and animal waste magnifies these challenges. For these applications, it's important to supply a metal roofing panel with enough zinc and barrier coatings to prevent early corrosion."

One way to protect the metal panel on this inside is by using a condensation barrier. "DR!PSTOP is the perfect product to use in animal confinement," says Tony DelGhingaro, VP – FILC USA. "In addition to controlling condensation, where applied, DR!PSTOP protects the steel by preventing corrosive elements from ever touching the steel.

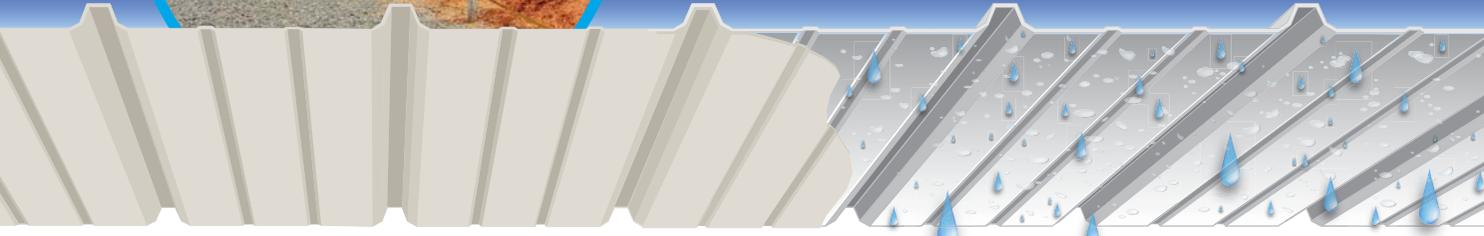
"The glue used to adhere DR!PSTOP creates a 'rubber-like' barrier from the acidic environment," he explains. "We know from testing this definitely prolongs the life of the steel. [See page 16.] However, due to the numerous variables associated with animal confinement, it's almost impossible to say exactly 'how much' longer."

In addition to using protected steel, it's also important to select the right fasteners for the material and the harsh environment. "A fastener failure can cause damage to a metal panel and, in some cases, require replacement of the fasteners and panel," Quehl explains. "Many fasteners available today have a minimal amount of zinc plating, as little as 4 microns, which is defined as commercial grade. This provides protection in low corrosion applications. However, in an extreme environment, the commercial grade thickness is not suitable to prevent corrosion, primarily because of the stress to the coating on the fastener head and threads from a hex socket and installation tool like an impact driver. For this reason, it is recommended to use a coating thickness and quality paint system that will withstand pressure from the installation tool. The best option is to use a long-life fastener, either 304 SS or a zinc-aluminum alloy, both of which match the warranty on most metal



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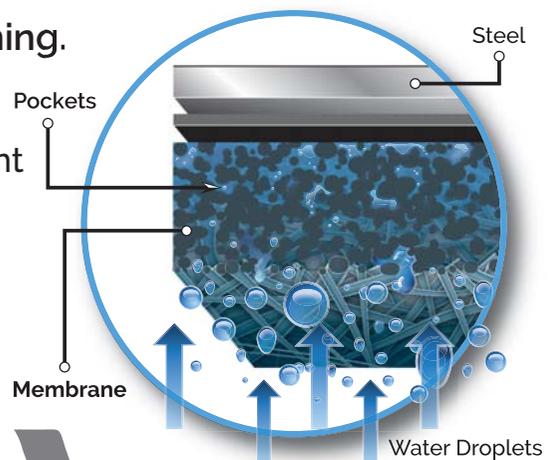
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panels. DMI offers coatings and long-life fastener options that are compliant with Dade County Florida specifications.

“While fasteners make up a small percentage of the overall cost of a building project,” Quehl continues, “a poor choice of fasteners based strictly on cost will create a large percentage of call backs on that project due to inferior corrosion protection. Always specify a fastener that will equal the warranty of the metal panel.”

In addition to hazardous conditions caused by animals, treated lumber can also be corrosive to fasteners. “Producers of treated lumber and many building codes specify hot-dipped galvanized or stainless-steel nails because they have a life expectancy comparable to that of the treated lumber,” explains Maze Nails marketing director Lisa Martin. “The International Residential Code- section R317.3.1 and the 2018 International Building Code-Section 2304.10.5.1 both state ‘Fasteners in contact with preservative-treated wood shall be of Hot-Dipped Zinc-coated galvanized steel, stainless steel, silicon bronze or copper.’ Maze coating weights for zinc-coated fasteners are in accordance with ASTM A-153.” The codes also state Stainless Steel fasteners shall be in accordance with the material requirements of ASTM F1667.

Speaking generally about corrosive environments and construction, Maze Nails president Roelif Loveland says, “Stainless steel is the ideal choice for corrosive environments since a very thin oxide layer forms on the surface of the stainless steel to protect it. This film is due to the chromium that is added into the carbon steel during production — changing the nature of the iron oxidation. This ‘passive layer’ renders the surface electrochemically passive and rust-resistant, in the presence of corrosive elements or substances. Even if the layer is scratched or removed in some way, it will reform and continue to provide protection.

“True ‘stainless’ steel must contain at least 10.5% chromium,” he explains. “Nickel is also added to create type 304/305 stainless steel alloys — and both nickel and molybdenum are added to create type 316 stainless steel.

“There are a myriad of environments and applications that benefit from the use of stainless steel fasteners,” Loveland con-

tinues. “Since animal sweat and waste can be particularly corrosive, hog confinement buildings and other livestock areas are ideal projects for using this rugged material. Maze Nails manufactures a very wide line of Stainless Steel Type 304 and 316 nails – in plain shank and ring shank – in hand-driven and pneumatic-tool formats. The alloy itself ‘work-hardens’ during the nail making process – so these fasteners tend to be very durable and bend-resistant during pounding.”



 **Smooth and spiral shank Double Hot-Dipped Galvanized Pressure Treated Lumber (PTL) nails from Maze Nails.** Photo courtesy Maze Nails.

If using aluminum panels instead of steel, especially in interior liner panel applications, extra caution should be used when selecting fasteners. “The default option for fasteners has historically been 304 SS,” Quehl says. “However, more and more data show that, depending upon the alloy of the sheet, aluminum can react to the stainless in a negative way because of the dissimilar metals contact. The panel will actually sacrifice itself to the fastener and begin to degrade. One should consult with the aluminum supplier for a proper recommendation. One option is to provide an aluminum fastener that will not have a negative reaction. DMI supplies a #12 diameter metal-to-wood aluminum self-drill that can be used on any aluminum panel with no adverse reaction.”

### Healthy Environment

Natural light contributes to the health and well-being of animals, so it is an important feature in animal confinement buildings. Onduline ([us.onduline.com/pro](http://us.onduline.com/pro)) manufactures TUFTEX polycarbonate sheets in popular metal profiles for daylighting purposes, which are commonly used in poultry confinement structures. Since hens need at least 12 hours of light

per day to lay, when the owner can take advantage of free daylight, they can reduce lighting costs. “Polycarbonate is all about ‘free light,’ using daylight in structures rather than electric lights,” says Buddy Pullen, Vice President of Pro Sales, TUFTEX. “In some cases, it is about economics but in poultry housing it is more about natural daylight increasing growth yields.”

PVC liner panels also improve the interior conditions of animal confinement buildings and are resistant to the corrosive elements inherent to animal confinement. Designed for installation on ceilings, TUFTEX Ag Foam sheets are rigid corrugated panels that are 38” wide with a 9” on center profile”; lengths are available up to 24’4”. The PVC panels are corrosion resistant and won’t rust, rot, chip, or peel. They are non-flammable, have excellent light reflectivity, stand up to high water pressure cleaning, and are easy to install. “PVC will not rust or corrode from ammonia and other harmful compounds commonly found in animal waste and its off gassing, and offers some noise dampening qualities keeping livestock calmer,” Pullen says. “It is also used in fertilizer and salt storage buildings for the same reasons.”

Proper installation will ensure the performance of PVC and polycarbonate sheets. Pullen cautions, “Builders need to predrill for expansion and contraction and on any installation other than walls the maximum span is 24”. The Ag Foam sheets are only for ceilings and can span 48””

“Agricultural environments such as pork and poultry farms, dairies, and stables can present challenges for any cladding material,” adds Brenda Hogan, Director of Marketing, Palram Americas (<https://www.palram.com/us/>). “Gases such as ammonia and hydrogen are common in livestock feeding or housing environments, and they are the source of quick and widespread rust and corrosion for metal, resulting in high maintenance and replacement costs.”

Palram’s PVC products include AG-TUF® Corrugated PVC Liner Panels and DURACLAD® Interlocking PVC Multiwall Panels. Both offer a corrosion-free and chemical-resistant alternative. The PVC panels are low cost and low maintenance, and are also impervious to bacteria, mold, and mildew. Panels can be frequently



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Both products are offered in bright white for high light reflectance. Standard AG-TUF is designed for interior cladding and AG-TUF UV is designed for exterior cladding applications. Panels are thru-fastened to framing support, and panel corrugations overlap to ensure proper panel alignment. DURACLAD features a multiwall structure, providing a high level of rigidity and strength. Interlocking tongue-and-groove edges with concealed, slotted fastener holes allow for expansion and contraction, quick installation, and a smooth and hygienic finish.

### Posts & Foundations

Ken McDonnell developed a post-frame foundation decay protection system that is comprised of the Post Protector and the Skirt-Board Protector ([www.postprotector.com](http://www.postprotector.com)). The system prevents contact with soil, moisture, animal waste

and other materials that will cause wood degradation. The Post Protector slips onto the post and is positioned in the decay zone (approximately 8" above grade to 14-16" below grade) and the Skirt-Board Protector, which clips over the skirt board. "If there is animal waste around a post or on a skirt board, the wood is going to be compromised," he says. "Post Protector is simply a physical barrier so there isn't direct contact." The barrier system is made from a specialty high-density polyethylene that is commonly used in landfill liners. "The material is flexible and really strong. Anything coming in contact with the post has had zero ill effects on this material."

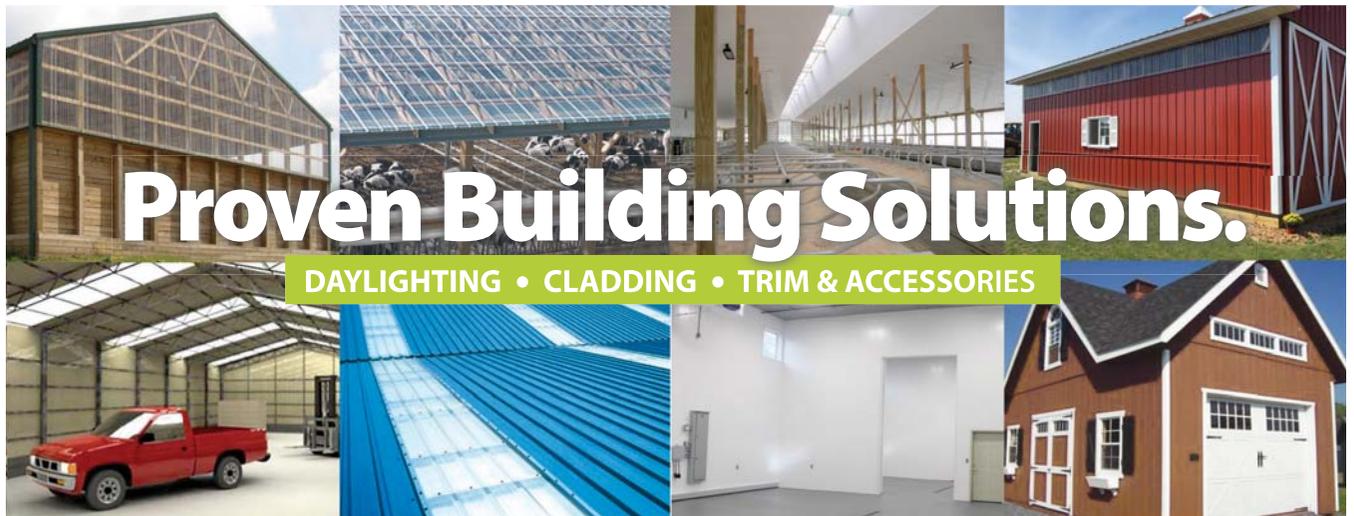
PlanetSaver Industries ([www.planet-saverind.com](http://www.planet-saverind.com)) manufactures the Green-Post, a unique post product that is treated against decay and pests. PlanetSaver's Barry Hoffman explains the problems that builders have been seeing and how the GreenPost helps solve those problems: "What we're hearing from builders is with today's fast growing timber growth rings

farther apart after 8 or 9 years of being in the ground, treated posts are seeing some rot." Rot typically happens in the "decay zone"; this is the area where microbes thrive thanks to the moisture and oxygen levels in the top 6-8" of the soil.

The GreenPost process creates an impermeable double barrier that keeps the wood treatment chemicals inside the wood and moisture and pests away from the wood. The double barrier consists of a water-based asphalt emulsion plus a layer of polyethylene, which then goes into an oven at over 600 degrees for a heat curing process. The polyethylene layer is very similar to the polyethylene blend that's used in landfill liners, which last about 100 years.

PlanetSaver also offers a polyethylene sleeve that can be applied by builders to posts sourced elsewhere. It's as stable as the wrap that's applied to the GreenPost. You must apply the wrap to the area of the post that will be in the decay zone. Sleeves have

*Continued on page 17*



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# DR!PSTOP Protection Put To The Test

**F**ILC, the makers of Dr!pStop, tested the product to gauge the benefits of using it in an animal confinement setting. Here's a summary of the test.

## 1. Purpose of the Test

The purpose of this test was to research how DR!PSTOP provides additional protection to the metal roof panels in buildings used for livestock confinement, where corrosion is very likely to occur.



Testing chamber similar to a chafing dish.

## 2. Testing

As there is no standardized test for corrosion in livestock confinement, the first task was to find the most corrosive tests regularly run on steel panels and see if they could be adapted to livestock confinement. In talks with some of the world's largest steel producers, one test seemed to lend itself well to the need.

The idea of the test was to loosely copy the humidity chamber testing also known as the Cleveland Condensing Test (ASTM-D4584). The test was performed on steel sheets with a protective layer of zinc (galvanized). Instead of the usual water, livestock confinement conditions were simulated in a chamber filled with liquid manure, heated from below.

By heating the liquid manure, the



Testing chamber filled with liquid manure.



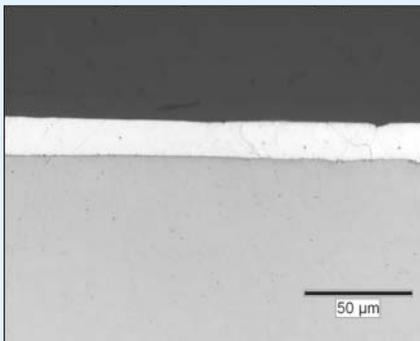
Chamber with steel samples in place.

temperature difference between inside and outside the chamber kept humidity levels at close to 100% and left a constant state of condensation on the test panels. Steel sheet test samples with and without DR!PSTOP were directly exposed to the simulated environment.

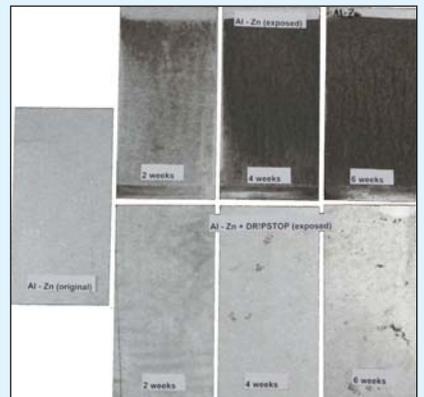
We observed the changes on the surface of each metal sheet after 2, 4 and 6 weeks (1000 hours). Samples were compared with original metal sheets, which had not been exposed to the testing conditions.

## 3. Conclusion

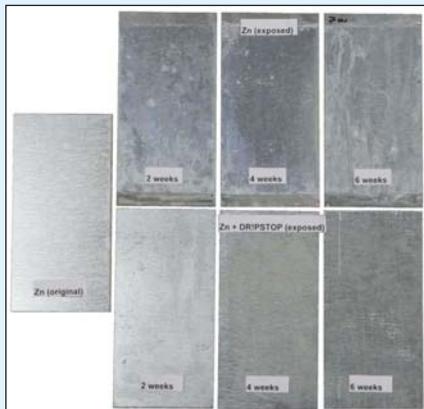
This test provides significant evidence that DR!PSTOP protects metal panels exposed to severe conditions in buildings used for livestock confinement. The panels covered with DR!PSTOP resist corrosion much better. **FBN**



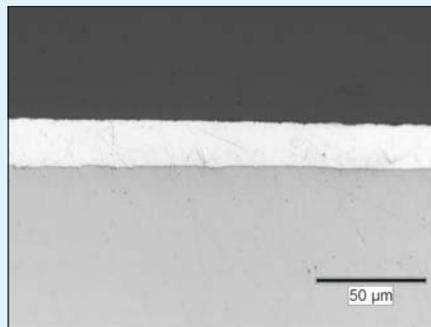
Microscopic cross section analysis (Galvanized, 500 times magnification). The white stripe is the protective zinc layer. Original.



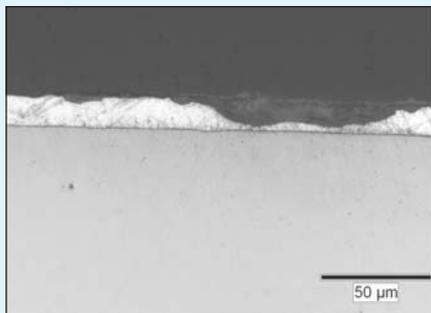
Steel test samples and their protective coating: Galvalume (Zinc + Aluminum coating)



Steel test samples and their protective coating: Galvanized (Zinc Coating: U.S. Steel DX51D, 200g/m<sup>2</sup> Zn)



After 1,000 hours *with* DR!PSTOP protection.



After 1,000 Hours *without* DR!PSTOP Protection. PHOTOS COURTESY OF FILC/DR!PSTOP

the flexibility of being positioned anywhere on the post so you have from 2"-6" above ground for proper protection required for it to be effective. "Once you put the post sleeve on, you don't have to worry about the post destabilizing because of rot. The only thing you have to worry about is what happens to your post above the ground," says Hoffman.

Perma-Column® (www.permacolumn.com) concrete piers are a popular choice because of their resistance to rot and corrosion. Made to last, the piers are made with 10,000 PSI precast concrete and 60,000 PSI rebar. The quarter-inch steel brackets used to attach the posts are powder-coated to prevent rust and corrosion. "Over 50 percent of our projects are agricultural construction," says Mark Stover of Perma-Column. "Instead of putting wood in the ground that will rot, we use pre-cast concrete with steel brackets that connect to the rest of the wood frame. This eliminates the need for treated lumber in the columns." By elevating the wood out of the ground, it's no longer in constant contact with the microorganism-filled materials that cause decay.

### Ventilation

Ventilation is crucial in animal confinement buildings. Biogases become problematic if ventilation is lacking. A suitable ventilation system should be in place to prevent buildup of the corrosive gases. "A ventilation system works at optimum performance when installed with equal amount of soffit ventilation," says Martin Rotter of Ventco (www.profilevent.com), which manufactures ProfileVent. "The ventilation system allows for the flow of fresh air into and throughout the building, while allowing excess heat, moisture, and fumes an opportunity to escape."

### Conclusion

Ultimately, not all buildings are suitable for animal confinement. If a structure isn't made or prepared for housing animals, either the animals will suffer or the building will, if not both. By using components designed to withstand the corrosive elements so commonly found in agricultural settings, it will help assure the structures your company builds will stand up to use for generations to come. Which is important - especially if you put your logo on the side of the building. **FBN**

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When trusses arrive on the jobsite, it's important to inspect them as quickly as possible. Photos courtesy of SBCA

# See Something, Say Something

Early detection, reporting of truss damage can prevent downstream headaches

■ By Sean Shields, Structural Building Components Association

**A**s this article series has pointed out several times, metal plate connected wood trusses are incredibly efficient framing elements that can distribute loads over long spans. In simple terms, a truss accomplishes this feat by using alternating structural framing elements that are either in compression or tension. Fortunately, you don't have to be a professional engineer to appreciate that this interplay within a truss makes every element of a trusses design, from the grade of the lumber to the arrangement of each interior web, incredibly vital to its ability to perform as intended.

Because every element is important, this article is going to focus on truss damage and best practices installers can follow to ensure damage to a truss element doesn't become a significant

issue in relation to the structural integrity of a building over time.

### It's Not Like a Chain

First, it's important to note that trusses are not like a steel chain. Chain links are uniform in the way they distribute tension loading and so the adage is true that a chain is only as strong as its weakest link. Conversely, trusses do not distribute load uniformly throughout each truss, or even from truss to truss in a system. Because of this complex interplay, it is exceedingly difficult to just look at damage to a truss in the field and know how that damage may impact the long-term performance of the truss system.

### It's Not About the Worst Case

Obviously, significant damage to one or more critical aspects

of the trusses in a system can potentially lead to a partial or complete failure of the whole system. This is the worst case, and, to be clear, it is not the focus of this article. Rather, let's look at the consequences of less obvious damage and the best practices for avoiding those outcomes.

### It's About Avoiding Guesswork

Several of the previous articles in this series focused on the best practices of storing, handling, and lifting trusses to avoid lateral bending and other activities that most commonly lead to truss damage. Many times, damage caused by these activities comes in the form of checks, splits and cracks in the wood members and/or metal connector plates that either bend or pull out from the wood at the joints.

The challenge is that while damage like this can typically be repaired in the field, sometimes the repair is more difficult or costly than delivering and installing a replacement truss. Even a veteran installer should not make a visual conclusion on how a truss can be repaired in order to perform as intended. This should be left to a design professional with access to all the information associated with the truss design, which is typically found within the design software.

This is why component manufacturers (CMs) are quick to point out in their construction documentation that trusses should not be altered in any way (which includes damage) without the assistance of a building designer, truss designer, or the manufacturer. Any alteration, including damage, can impact performance and only the CM will be able to correctly ascertain how to remedy it.

### It's About Avoiding Headaches

If truss damage is not caught and addressed before or during initial installation, the remedy can go from a minor inconvenience to a major headache quickly. Again, sometimes a truss repair isn't possible or efficient and a new, replacement truss is the best option. If the trusses are installed and sheathing is

applied, it becomes a lot more difficult and time consuming to rip out and replace a truss.

Similarly, if mechanical, electrical and plumbing (MEP) infrastructure is installed before a truss repair is completed, it may be difficult or impossible to pursue the best repair method because the MEP is in the way. In this case, the consequence is typically a more expensive and time-consuming repair.

As another example, late detection of damage to a truss that ties into a multi-ply girder may mean that a different hanger will need to be used, forcing installers to remove the hangers already attached to the girder. The removal of that hanger may prompt the need to apply a repair to the girder as well.

A more subtle form of truss damage comes in the form of connector plate damage or plate pull out, typically caused on the jobsite due to excessive lateral bending. (See "The Plane Truth" in the November 2020 issue for best practices to avoid this kind of damage.) This kind of damage may lead to long term performance issues where the trusses deflect (bend out of plane) more than designed, which can lead to issues like drywall cracking. Plate pull out in agricultural buildings also exposes more of the metal to moisture and corrosive conditions that can shorten the life of a truss.

### It's About Small, Simple Steps

Fortunately, the best practices for avoiding any and all of these consequences is not difficult to implement. First, truss bundles should be visually inspected either at the time of delivery, or as soon as possible afterward. If there is any noticeable damage that occurred during delivery, the CM should be contacted immediately and, if possible, a digital photo of the damage should be sent to the CM so they can begin designing the repair or scheduling



***If you see damage to a truss, take a digital picture of the damage and immediately send it to the manufacturer so they can begin the process of designing a repair or fabricating a replacement truss.***





the production and delivery of a replacement truss. The sooner the CM is contacted, the less disruptive the remedy will be to the installation process.

Sending a digital picture of the damage may also enable the CM to deem only a simple repair is needed and the truss can be stabilized with a temporary scab during the lifting and installation process. This avoids any potential delay in the construction schedule while a repair is designed and the temporary scab can either be removed or incorporated into the repair after installation (but before sheathing or MEP is applied).

### It's About Industry Best Practices

Along these lines, the Building Component Safety Information (BCSI) Handbook-B5 Summary Sheet, "Truss Damage, Jobsite Modifications & Installation Errors," provides the following steps to correct truss damage on the jobsite:

1. Temporarily brace or support the Truss to prevent further damage to the Truss and danger to workers.

2. Report damage, alterations or installation errors to the Truss Manufacturer immediately.



**Damaged trusses may not perform as designed. Damage that is detected and addressed early will avoid more costly downstream consequences.**

3. Do not attempt to repair the Truss without a Repair Detail from the Building Designer, Truss Designer or Truss Manufacturer.

4. Prior to beginning the repair, lay the Truss flat on a solid, level surface. If the Truss is already installed, shore up the Truss to relieve any Load.

5. Repair the Truss by following the information provided in the Repair Detail exactly. Make sure to use the correct materials as specified. Seek professional guidance if anything is unclear.

6. Keep the Repair Detail in case the Building Official, Building Designer or Owner requests it.

7. If the Repair Detail is not for the specific field condition you are repairing, do not use it. Always follow the repair Detail prepared for your specific situation.

8. If the designed repair cannot be accomplished, call the Building Designer, Truss Designer or Truss Manufacturer.

## B5 Truss Damage, Jobsite Modifications and Installation Errors Daño a los Trusses, Modificaciones en la Obra y Errores de Instalación

Metal plate connected wood trusses are pre-fabricated structural components, assembled with wood members and metal connector plates and designed to carry superimposed loads.

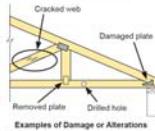
**WARNING** Damage, jobsite modifications or improper installation will reduce the strength of a truss. Seek professional assistance from the building designer, truss designer or truss manufacturer to remedy any damage, modifications and/or installation issues.

**NOTICE** Building Codes prohibit the alteration of a truss without the prior approval of a registered design professional.

### Follow These Steps to Correct Damage, Modifications and Errors

If a truss is damaged, altered or improperly installed:

1. Temporarily brace or support the truss to prevent further damage to the truss and potential danger to workers.
2. Report damage, alterations or installation errors to the truss manufacturer immediately. Failure to report may void any warranties.
3. Do not attempt to repair the truss without a Repair Detail from the building designer, truss designer or truss manufacturer.
4. Prior to beginning the repair, lay the truss flat on a solid, level surface. If the truss is already installed, shore up the truss to relieve any load.
5. Repair the truss by following the information provided on the Repair Detail exactly. Make sure to use the correct materials as specified. Seek professional guidance if anything is unclear.
6. Keep the Repair Detail in case the building official, building designer or owner requests it.
7. If the Repair Detail is not for the specific field condition being repaired, **DO NOT** use it. Always follow the Repair Detail prepared for your specific situation.
8. If the designed repair cannot be accomplished, inform the building designer, truss designer or truss manufacturer.

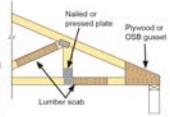


Examples of Damage or Alterations

### Common Repair Techniques

Each Repair Detail is generated on a case-by-case basis, since trusses and the type of damage vary considerably. Examples of common repairs include:

- Plywood or oriented strand board (OSB) gussets over damaged plates or joints.
- Metal nail-on plates.
- Lumber scabs or repair frames over broken chords and/or webs.
- Truss plates applied by a portable press.



**NOTICE** Do not attempt to repair the truss without a Repair Detail from the building designer, truss designer or truss manufacturer.



**DON'T** cut truss members. The modification shown in this photo needs to be repaired. **NO** corte los miembros de las trusses. La modificación mostrada en esta foto necesita una reparación.

Trusses de madera conectados con chapas de metal son componentes estructurales prefabricados, montados con miembros de madera y chapas de metal para conexión y son diseñados para llevar cargas sobrepuestas.

**ADVERTENCIA!** Daño, modificaciones en la obra o instalación incorrecta reducirán la fuerza del truss. Póngase en contacto con el diseñador del edificio, diseñador del truss o fabricante del truss para remediar algunos daños, modificaciones y/o problemas de instalación.

Los códigos de construcción prohíben la alteración de una armadura sin la aprobación previa de un profesional de diseño registrado.

### Siga estos pasos para corregir daño, modificaciones y errores

Si un truss está dañado, cambiado o instalado incorrectamente:

1. Anclar o soportar el truss temporalmente para prevenir más daño al truss y peligro potencial a los trabajadores.
2. Reporte daño, alteraciones o errores de instalación al fabricante de los trusses inmediatamente. Falta de reportarlo puede poner en nulo la garantía.
3. No intente a reparar el truss sin unas instrucciones de Reparación del diseñador del edificio, diseñador del truss o el fabricante del truss.
4. Antes de empezar la reparación, coloque el truss plano sobre una superficie sólida y llana. Si el truss ya está instalado, apuntalar el truss para aliviar alguna carga.
5. Reparar el truss por seguir exactamente la información provista en las instrucciones de Reparación. Asegúrese que use los materiales correctos como es especificado. Busca el guía profesional si algo está vago.
6. Guarde las Instrucciones de Reparación en caso de que el inspector de edificios, diseñador del edificio o dueño las solicite.
7. Si la Instrucción de Reparación no es para la condición específica que se está reparando, **NO** la use. Siempre siga las Instrucciones de Reparación, específicamente preparadas para su situación exacta.
8. Si no se puede hacer la reparación designada, informe al diseñador del edificio, diseñador del truss o fabricante del truss.

### Técnicas comunes de reparación

Cada Instrucción de Reparación está generada en base de caso-por caso, porque los trusses y el tipo de daño pueden variar mucho. Ejemplos de reparaciones comunes incluyen:

- Madera contrachapada o panel de fibras orientadas (OSB) escudese sobre chapas dañadas o juntas.
- Chapas de metal que se clavaron.
- Costras de madera o armazón de reparación sobre cuerdas o miembros secundarios rotos.
- Chapas de truss aplicadas por una prensa portátil.

No intente reparar el truss sin las Instrucciones de Reparación del diseñador del edificio, diseñador del truss o fabricante del truss.



Sometimes the most efficient solution for a damaged truss is not a repair but a new truss.



Building Component Safety Information (BCSI) Handbook-B5 Summary Sheet, "Truss Damage, Jobsite Modifications & Installation Errors."

Throughout the installation process, it's also a good practice to quickly review each truss as it's picked and after it's installed, particularly if any lateral bending occurs during the installation process.

### Bottom Line

It's important for installers to review trusses at the time of delivery for damage and follow best practices for minimizing the risk of truss damage during material handling and installation on the jobsite. If a truss is damaged, installers should immediately contact the CM and send them a digital photo of the damage. This will allow the CM to work quickly to issue either an approved truss repair or produce and deliver a replacement truss. Taking this overall approach will minimize impacts to the construction schedule and eliminate potential headaches later when the building is more fully enclosed. **FBN**

Sean Shields is Director of Communications for the Structural Building Components Association (SBCA, <https://www.sbcacomponents.com>) and has authored over a hundred articles focused on structural framing and off-site construction since 2004.








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# Views from BCMC



■ By Karen Knapstein

**A**t the invitation of the Structural Building Components Association, (SBCA), I represented *Frame Building News*, attending the Building Components Manufacturers Conference, (BCMC) trade show at the CHI Health Center in Omaha, Nebraska, Oct. 6-7. It was the event's 40th anniversary. And, since the host city is also the host of the College World Series, BCMC incorporated a baseball theme throughout the show and adopted the tagline 'Component World Series'.

I wasn't able to speak with everyone, but over the course of my stay, I spoke with dozens of manufacturers. Seeing the equipment in action, including machines that are used to make roof and floor trusses to maximize the labor force available and minimize waste, made for an interesting couple of days.

"With over 825 registrants pouring through 92 exhibitor booths spread out over 55,530 square feet, it was crystal clear the component manufacturing industry is experiencing very strong demand for its products and services," says Sean Shields, the director of communications for SBCA, which puts on BCMC. "This show floor highlighted many of the latest advancements in fabrication equipment and software available to help manufacturers improve the quality and performance of their framing packages. Similarly, the education sessions focused on the trends shaping this industry, from accurately assessing automation ROI to the integration of field labor, manufactured framing, and building design."

If you have questions or want information about any of these companies, fill out the request for information on page 42 and mail it in ... we'll take care of the rest. **FBN**



The 40th annual BCMC was held Oct. 6-7 in Omaha, Nebraska, at the CHI Health Center. [www.bcmshow.com](http://www.bcmshow.com) Photos by Karen Knapstein



**FastenMaster Framing Systems** exhibited its framing solutions, including fasteners developed to solve problems that were found in the field. For example, the NLB Connector eliminates floor squeaks by allowing vertical truss movement in non-load bearing walls while still providing lateral stability. Also, its FrameFAST Structural Framing System replaces framing ties, clips, and straps with 6" FrameFAST screws. [FastenMaster.com](http://FastenMaster.com)



Transport Products & Service Enterprises, Inc. sells Auwärter trailers. New to the North American market, the specialty trailers are used to transport SIPs vertically. The platform sits on top of the trailer. The driver can unload the platform, get another load, and then come back and pick up the platform once it's empty so it doesn't hold up delivery. [www.tpseinc.com](http://www.tpseinc.com)



Panels Plus, an Innovance company, which uses MiTek software, debuted its Platinum Series Automated Sheathing Bridge, which offers more automation to maximize worker productivity. Sheathing stations fasten sheathing to wood wall panels made with lumber from 2x4 to 2x10. [www.panplus.com](http://www.panplus.com)



The Simpson Strong-Tie booth focused largely on software solutions. The company still provides fastening and hardware solutions for builders. Additionally, its software allows building designers, builders, and owners to communicate at a higher level before building starts. [www.strongtie.com](http://www.strongtie.com)



QuickTie Systems offers a unique tie-down system. It's a cable system that holds the wall to the foundation. During installation, the cable assembly is tensioned to 130%. Then, once completed and loaded, there's no slack in the cable and it has the proper tension of 100%. [www.quicktieproducts.com](http://www.quicktieproducts.com)



American International Forest Products is a lumber wholesaler and distribution company. They operate with seven different departments, including CDX panels, European Spruce, Doug Fir, and more. "You name it, we sell it," they said. [www.lumber.com](http://www.lumber.com)



↑↑ (New Way Holdings) NWH Roof & Floor Truss Systems exhibited its Stealth Floor Truss Machine, which, with 2 workers on each side, makes quick work of cranking out floor trusses. [www.nwhtrussystems.com](http://www.nwhtrussystems.com)



Spida Machinery exhibited in a 4,000 sq. ft. booth. One of the machines the company exhibited (shown at left) is its Mini 8 table press for making small floor and roof trusses up to 8' high x 32' long. [www.spida.com](http://www.spida.com)



↑↑ SPAX, a division of Altenloh Brinck & Co., demonstrated their Specialty Engineered Fasteners, Multi-Purpose Engineered Fasteners, and PowerLags. SPAX fasteners feature patented serrations, a patented MULTIhead, and a unique point that prevents splitting and eliminates the need to pre-drill wood. [www.spax.us](http://www.spax.us)





Precision Equipment Manufacturing makes truss roller trailers in standard and gooseneck configurations. The company, which marked its 20th anniversary this year, promoted its new split-roller design at BCMC 2021. The new design gives the hauler the ability to load two loads and unload at two different sites. Extension trailers are available to accommodate really long loads. [www.precisionequipmfg.com](http://www.precisionequipmfg.com)



Lakeside Trailer Manufacturing has been building trailers since 1986. They launched their business making side-offload trailers that carried trusses upside-down. In 1987, they started making roll-off trailers, and for a time, they made both side-offloads and roll-offs. However, as things progressed, they stopped making side-offloads and the company is now totally devoted to roll-off trailers. They manufacture standard models, but they also make custom trailers, as needed. Their 48' stretch roll-off extends up to 70'. [www.rollerbed.com](http://www.rollerbed.com)



The purpose of the Truss Plate Institute is to develop and maintain the design standard for metal plate connected wood truss construction. TPI members include MiTek, Alpine, Cherokee, Simpson Strong-Tie, and Eagle. One of the TPI goals is to get the industry involved in writing the standard. [www.tpinst.org](http://www.tpinst.org)



At 15,000 square feet, MiTek had the largest exhibit space at the 2021 BCMC. One of the machines on display was its prototype SmartPanel Stacker. Another machine on display was the Hornet Saw (inset), which cuts studs to length and marks stud placement, speeding construction time. [www.mitek-us.com](http://www.mitek-us.com)

Fireproofing is a hot topic, as evidenced by the heavy traffic at the Global Fireproof Solutions booth. Sales representative Mike Treadwell said one of the biggest draws of their service is it doesn't reduce the strength of the wood. [www.GlobalFire.us](http://www.GlobalFire.us)



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FrameGuard, from Lonza Wood Protection, is a surface treatment designed to protect lumber, panels, and engineered wood from termites, decay, and mold. It's from the same people who bring Wolmanized Wood to the market. [www.frameguardwood.com](http://www.frameguardwood.com)





# Nails **vs** Screws

When and Where To Use Them in Post-Frame Construction

■ By Wick Buildings

**T**o guarantee quality in your post-frame construction, the devil is in the details. The use of nails vs. screws in your pole barn building is a perfect example. Knowing when, where, and why each fastener should be used is yet another step towards helping you get the most bang for your buck.

The use of nails vs. screws typically comes down to one overriding issue: money. But that's not necessarily the best approach to having a building your customer will be satisfied with for years to come.

Screws, without a doubt, provide a more secure connection. Nails, however, are generally less expensive to use. In actuality though, screws and nails both have their place. In this article, we'll describe the best application for each.

## Wood-to-Wood: Using Nails "Under" the Steel

Whether you're applying nails or screws, the goal is to provide enough shear strength to support wind and snow loads.

Nails are best used in three specific areas of your post-frame building, all of which are essentially under the steel that will ultimately wrap around the structure. (We'll get to that steel in the section on screws.)

### Three Areas Well-Suited for Nails

**1. Girts to Columns.** Girts are horizontal lumber components that connect columns. Note that they're placed on the outside of the columns. The exterior side-wall steel is eventually fastened to the girts. Girts should be attached with nails of the appropriate size and quantity.



**Whether you're applying nails or screws, the goal is to provide enough shear strength to support wind and snow loads..** Photo courtesy of Wick Buildings.

**2. Purlins to Trusses.** Much like how the girts form the framework for the steel on the walls, purlins do the same on the trusses, where the roof steel is attached. Same drill here as the girts: Use the correct size and right amount of nails to secure the purlins to the trusses.

**3. Bracing.** During construction, the bracing keeps the building frame plumb and level prior to structural sheathing. Permanent bracing stiffens the structure and helps the structure withstand wind and snow loads.

Bracing is actually used to connect all the components we've just mentioned—columns, girts, purlins, and trusses. Properly sized and placed nails can be used effectively for the bracing.

### Bonus Tips on Using Nails

**Ring-shank nails.** A ring-shank nail will provide even more strength than typical nails. The circular pattern embedded in the nail locks into the wood fiber when it's driven into place. Wick uses only ring-shank nails.

Compared to nails, the standard screws Wick uses generate **significant pull-out resistance**

**122%**  
compared to ring shank

**352%**  
compared to smooth shank

**Galvanized nails.** Much like builders can cut corners on the use of nails versus screws, another way to shave money is to skimp on the quality of the nails. But you don't want to do that.

For example, in areas subject to corrosion, like buried columns, splash planks, and anywhere a nail is exposed to weather, galvanized nails should be used.

Using a less expensive nail shouldn't be a financial decision. It should be based first and foremost on the requirements dictated by the engineers designing the building, who can specify the type of strength you need.

### Steel-to-Wood: Securing Your Steel Structure with Screws

Always use screws to attach your exterior steel siding to a structure. Compared to nails, the standard screws that we use generate significant pull-out resistance: 122% compared to ring shank and 352% compared to smooth shank.

Just think of it this way: When fasteners begin pulling out, structural movement occurs. Why is this so critical on the steel that encases your building? Here are two big reasons:

**1. It's your frontline defense.** The steel that wraps your post-frame structure is your outermost material. It's the frontline against the elements. Over time, moisture, temperature, wind, and snow loads can cause your building to move. Screws help combat that movement.

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**In areas subject to corrosion, like buried columns, splash planks, and anywhere a nail is exposed to weather, galvanized nails should be used.** PHOTO COURTESY OF WICK BUILDINGS



**2. It forms a strong shell.** That steel not only provides a barrier to the elements; it also ties the structure together and gives it strength. When the entire shell is fastened with maximum resistance thanks to screws, your building will be stronger and have a longer lifespan.

### Basic Guidelines on Screws

**Greater resistance for longer screws.** The longer the screw, the more likely it is to control contraction and expansion of steel. Due to the length of the panels, this is especially critical when attaching roof steel.

Wick uses 1½” screws to attach the steel panels to the roof. These screws provide an uplift load resistance 56.5% greater versus 1” screws. We’re always cautious of



diminishing returns, but these numbers make our decisions easy.

**Screwing in the flat versus the rib.** Some builders will install screws on top and through the major rib of your steel siding, versus in the flat. They’ll use a 2”

screw and install it on the top of the rib.

Unfortunately, the uplift resistance is lower, because only an inch of the screw goes into the wood (see visual below). This also makes the panel more susceptible to moving when wind and snow exert

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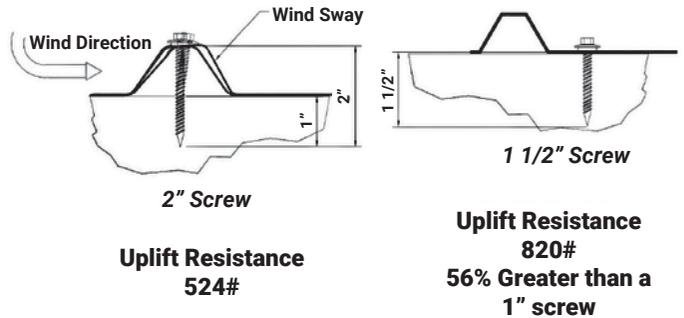
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Wick uses 1 1/2" screws to attach steel panels to the roof, providing an uplift load resistance **56.5% greater** than 1" screws.



stresses on your building, and when the steel panel expands and contracts with heat and cold.

By screwing in the pan (the lower part of the steel), you gain 56% greater uplift resistance, as 1 1/2" of the screw sinks into the wood. You also get less movement due to wind, snow and temperature stresses.

The argument against using the screw in the flat or pan, especially on the roofline, is that water runs through those channels, and has greater potential for leaking at the screw.

However, that's a potential problem easily overcome by using the appropriate screw with an integral washer head design, which reduces overdriving and ensures a weathertight seal.

### Use Data, Not Dollars, to Make Your Decision

As we've noted, both screws and nails have their place. Just don't forget that this really should be an engineering decision first, not an economic one.

A qualified engineer can use data to determine what's best and ultimately make the nail vs. screw decision an easy choice.

The whole nails or screws topic is really just the tip of the iceberg when it comes to the decisions you'll need to make when building a pole barn. It's no small undertaking, and everyone has different capabilities, timelines, and budgets. Just know that you don't have to go it alone. **FBN**

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# Fastener Compatibility with Profiled Metal Roof and Wall Panels

Proper Selection Leads to Secure Attachment

By the Metal Construction Association

**Editor's Note:** *This technical bulletin was published by the Metal Construction Association [www.metalconstruction.org], and is reprinted with permission.*

**P**rofiled metal roof or wall panels rely upon mechanical fasteners to secure the components to a structure.

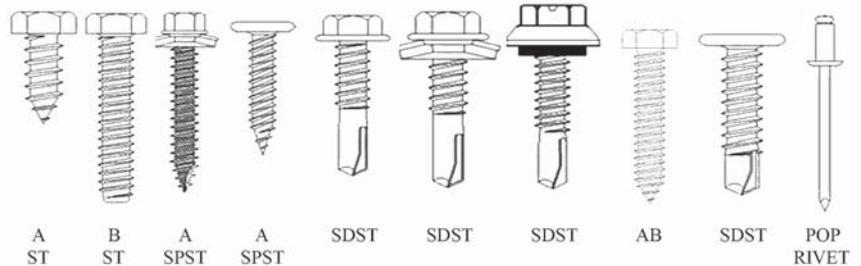
It is very important to select the correct type of fastener for metal construction in order to ensure a strong and weather-tight attachment. This Technical Bulletin serves as a guide for the selection of exposed fasteners used with metal roof and wall panels.

## Discussion

Fasteners are either primary or secondary in nature. Primary fasteners are used to transfer loads from one design element to another. These loads can be dead, design, imposed and wind loads. Where used externally, these fasteners must provide a weather-tight seal under all load conditions. They are also often required to be coated or colored in some way to match the material they are securing.

There are many different types of fasteners. These fastener types include “self-drilling,” “self-tapping” or both. Self-drilling (SD) screws have a drill point in the tip of the fastener. Self-tapping (ST) screws do not have a drill point but are able to tap their own threads into the attachment material. Self-piercing (SP) screws “pierce” through light gauge metals then self-tap (ST) into the material below.

For example, type A, B or AB screws are self-tapping. The fasteners commonly



used for attaching to light gage framing are SDST, self-drilling self-tapping screws (SDST). These threaded fasteners have the ability to drill their own hole and form their own internal mating threads. Another type of tapping screw can be “self-piercing,” which has the ability to pierce metallic material 33 mils (0.033”) or less in thickness and tap their own mating threads when driven. Self-piercing tapping screws have a sharp point angle not more than 30 degrees and are often used to secure metal panels to wood substrates.

Secondary fasteners must maintain a secure attachment. They can be used to provide lateral resistance such as part of a diaphragm. They are typically used for stitching of sidewall and roofing laps or securing flashing or other components to sheeting. These types of fasteners are often used with sealants or washers to draw the joint tight. Secondary fasteners may be coated or colored to match the surrounding material. Examples of these types of fasteners may be self-drilling or self-tapping screws, or rivet type products.

## Durability

Any type of fastener must be designed to be as durable as the metal wall or

roof cladding system itself. Fasteners are available in a variety of substrates and materials with different levels of corrosion resistance and/or durability when exposed to the harsh conditions of weather for years. The metal roof or wall panel manufacturers can provide specific recommendations for selecting fasteners for a specific system.

## Compatibility

A potential risk to the integrity and aesthetics of a building exists when the wrong type of fastener is used with a metal roof or wall cladding system. Under certain conditions, premature corrosion of the metal panel and/or the fastener may occur. This effect is known as galvanic corrosion and is often a result of corrosion between the dissimilar metals that are in contact with each other. When selecting fasteners, the relative surface area of the contact points as well as the acidity of the rainfall in the environment need to be considered.

To prevent dissimilar metal corrosion at the connection point, fasteners should be made of the same material as the roof or wall systems whenever possible. At the very least, the fastener should display equivalent corrosion resistance

to the material being fastened into. As an example, the use of galvanized steel fasteners with aluminum metal wall cladding systems is not recommended.

To assist designers and installers with the selection of proper fastener types, the table shown on page 24 was developed by the Metal Construction Association to serve as a guideline for compatibility with different types of materials. The intent is to show equivalent corrosion resistance between the fasteners and cladding material.

**Load Resistance**

Fasteners of any type or material are used to resist an applied load. Some connections are critical components in the structural design of the building while others are not. When an attachment involves design critical elements, the use and frequency of any fastening device shall be considered carefully and proven by testing and/or engineering analysis.

**SPECIAL NOTE A: Use of Seam Clamps and Brackets**

It is common practice to utilize aluminum seam clamps (for standing seam profiles) and specialty brackets (for face-attached profiles) to facilitate the attachment of rooftop ancillaries such as service walkways, solar collectors, snow retention devices and other roof accessories. Seam clamps pinch the seam by some mechanical means, but without penetrating the seam material. In such applications, aluminum clamps are suitable for use with all cladding types tabled with the exception of “Copper and Copper Alloys,” provided that accompanying hardware is 300 series stainless steel. Stainless setscrews or other nodes that engage the cladding material should have rounded tips so as not to abrade metallic coatings on steel, or cause fracture points to other metals listed. Avoid sharp edges or points on fasteners or clamps engaging the seam.

Specialty brackets for use on face-attached cladding profiles when constructed of aluminum are suitable for use with all cladding types in the table with the exception of “Copper and Copper Alloys.” Screws or bolts that attach these brackets should be selected in accordance with the guide table.

**SPECIAL NOTE B: Preservative-Treated Lumber Applications**

Preservative-treated lumber can be incompatible with certain types of fasteners. In those cases where any type of metal roof or wall cladding materials are being attached to preservative treated lumber, the following fasteners are not compatible: zinc plated screws, zinc-alloy headed screws, stainless capped screws, and aluminum. When attaching metal panels to preservative-treated lumber, a moisture barrier may be used between the lumber and the panel material. Metal

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panel fasteners that are compatible with preservative-treated lumber are stainless steel fasteners, or hot dip galvanized nails manufactured to ASTM A153 Class D or heavier. Other types of fasteners coated with proprietary anti-corrosive technologies are also available for use with preservative-treated lumber.

- Copper fasteners may be used with preservative treated wood as allowed by code.

- If panels are coated on both sides, a moisture barrier may not be needed.

- Zinc plated fasteners and bolts should not be used with any preservative treated wood. Especially with waterborne treatments.

### About the Metal Construction Association

Founded in 1983, the Metal Construction Association brings together the diverse metal construction industry for the purpose of expanding the use of all metals used in construction. MCA promotes the benefits of metal in

construction through:

- Technical guidance and product certification.
- Educational and awareness programs.
- Recognition of industry-achievement awards
- Monitoring of industry issues, such as codes and standards.
- Research to develop improved metal construction products.
- Promotional support for the industry.
- Publications to promote use of metal products. **FBN**

Metal Roof or Wall Cladding Material	Fastener Material								
	Zinc Plated Steel Screws	Organic Coated Plated Steel Screws <sup>1</sup>	Hot-Dip Galvanized Steel Nails <sup>2</sup>	Zinc-Alloy Head Steel Screws	Stainless Head Steel Screws	Aluminum Screws & Rivets <sup>4</sup>	Copper & Copper Alloys	300 Series Stainless Steel	Organic Coated 400 Series Stainless Steel <sup>1</sup>
Unpainted Galvanized Steel <sup>3</sup>	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Painted Galvanized Steel <sup>3</sup>	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Unpainted Galvalume Steel <sup>3</sup>	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Painted Galvalume Steel <sup>3</sup>	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Aluminum	No	Yes <sup>5</sup>	No	Yes <sup>5</sup>	Yes <sup>5</sup>	Yes	No	Yes	No
Uncoated Copper & Copper Alloys	No	No	No	No	No	No	Yes	Yes	No
300 Stainless Steel	No	No	No	Yes	Yes	No	No	Yes	Yes
Zinc Sheet	No	No	No	No	No	No	No	Yes	No

## Recommended Fastener Guide

The included table serves as a guideline for the selection of fasteners used with metal roofing and wall panels. The performance of compatible fasteners shown in this table matches the expected life of the metal roof or wall cladding materials. However, in highly corrosive environments such as heavy industrial, coastal marine (within 1,500 feet from a salt water body), high levels of airborne pollutants, preservative-treated lumber or fire-retardant lumber, the compatibility of certain fasteners with metal roofing or wall cladding materials may be affected. Additionally, corrosive sources on the inside of the building or for buildings where the interior is also exposed to the elements must be taken into consideration when selecting the fasteners. In these types of applications, the manufacturers of the fastener and metal panel will have specific and unique recommendations and should be consulted regarding suitability for use. In addition, in the event that certain coating barriers are damaged or scratched through to the substrate there is increased potential for premature corrosion. Care should be taken during installation and during routine maintenance of the panels in order to protect the integrity of the coatings used for metal panels.

The table shows recommendations based on various cladding material and fastener combinations. Whenever a cladding material is painted,

the guidance in the table is based on the assumption that the fastener will also be painted.

Notes:

1. Organic coated fasteners should have corrosion resistance equal to or better than no red rust after 500 hours in ASTM B117 salt spray test.

2. Nails should be galvanized per ASTM A153.

3. The performance of base metal may be impaired by coastal and heavy industrial environments. Consult with the respective manufacturer of any building material or component whenever carbon steel panels and/or carbon steel fasteners are used in coastal and/or heavy industrial environments as these applications may or may not void available product warranties.

4. Commercial availability of threaded aluminum fasteners is very limited due to their lower torsional, tensile, and shear properties. However, aluminum bodied pop-rivets are commercially available and should be used according to the recommended fastener guide. Note that pop-rivets may use different materials for the body and the mandrel.

5. Recommend 300 series stainless steel but manufacturers of the fastener and metal panel should be consulted regarding suitability for use.



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# Lumber Types & Properties

## Selecting Between and Within Wood Types

By Jacob Prater

**D**imensional Lumber Types and Some of Their Properties: Selecting between and within wood types.

The 2x4: It's everywhere and we use it all the time; however, not all are created equal. Of course, you need to meet the specifications for any building project, but sometimes you do have choices and they may vary by species or wood type, where and how they are produced, and how they are treated and stored before they get to you.

So, why might you want one type of wood over another? And how are they different? Is tighter grain better than wider grain? These are questions that can be answered generally while noting that there may always be an exception to general rules.

Most construction lumber falls into the category of softwood, which means that it comes from gymnosperms (means naked seed), which are chiefly conifers such as hemlock, spruce, fir, and various pines. While softwoods vary in their strength properties and density, they are typically grouped and sold under a comparable stamped product that meets similar engineering properties. These groupings really simplify choices and help to keep quality and strength controlled on the purchasing end as sawmills may be getting different species coming to them due to changes in the logging industry and what is being cut.

Examples of these groupings are SYP, Southern Yellow Pine; DF-L (or Doug Fir-L), Douglas Fir and Western Larch; Hem-Fir, a combination of Western Hemlock and various true Fir species; and SPF, a combination of Spruce, Pine, and Fir (listed in order of strongest to weakest). These groupings will be stamped on the



**Figure 1. S-P-F stamp for Spruce, Pine, and Fir.**  
PHOTO BY JACOB PRATER

wood you purchase like the example of S-P-F in **Figure 1**. Different species certainly have advantages over each other in different categories including everything from looks to resistance to warping and, of course, strength.

Strength is a critical factor in many uses; to be sure the right material is used, all you have to do is use the correct grade and type of lumber prescribed. But you can also make choices within available wood and get a stronger product or you can use the stronger product (wood type) within that grade if it is available, if it suits your needs, and if the price is right (sometimes they don't even get priced higher).

Among the strongest softwoods used in construction is Southern Yellow Pine with Douglas Fir a close second, while White Pine is on the lower end with Spruce and Hemlock rounding things out in the middle. A basic understanding of strength for lumber types is displayed in **Table 1**, where the design values for the previously mentioned lumber groupings can be compared for bending and compression strength. Bending strength affects how the wood responds to spanning while compression strength here is related to the load bearing of a stud.

Strength isn't the only thing that might matter though. Sometimes strength-to-

weight ratio may be important, in which case Spruce is the best option. While species choice can be important, Shuva Gautam (Forestry Professor and Teacher of Wood Products) stresses that it is often more important how a product is treated and stored before and after you receive it. In essence, the drying process and then the conditions of storage will dramatically affect straightness of the lumber within a particular grade and wood type.

For constructing climate-controlled buildings, kiln dried wood that is then stored in climate-controlled conditions would be ideal. While for non-air-conditioned buildings kiln dried wood that is then stored under cover might be better. The issue in each instance being acclimating the wood to the moisture conditions where it will be after construction so that it remains as dimensionally stable as possible.

In addition to the dimensional stability of wood and the moisture environment, the physical act of drying it, particularly kiln drying it makes the wood stronger. Kiln drying is standard for construction lumber to ensure a quality product, but you will want to make sure that wood stays dry afterwards.

### Factors Affecting Strength

Given that some species are generally stronger than others, there is also variation within a species in terms of strength of the wood product you may buy. Several factors may affect the strength of wood within a species including tree age and growth ring thickness. Softwoods grow two different types of woody material: earlywood and latewood. Latewood is stronger than the earlywood and, as a result, when there is more latewood in a particular piece of

**Table 1. Base Design Values for Visually Graded Dimensional Lumber**

Design Values, lb/in <sup>2</sup>			
Species & Commercial Grade	Size Classification (in)	Bending	Compression Parallel to Grain
<b>Douglas-Fir-Larch</b>			
Select Structural	2x4	1500	1700
No. 1	2x4	1000	1500
Stud	2x4	700	850
Construction	2x4	1000	1650
<b>Hem-Fir</b>			
Select Structural	2x4	1400	1500
No. 1	2x4	975	1350
Stud	2x4	675	800
Construction	2x4	975	1550
<b>Spruce-Pine-Fir</b>			
Select Structural	2x4	1250	1100
No. 1	2x4	875	1150
Stud	2x4	675	725
Construction	2x4	1000	1400
<b>Southern Pine</b>			
Select Structural	2x4	2850	2100
No. 1 Dense	2x4	2000	2000
No. 1	2x4	1850	1850
No. 1 Non-Dense	2x4	1700	1700

wood it will be stronger. This latewood is the darker-colored material in softwoods and is grown on the tree in the latter part of the growing season. Latewood is more dense owing to thickened cell walls and has greater strength properties than the lighter-colored earlywood. Most of the time more growth rings per inch of thickness means there will be more latewood in the board. This, of course, translates to older, bigger trees producing stronger wood.

Tree growth rate affects wood strength in addition to the variation in species. And this one is a little tricky. As a gen-

eral rule, softwoods will be stronger if they are growing more slowly (hardwoods exhibit the opposite with faster growing trees yielding stronger wood products). There is an important distinction that should be made about growth rate here: The real point of this is about tree age. While growth rate does affect the density and strength of wood in some species, the more important factor is that as softwood trees age, many of them will form denser and thus stronger wood than when they were younger and growing more rapidly. The major distinction here isn't really growth rate, but ring thickness and how

the tree is laying up wood. In other words, if you have two old trees (same age) of the same species and one is growing faster than another, there isn't necessarily going to be a lot of difference in wood density and thus strength. But there will be a difference in the wood between a 20-year-old tree and a 120-year-old tree. As a bonus, that wood from an older tree is also less likely to have knots in it.

**Juvenile Wood**

With this knowledge, you can make choices at the lumber pile based on the thickness of growth rings, but remember: If it makes the grade that you need, it makes the grade that you need. Things that you might avoid if you can would be wide growth rings and lumber that includes the center of the tree. Avoiding these could help you avoid what is called "juvenile wood." Juvenile wood is the rapidly growing wood of any tree. This wood will be formed at the top of the tree but remains in the center as more wood is laid on around it each year as the tree grows vertically. This juvenile wood is flexible and serves the tree well in bending in the wind, but as a result it is not as strong as wood that is put on later.

The difference in this juvenile wood has to do with the orientation of the layers of the cell walls within the wood. In juvenile wood the layers of cell wall are all oriented in roughly the same direction, whereas in wood laid on later the layers in the cell walls are at an angle to each other, making the wood stronger (think about plywood and how the layers are crossways to each other).

**Strength and Location**

Growth rate, ring thickness, and thus strength and wood density are also affected by where the wood is produced. The more northern parts of the range where a species may be grown will cause trees to grow more slowly laying on thinner growth rings and denser wood. As a result of this, some Spruce that is grown in Canada may be exceptionally hard, dense, and



Figure 2. Best grain orientation in premium quality studs. Note the tighter growth rings in these high quality studs. PHOTO BY JACOB PRATER

strong while in contrast fast-grown Yellow Pine from farther south may be softer and weaker than expected (evidence of this is in Table 1 where you can see there are three types of No. 1 Southern Pine relative to density from growth rate).

To be fair to the species that make up Yellow Pine, when it is grown slowly (massive old trees) can be incredibly hard and dense as evidenced by the use of reclaimed “Heart Pine” used as flooring. Even though some of this more rapidly grown wood (you’ll be able to see the ring thickness) may be weaker, it still makes the grade that it is stamped with so you should not be afraid to use it within that grade and for its application. The plus side to rapidly growing trees and shorter rotations on timber plantations (sometimes as little as 25 years between planting and harvesting) is that wood can be produced faster and more economically than slower-growing wood, thus giving you a good and very useful product at a lower price. The savvy builder will use the best wood

available for each application, the strongest as required, the straightest where it’s needed, the pretty where it’s exposed, and the knotty and rough where it is hidden and doesn’t require strength.

If straightness and resistance to warping are important to you then the grain orientation of the wood may be more important than species, though some species are

more known for warping. The ideal grain orientation for the dimensional stability of lumber is to have the growth rings crossing the wood in the shortest direction and the grain running parallel to the length of the board (called quartersawn). The closer any piece of wood is to this ideal grain orientation the more dimensionally stable the board will be (see Figure 2).

**Wood Selection**

Between species, ring thickness, grain direction, and how the wood was stored one can be easily overwhelmed with choices, so what is the best course of action? For good or ill there are not always choices and at times you have to use what is prescribed or simply what is available. A quick look at a qualitative comparison chart (Figure 3) might tell you all you really need to know aside from strength. Dan Heinen, contractor in eastern Kansas for over 50 years, says, “On commercial jobs everything is usually dictated even down to wood species, but you have some choices in other construction.” Dan also commented that when you order a bunk of wood you “get what you get,” which may mean varying quality and a wood species that you may be less familiar with (Figure 4). He stressed that if you have the time and can pick through a pile, it can make a difference in how quick and easy your project is to build, but that “you have to have the time to pick through a lumber pile.”

Wood Type				
Species	Douglas Fir and Western Larch	Western Hemlock, California Red Fir, Grand Fir, Noble Fir, Pacific Silver Fir, and White Fir	White Spruce, Engelmann Spruce, Red Spruce, Black Spruce, Jack Pine, Lodgepole Pine, Balsam Fir, and Alpine Fir	Longleaf, Loblolly Pine, Shortleaf Pine, and Slash Pine
Color	Reddish-brown to yellow	Yellow-brown to white	White to pale yellow	Pale yellow to golden
Other Characteristics	<ul style="list-style-type: none"> <li>• High degree of hardness</li> <li>• High resistance to decay</li> </ul>	<ul style="list-style-type: none"> <li>• Takes paint well</li> <li>• Holds nails well</li> <li>• Excellent gluing characteristics</li> </ul>	<ul style="list-style-type: none"> <li>• Takes paint well</li> <li>• Holds nails well</li> <li>• Excellent gluing characteristics</li> </ul>	<ul style="list-style-type: none"> <li>• Superior load-bearing capacity</li> <li>• Holds fasteners well</li> <li>• High degree of hardness</li> </ul>

Figure 3. Wood type chart. COURTESY OF MENARDS, WWW.MENARDS.COM.

In light of the fact that different species have their own characteristics related to how easy they are to work with, woods such as hemlock, while strong, may not be a great choice in some circumstances due to their likelihood to warp and twist (you might avoid putting sheetrock on them). Other woods such as Douglas Fir might be straighter and strong but vary in quality quite a bit. What you choose to use is application-dependent and availability-driven, but when pressed if he had a choice of wood species Dan Heinen responded, “I love working with White Pine. It’s lighter and softer, but it doesn’t split out as much when you nail it up, and it looks better where exposed.” Certainly, taking fasteners without splitting and holding them well is something to be considered and in this category as the wood gets denser it is more likely to split when nailed.

Another part of Dan’s preference mentioned the weight of the wood. How much each individual piece weighs can certainly add up and be important when it comes to handling the product at all stages. A 2x4 8-foot can vary from about 17 lbs. for Southern Yellow Pine to 11 lbs. for White Pine (Table 2). That means that three Southern Yellow Pine 2x4s are close to the same weight as five White Pine 2x4s. That’s enough to make a clear choice if you are handling it by hand all day and you don’t need the added strength of the Yellow Pine.

When asked if lumber today was better or worse than decades ago, Dan responded, “There has always been junk lumber and good lumber.” He then stressed that having a good supplier always helped to ensure good product, but that in any ordered bunk of lumber there are some lower quality pieces and you just use those where it matters less, but all of it makes the grade as stamped. **FBN**

**Jacob Prater** is a Soil Scientist and Associate Professor in Wisconsin. His passion is natural resource management along with the wise and effective use of those resources to improve human life.

Table 2. Wood Weights	
Species	Approximate Weight lbs 2x4 8 ft. at a lumber yard
Southern Yellow Pine	17+
Douglas Fir	15-16
Western Hemlock	14-15
Sitka Spruce	13-14
White Pine	11-12



**Figure 4. Variation in lumber quality in a bunk of SPF studs.** PHOTO BY JACOB PRATER

# Woodworking/Hobby Shop



## PETERSHEIM BROS. CONSTRUCTION Paoli, Indiana



### PROJECT DETAILS

**Location:** Hardinburg, Indiana

**Size:** 30' x 40' x 8'

**Building System:** Daviess County Metals

**Roof Panels:** Daviess County Metals Classic Rib,  
29 ga., Sherwin-Williams Coil Coatings

**Wall Panels:** Daviess County Metals 10"  
Board & Batten, 26 ga.

**Coil Supplier:** Graber Post Buildings

**Fasteners:** Direct Metals Inc.

**Insulation:** rFOIL under roof

**Windows:** Jeld-Wen, (8) 3' x 3'

**Doors:**

(1) 36" walk door

9' x 7' overhead door

**Ventilation:** Hypervent foam strip under ridge cap

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Known bondholders, mortgages, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None. 12. Tax status: Has Not Changed During Preceding 12 Months. 13. Publisher title: FRAME BUILDING NEWS. 14. Issue date for circulation data below: August 1, 2021. 15. The extent and nature of circulation: A. Total number of copies printed (Net press run). Average number of copies each issue during preceding 12 months: 0. Actual number of copies of single issue published nearest to filing date: 0. B. Paid/requested circulation. 1. Mailed outside-county paid subscriptions/requested. Average number of copies each issue during the preceding 12 months: 127. Actual number of copies of single issue published nearest to filing date: 134. 2. Mailed in-county paid subscriptions/requested. Average number of copies each issue during the preceding 12 months: 20,229. Actual number of copies of single issue published nearest to filing date: 20,856. 3. Sales through dealers and carriers, street vendors and counter sales. Average number of copies each issue during the preceding 12 months: 0. Actual number of copies of single issue published nearest to filing date: 0. 4. Requested copies distribution through other classes mailed through the USPS. Average number of copies each issue during the preceding 12 months: 0. Actual number of copies of single issue published nearest to filing date: 0. C. Total paid/requested distribution. Average number of copies each issue during preceding 12 months: 20,356. Actual number of copies of single issue published nearest to filing date: 20,990. D. Non-requested distribution (by mail and outside mail). 1. Outside-County Non-requested copies. Average number of copies each issue during the preceding 12 months: 0. Number of copies of single issue published nearest to filing date: 0. 2. In-county non-requested copies. 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