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RURAL BUILDER MAGAZINE SPECIAL SECTION

THERMAL BRIDGING IN CFS
CAUSES & MITIGATION

METAL FRAMING TECHNIQUES
FOR NON-METAL STRUCTURAL PANELS

CFS TRUSSES
5 ADVANTAGES IN METAL ROOFING PROJECTS

INSULATED METAL PANELS
A GROWING TREND

A Closer Look at CFS Construction

In this issue, we cover some practical information and tips on working with cold-formed steel frame buildings.

The first article, "Calculate and Mitigate Lightning Risks," isn't specific to CFS but certainly applies. The NFPA 780 Simplified Risk Calculator developed by the National Fire Protection Association evaluates five parameters to assess a building's vulnerability to lightning. As the piece points out, the tool can identify unexpected risks. Its strength lies in the fact that it takes a holistic rather than a generalized approach.

"Cold-Formed Steel Trusses: 5 Advantages of CFS Trusses" explains why CFS trusses are a great solution for metal roofing. As metal roofing continues to grow in popularity, the demand for CFS trusses is likely to grow as well.

"Insulated Metal Panels: An Increasingly Popular Choice for Construction Challenges" details how IMPs allow faster construction with less manpower as well as other benefits that can help builders adapt to evolving industry trends.

"Connecting the Dots: Metal Framing Techniques for Non-Metal Structural Panels" explores the ways builders can handle buildings that combine CFS with other structural types. It covers fastener selection, managing movement and moisture, layout, tolerances, and structural planning, as well as field tips for successful hybrid installations.

"Smarter Steel Framing Is Here: And It's Changing Rural Construction" covers how steel allows builders to do more with less on rural construction sites, while allowing design flexibility.

"Thermal Bridging in Cold-Formed Steel Buildings: Causes and Mitigation" delves into the reasons for thermal bridging in CFS buildings and solutions for mitigating them. It also compares thermal bridging in CFS versus wood.

With the CFS construction industry continuing to grow at a healthy pace, the outlook for this segment of construction is looking bright!

—Dan Brownell

Contents

On the cover: NTT Data Center HI2 in Hillsboro, Oregon. PHOTO COURTESY OF KINGSPAN

Calculate and Mitigate Lightning Risks

Imagine a billion-volt lightning bolt striking a building; not just a cinematic scenario, but a real, imminent risk in today's increasingly unpredictable climate.

For over 120 years, the National Fire Protection Association's (NFPA) Standard 780 has stood as the definitive guide for effective lightning protection. Within the standard lies a crucial tool: the Simplified Risk Calculator, designed to quantify lightning risk for specific structures, empowering architects, engineers, and building owners to shield properties from nature's electric wrath.

SIMPLE TOOLS TO QUANTIFY LIGHTNING RISK

Lightning's ability to ravage concrete, disrupt intricate electrical systems, and undermine critical infrastructure raises a pressing question: What does this risk mean for your project? The NFPA 780's Simplified Risk Calculator offers a tailored answer, providing a matrix to precisely quantify this natural force's threat to specific structures. This knowledge is pivotal for building professionals in determining the necessity of a lightning protection system. Accessible as an app on various commercial websites, this quick-to-use tool often yields surprising results.

PARAMETERS OF THE SIMPLIFIED RISK CALCULATOR

The tool evaluates five key parameters to assess a facility's vulnerability:

1. Structural Type and Location: Assessing the geographic location, essential in determining lighting strike frequency.

2. Structural Dimensions: Reviewing the size and height, as larger footprints and taller structures typically increase vulnerability.

3. Surrounding Environment: Considering general locale such as nearby taller structures and natural elements, such as trees, to evaluate exposure to lightning strikes.

4. Occupancy and Contents: Gauging risk based on building occupancy and contents, especially those flammable, hazardous, valuable or challenging to access or evacuate.

5. Consequences of a Lightning Strike: Weighing the potential for human injury, operational disruption, environmental impact, historical preservation and damage to irreplaceable equipment.

BEYOND GEOGRAPHIC LOCATION: A HOLISTIC ASSESSMENT

Lightning risk is not solely determined by high-lightning activity regions. The NFPA 780 calculator's comprehensive approach can reveal unexpected risks — a smaller structure in a lower-zone risk may face heightened danger due to specific contents or construction materials. In contrast, a larger building in a high-risk area might have a reduced risk due to its construction type and occupancy. This tool emphasizes the importance of a holistic risk assessment over a generalized approach.

CASE STUDY: A PRACTICAL APPLICATION

Consider a large, 60-pump gas station and convenience store in the Midwest, a region with moderate lightning activity. Initial assessments placed its risk as moderate based on location. However, the NFPA 780 calculator identified a high-risk score due to the building's large footprint, the presence of flammable materials and high occupancy. This insight led to the installation of a lightning protection system on the store and the fuel canopies, demonstrating the tool's vital role in preventing potential disasters.

CONCLUSION: A CALL TO ACTION

The NFPA 780 Simplified Risk Calculator is indispensable for forward-thinking building professionals. As changing weather patterns increase the frequency and unpredictability of lightning strikes, this tool becomes essential in designing safer, lightning-resilient structures. With around 25 million lightning strikes annually in the U.S., addressing this natural threat is not just prudent, it's imperative. **MB**

Jennifer Morgan *is co-owner of East Coast Lightning Equipment Inc. Her role at ECLE includes oversight of purchasing, accounting, hiring and business development. She also serves as the CEO of Scientific Lightning Solutions of Titusville, Florida. SLS solves lightning related problems for mission critical facilities, such as rocket launch pads, power generation facilities and mines. She has served as the Education Coordinator for the Lightning Safety Alliance, a not-for-profit business league since 2009 and joined the NFPA 780 Technical Committee as an alternate member in 2019.*

BY TIM LINDQUIST

CFS roof trusses are about half the weight of wood trusses. This makes them cheaper to transport and easier to handle and install.
PHOTO COURTESY OF FRAMECAD

Cold-Formed Steel Trusses

5 Advantages in Metal Roofing Projects

The construction industry is continually seeking innovative ways to improve building performance, safety, and efficiency. Cold-formed steel (CFS) trusses are recognized as a leading solution for metal roofing, offering distinct advantages over traditional materials like wood. CFS trusses provide a wide range of benefits that address the evolving challenges faced by builders and developers. There are five key advantages to utilizing CFS for metal roofing projects.

1. Fire resistance and durability
2. Light weight and structural efficiency
3. Supply chain and production advantages
4. Easier disassembly and sustainability
5. Design flexibility and installation

5 KEY ADVANTAGES FOR CFS AND METAL ROOFING

1. Fire Resistance and Durability

With the increased threat of damage caused by wildfires such as in the Los Angeles fires this year, the industry needs to rethink how homes should be built, and based on recent flame tests, many are calling for the use of non-combustible CFS as a leading material. While CFS trusses alone can't stop wildfires, their integration into comprehensive fire-resistant building systems addresses the primary ignition observed in the Los Angeles fires — particularly ember penetration through vulnerable roof structures. CFS framing is non-combustible and maintains its non-combustible properties over time from building, occupation, renovation to repairs. Unlike wood, steel can't burn. It doesn't ignite or contribute to the spread of flames, which offers critical time for occupants to evacuate in the event of a fire. Fire-resistant coatings can be applied to steel to delay structural damage, further enhancing safety and potentially lowering insurance premiums. Properly protected CFS assemblies can maintain their integrity up to 1,700°F for up to 2 hours. And steel maintains its load-bearing capacity longer than wood during fires, delaying roof collapse and allowing more time for firefighting efforts.

2. Light Weight and Structural Efficiency

CFS roof trusses weigh approximately half as much as their wood counterparts. This reduced weight leads to several benefits such as easier handling and installation, speeding up the construction process, lower transportation costs, and less strain on the building's foundation and supporting structures.

Of all commonly used construction materials, steel has the highest strength-to-weight ratio. Steel is inherently strong, and when formed through cold-working processes, it becomes even more resilient without significant loss of weight. This high strength allows CFS trusses to support heavy loads while maintaining minimal material weight, making them ideal for large-span applications.

For residential construction, CFS is ideal for open plan designs and flexible layouts, as it has the ability to span larger distances without additional support. In commercial spaces, CFS trusses are increasingly the go-to option for supporting metal roofing systems. CFS trusses deliver the strength and flexibility needed for expansive roof structures due to their ability to support large spans without extra support columns. This is a significant advantage in spaces like shopping centers or warehouses where maximizing usable space is crucial.

In addition to being strong, CFS trusses

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Innovation with purpose: solving real-world construction challenges

Since our inception nearly 50 years ago, Howick Group has grown from a local New Zealand manufacturer into a global leader in light steel roll-forming systems. Our machines are used in over 80 countries by builders, developers and offsite construction specialists who want to work smarter, not harder. What sets us apart? We're pioneers - inventive to the core and constantly pushing boundaries to help the industry build faster, smarter, and more sustainably.

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are structurally efficient and resistant to many of the common issues associated with traditional materials such as wood. For instance, they do not suffer from issues like warping, twisting, or rotting, which can be common with timber trusses in humid or fluctuating environments. The corrosion-resistant properties of steel, especially when treated with coatings such as galvanized finishes, help ensure that CFS trusses remain durable even in adverse conditions.

3. Supply Chain and Production Advantages

While both steel and wood supply chains can be affected by global events and market conditions, the steel supply chain has demonstrated greater stability and predictability, making it a more reliable option for construction projects. With more stable pricing, it's easier for developers to estimate project costs more accurately than building with wood.

Steel can be contained, stored, and transported in compact coils, requiring less storage footprint than wood. The lightweight nature of CFS allows for more efficient transportation, lowering shipping costs and reducing the carbon footprint, and it doesn't require special treatment for moisture, pests, or decay during transit, simplifying the logistics process.

Tim Lindquist, FRAMECAD Regional Director, Americas. PHOTO COURTESY OF FRAMECAD

Of all commonly used construction materials, steel has the highest strength-to-weight ratio. This allows CFS trusses to support heavy loads while maintaining minimal material weight, making them ideal for large-span applications. .
PHOTO COURTESY OF FRAMECAD

Faster construction means that projects can be completed ahead of schedule, which is particularly beneficial for developers and clients who need to move into or use the building quickly.

Prefabricated CFS components are easier to install, significantly speeding up the construction process. This efficiency minimizes project delays, ensuring developments reach the market sooner. By incorporating these advantages, CFS contributes to a more streamlined, efficient, and cost-effective construction process that benefits all stakeholders involved in building projects.

4. Easier Disassembly and Sustainability

Steel, as a material, is highly recyclable, and many cold-formed steel products are made from recycled steel. This reduces the demand for virgin materials and lowers the environmental impact of steel production. CFS trusses can also be fully recycled at the end of their life cycle, further contributing to their sustainability.

Moreover, the lightweight nature of CFS trusses means that less material is required to achieve the desired structural integrity, which reduces waste during construction. Since cold-formed steel is precision-engineered, the trusses are often fabricated to exact specifications, minimizing the need for on-site alterations and waste.

When building roof trusses, CFS has the advantage in that screws are fastened rather than welded. Therefore, CFS trusses can be disassembled and reused or recycled more easily than welded steel or wood trusses. And, when a CFS-built structure requires demolition, waste is minimized since steel is 100% recyclable.

CFS enables precise and consistent fabrication, resulting in seamless integration of prefabricated components. Components are manufactured to exact specifications, ensuring consistency and quality. Precise manufacturing means fewer on-site cuts, leading to reduced material waste and disposal costs.

5. Design Flexibility and Installation

CFS trusses provide architects and engineers with exceptional design flexibility. Structural design software can create roof trusses for any architectural roof design and roof load. This means that more complex designs can be achieved. And with an automated design, manufacturing processes are quick and precise down to less than a millimeter. They are highly cost-effective, involving less billable engineering time, faster manufacturing time, and reducing rework to almost zero.

CFS can be easily tailored to suit specif-

The steel supply chain is more stable than wood's, which makes it a more reliable and easier to project costs accurately. PHOTO COURTESY OF FRAMECAD

ic project needs. It can be bent and shaped into various configurations, which means that CFS trusses can be customized to fit complex architectural designs. The material's versatility also makes it suitable for both low-rise and high-rise buildings, and it can be adapted for a wide range of applications, from residential homes to large-scale commercial structures.

CFS trusses can be designed and manufactured in many different ways. The wide range of sizes, thicknesses, and strength of CFS offers engineers flexibility in selecting the appropriate material for the design requirements. The most popular ways to design and manufacture trusses are either with an inline truss or a back-to-back truss.

Inline Truss Considerations

- Easy to manufacture and transport
- Easy to install onsite
- Safer to use
- Doesn't require bracing during erection and sits well on top of walls

Complex designs can be achieved with CFS and using automated design, manufacturing processes are quick and precise down to less than a millimeter. PHOTO COURTESY OF FRAMECAD

Back-to-Back Truss Considerations

- Faster to produce than inline as fewer tooling options required
- Less material required
- Can be engineered for larger spans
- Cutting edges require more safety precautions
- Need to be braced during erection

As for installation, prefabricated components reduce the need for highly skilled labor. Considering the shortage and cost of skilled labor, CFS trusses help in this capacity. Also, with no welding required, installation is faster and simpler on-site compared to welded steel.

CONCLUSION

CFS trusses have emerged as a superior choice for metal roofing projects, offering a multitude of advantages that address the evolving needs of the construction industry. The five key benefits of CFS trusses contribute to safer, more efficient, and environmentally conscious building practices.

As the construction industry continues to evolve, the adoption of CFS trusses for metal roofing represents a forward-thinking approach that balances performance, safety, and sustainability. This technology not only meets current building standards but also paves the way for more resilient and efficient structures in the years to come. **MB**

Tim Lindquist *is FRAMECAD's Regional Director, Americas. He holds a Bachelor of Science degree in Construction Management and Engineering from North Dakota State University. With over 20 years of experience in the construction industry across civil, industrial, residential, and commercial sectors, he has held roles including Principal, Partner, and Operations Director at a FRAMECAD customer firm, Integrated Steel Solutions, where he managed cold-formed steel (CFS) manufacturing operations.*

BY DAN BROWNELL

The Chicago Drive Ventures Warehouse in Hudsonville, Michigan. This single slope, clear span commercial structure embodies innovation and functionality and features FALK HFW 40 Wall Panels. PHOTO COURTESY OF FALK

Insulated Metal Panels

An Increasingly Popular Solution for Construction Challenges

Insulated metal panels (IMPs) are wall and roof panel structures composed of steel or aluminum skins with an insulated core of rigid foam or mineral wool. These all-in-one prefabricated systems offer many advantages over traditional construction methods that require multiple components to be assembled sequentially on site.

ADVANTAGES OF IMPS

IMPs have been used in construction for decades but are growing more popular because they provide a number of increasingly important advantages, such as reduced need for skilled labor and lower total man hours; compressed project timelines; manufacturing quality control; structural benefits; greater energy efficiency; wildfire resistance; and design flexibility.

IMPs are an especially strategic choice for metal building roofs, in addition to walls. "When insulated metal panels are used for both a building's roof and walls, it further increases the efficiency to build and structural benefits for the facility," said Matt Broton, Vice President of Sales at FALK Panel.

LESS SKILLED LABOR AND FEWER TOTAL MAN HOURS NEEDED

IMPs arrive at the construction site ready to be installed, which means on-site work is greatly reduced compared to traditional construction. With the precision component assembly work already completed offsite, the onsite labor requires less skilled workers, which translates to lower labor costs.

Also, fewer total man hours are needed. According to the Metal Construction Association's Selection Guideline for Insulated Metal Panels, panels can be installed very quickly. The document states that "Depending on job complexity and size, IMPs can be erected at a rate of up to 5,000 sq. ft. per 8-hour shift by a four-man crew on an industrial project and up to 1,100 ft^2/8-hour shift by a four-man crew on an architectural project when proper lifting equipment is used. Higher installation rates can be achieved with insulated metal roof panels."

COMPRESSED PROJECT TIMELINES

Since the panels are prefabricated, much of traditional onsite scheduling and coordination of various trades isn't needed. This means the building can be enclosed much faster than a traditional build, allowing work on the interior to begin sooner. Interior work can progress without being interrupted by weather condi-

tions, further speeding the construction timeline. "IMPs present an efficient construction solution, particularly well-suited for projects with accelerated timelines, challenging weather conditions, or when coordination with other trades is required during installation," said Brian Ng, AWIP VP of Engineering.

MANUFACTURING QUALITY CONTROL

Because the panels are prefabricated in an indoor, climate-controlled environment, it's easier to achieve consistent results and have better quality control. Compared to the field conditions on a construction site, the factory-like setting allows for stable temperatures, humidity, and lighting, as well as more consistent su-

This close-up view of an All Weather Insulated Panel (AWIP) exterior wall illustrates how IMP textures and patterns can be integrated with windows to create an aesthetically pleasing, cohesively designed building. PHOTO COURTESY OF AWIP

NTT Data Center: Data centers must comply with strict building codes and high energy-efficiency standards. When designing NTT Data Center HI2 in Hillsboro, Oregon, architects chose Kingspan IMPs for the building envelope. With R-values up to 8.0 per inch, IMPs offer exceptional thermal efficiency, reducing the need for excessive heating or cooling — a crucial consideration in the operation of large-scale data centers like this. PHOTO COURTESY OF KINGSPAN

pervision and training, less material waste, and more protection from the elements and from damage while stored.

"IMPs are produced under stringent quality standards," Broton explained. "At FALK, quality testing happens throughout the entire production process — and every project that rolls out the door undergoes thorough testing and quality checks."

STRUCTURAL BENEFITS

IMPs' sturdy layers contribute stiffness and enhance structural strength. Plus, their weather-resistant composition and design provides an effective water, moisture, air, and vapor barrier, while the panels' large size reduces the number of seams and vulnerability to leakage. Also, IMPs need less ongoing maintenance, which can add up to significant savings over the long-term.

GREATER ENERGY EFFICIENCY

IMPs are especially known for being energy efficient, which is why they're often the product of choice for cold-storage facilities and structures that require high standards for energy efficiency, such as churches, offices, schools, hospitals, manufacturing plants, data centers, and distribution facilities.

"IMPs offer R-values up to 8.0 per inch and continuous insulation," said Karim Muri, VP of Marketing Services and Strategy Development at Kingspan Insulated Panels North America. "This thermal efficiency minimizes the need for excessive heating or cooling, which helps to keep building occupants comfortable, protect products being stored or shipped, and lower operational energy costs."

Although the initial costs of IMPs are higher, they can reduce long-term energy expenses to help offset the initial investment, which makes them attractive to building owners.

WILDFIRE RESISTANCE

IMPs insulated with mineral wool rather than foam are designed to provide extra fire protection. This issue of vulnerability to wildfires grabbed national headlines in January 2025 when 14 massive wildfires burned more than 57,000 acres, destroyed over 18,000 structures, and caused at least 30 deaths in the Los Angeles area.

DESIGN FLEXIBILITY

IMPs are available in many textures, colors, and finishes, and can be installed horizontally or vertically to achieve the visual effect desired.

"IMPs of the past were typically only available in limited hues and styles, but panels today allow architects and building owners to tap into virtually endless design possibilities," Muri said. "A variety of standard and custom colors can be chosen to create unique looks that align with a brand's identity and complement a location's aesthetic. Ribbed panels can be used to add accented lines and shadow effects to projects. Kingspan also has its Accent Fin products, hollow and protruding accents that seamlessly integrate with our IMPs to elevate facades."

In addition, IMPs are compatible with other cladding options — such as stone, brick, fiber cement, and vinyl, as well as other metals — to complement and enhance the overall design.

IMP INSTALLATION TRAINING

While IMP installers don't need to hold the licenses that some skilled trades need years to earn, they may require some brief training so they can install IMPs properly. For example, AWIP requires builders who install its panels to undergo a one-day training session to become an authorized installer. This ensures they have the skills needed to do the job properly. Ng explained in more detail: "AWIP provides IMPpro installer training courses, where you can become an authorized installer for wall, roof and roof deck IMPs. These training sessions are offered at our three facilities located in East Stroudsburg, Pennsylvania; Little Rock, Arkansas; and Vacaville, California.

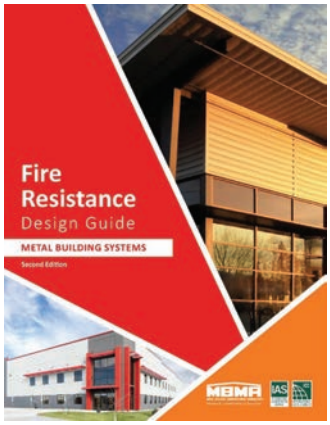
CONCLUSION

More builders are turning to IMPs as a solution to current construction challenges. Two of the biggest are labor shortages and long build times. IMPs greatly reduce these two problems and improve many others as well. Ng summed up the advantages of IMPs over conventional methods: "IMPs offer advantages that extend beyond construction efficiency. Their superior thermal performance contributes to long-term energy savings, while the cost-effectiveness and streamlined installation process make them an attractive solution for both builders and owners seeking performance and value." **MB**

MBMA RELEASES 2ND EDITION OF FIRE RESISTANCE DESIGN GUIDE FOR METAL BUILDING SYSTEMS

The Metal Building Manufacturers Association (MBMA) has published the Fire Resistance Design Guide for Metal Building Systems, Second Edition. This comprehensive resource for fire protection of metal building systems has been updated to reflect the latest codes and research.

"Having up-to-date fire protection information is vital when planning and constructing a new building," says Vincent E. Sagan, P.E., MBMA Director of Codes and Standards. "The updated Guide provides a wealth of information on how to effectively meet the fire-resistance requirements of a metal building project. It incorporates current practices and the results of research undertaken by MBMA, its member companies and other industry groups."



The 103-page guide includes the following information:

- Prescriptive fire protection practices related to occupancy and construction options
- Fire protection considerations for metal building system columns, roofs and walls
- Detailed explanations of specific fire protection materials
- Repair/replacement after fire damage
- Comprehensive industry resource listing for fire-resistance design

The second edition, co-branded with the International Code Council (ICC), is updated to reference the 2018 International Building Code (IBC). **MB**

BY TORI SMEJKALF

Connecting the Dots

Metal Framing Techniques for Non-Metal Structural Panels

As hybrid construction practices continue to evolve, builders are working with a wider variety of materials than ever before. One of the most important trends is the pairing of metal building framing systems with non-metal structural wall panels — such as structural insulated panels (SIPs), insulated concrete forms (ICFs), engineered wood, and composite wall systems.

While these panelized systems offer unique advantages in energy performance, speed, and cost, they also require thoughtful coordination when integrated with metal framing. From fastener compatibility to structural behavior, the connection points between materials are critical for long-term performance. With more projects now combining these systems to meet energy codes, reduce labor, or speed up timelines, understanding how to bridge the gap between dissimilar materials is more important than ever.

At Cornerstone Building Brands, we've seen how versatile metal framing systems — when engineered and installed properly — can be effectively integrated with nearly any wall type, including non-metal panel systems commonly used in industrial, commercial, and rural projects.

Blended Materials: Architectural finishes including EIFS, ACM panels, and tall stone columns transform this office space into a bold design statement — while still relying on a steel-framed building system at its core. IMAGE COURTESY OF CORNERSTONE BUILDING BRANDS

UNDERSTANDING THE SYSTEMS: A MATERIAL MISMATCH THAT CAN WORK

Non-metal wall panels behave very differently than structural steel. SIPs and ICFs, for example, deliver impressive insulation values and support modular construction but offer less rigidity than metal frames. Engineered wood or composite panels may be easier to source or install, but they interact differently with fasteners and framing under thermal or structural loads.

The good news? These differences aren't a limitation — they're just a design consideration. With proper detailing, metal framing systems can be reliably connected to most of these materials in a way that maintains code compliance and performance expectations. But doing so requires teams to think beyond just structural loads and consider movement, moisture, and connection detailing across the building's lifecycle.

FASTENER SELECTION AND CONNECTION STRATEGIES

One of the most immediate challenges on hybrid projects is fastener compatibility. Metal framing often relies on self-tapping or high-torque screws, but those don't always work with foam-core SIPs, cement board, or wood-based sheathing. In some applications, fasteners may over-penetrate or fail to grip if the substrate lacks structural reinforcement.

In these cases, alternate fastening strategies — such as clip angles, connection plates, or hybrid fastener systems — are necessary to create a durable and reliable load path. Reinforced attachment zones may be required in SIPs or ICFs, especially where structural loads need to be transferred into the steel frame. Additionally, engineers must consider edge distances, sheathing thickness, and fastener pull-through resistance.

Design teams should verify that fasteners and connection methods are compatible with both systems by referencing approved details, manufacturer guidelines, and engineering requirements. It's also important to clearly document those selections in construction drawings to avoid errors during installation.

MANAGING MOVEMENT AND MOISTURE

Unlike steel, non-metal wall panels expand, contract, and flex with changes in humidity and temperature. Without the right detailing, this differential movement can lead to cracks, joint failures, or air and water intrusion. Framing systems must be designed to accommodate movement while maintaining structural integrity.

Common strategies include:

- Slip joints or slotted connections at panel-to-frame transitions
- Thermal breaks to reduce condensation and thermal bridging
- Flexible sealants and barriers that maintain continuity between materials

Moisture control is especially important

with organic or foam-based panels. SIPs, ICFs, and wood-composite systems can be vulnerable to degradation if exposed to prolonged moisture. That's why detailing around openings, corners, and foundation transitions is so important in hybrid systems. Flashing, air barriers, and drainage planes should be planned with both the metal and non-metal materials in mind.

LAYOUT, TOLERANCES, AND STRUCTURAL PLANNING

Most non-metal panel systems are prefabricated off-site, meaning they arrive at the job with little room for adjustment. That places a premium on layout precision during framing. Even slight framing misalignments can delay installation or result in costly field modifications.

Critical areas for review include:

- Bearing plate alignment and spacing
- Coordination around windows, doors, and corners
- Consistent tolerance allowances for pre-drilled or prefabricated panel connections

It's also important to account for load transfer between systems. For example, if the wall panel is carrying lateral loads into the steel frame, engineers must confirm that bracing, shear connectors, or tiebacks are designed and detailed correctly.

FIELD TIPS FOR SUCCESSFUL HYBRID INSTALLATIONS

On-site success comes from planning, communication, and training. Some field-proven best practices include:

- Involving both the framing and panel suppliers early in the design phase
- Clarifying connection details in structural and architectural drawings
- Ensuring installation crews are familiar with fastener types, spacing and sealant requirements
- Using mockups or pre-install test bays to identify issues before full installation begins

Hybrid construction works best when it's treated as a coordinated system — not a patchwork of components.

LOOKING AHEAD: MORE HYBRID PROJECTS ON THE HORIZON

The rise in energy-efficient buildings, modular construction, and labor-saving strategies means hybrid wall systems are becoming more common — not less. Builders are seeking options to achieve flexibility, speed, and lasting performance. Metal framing combined with panelized non-metal walls can offer solutions for many applications.

Future innovations in panel design and attachment hardware may make this integration even easier. Still, success will depend on the basics: precision detailing, moisture control, and close coordination across teams.

FINAL THOUGHT: VERSATILITY STARTS WITH SMART COORDINATION

The modern jobsite isn't limited to just one material. With the right planning, metal building framing can connect seamlessly to a wide range of non-metal structural panels, delivering lasting solutions for everything from rural buildings to large-scale commercial developments. Working with the right partners and coordinating early can help identify the most effective connection strategies even when working with panel types outside the manufacturer's scope.

Collaboration and thoughtful detailing are key to making these systems work together in the field. Because in the end, it's not just about what materials you choose — it's about how well they're engineered to work together. **MB**

Tori Smejkal *is Director of Product Marketing at Cornerstone Building Brands (cornerstonebuildingbrands.com). Her product development and customer experience background supports a holistic approach to metal building product marketing strategies for commercial and residential building customers.*

Interior of the Catfish House. The desine seamlessly blends various materials into a strikingly beautiful, unified whole. IMAGE COURTESY OF CORNERSTONE BUILDING BRANDS

Smarter Steel Framing Is Here

And It Is Changing Rural Construction

Steel has earned its place in rural construction. It is strong, consistent, lightweight, and resistant to fire, pests, and moisture — clear advantages over traditional timber, especially in agricultural environments. But focusing solely on the material misses a deeper opportunity for rural contractors: how that steel is processed, framed, and delivered to site.

The opportunity isn't just in what we build with — it's in how we build it.

And increasingly, the answer lies in automation.

THE LABOR EQUATION IS CHANGING

Across North America and most parts of the developed world, the story is the same in the construction industry: there is less labor available, and it is getting more expensive. Rural builders often wear multiple hats — project manager, estimator, installer — because crews are lean and job sites are remote. Anything that saves time and reduces dependency on skilled labor has real impact.

That is where automated framing systems enter the picture. Instead of manually cutting, measuring, and reworking onsite, builders can work with framing components that arrive pre-cut, pre-punched, and ready to assemble. Less time on the

tools. Fewer errors. Better margins.

REPEATABILITY, NOT RIGIDITY

Some rural builders have been hesitant to adopt framing automation, fearing that precision means inflexibility. But modern roll-forming systems offer both accuracy and adaptability.

Want to frame a standard farm shed? No problem. Building a cool store or workshop with non-standard spans? That is possible too. Some systems now support adjustable framing or panelized assembly, meaning rural builders can adapt without sacrificing factory precision. This is especially helpful in rural sites where tolerances shift, ground conditions vary, and projects often evolve mid-stream.

DOING MORE WITH LESS

Automation is not just about big machines in big factories. It is increasingly accessible to small and mid-size operations. Regional manufacturers and builders can now run compact roll-forming lines or work with framing partners who install these systems — bringing prefabrication benefits into the rural sector without the need for massive infrastructure.

For the rural construction market, this unlocks something powerful: the ability to scale without scaling headcount. Whether you're producing five sheds a year or 50, framing automation can lift capacity without compromising quality or delivery speed.

AN EVOLUTION IN RURAL CONSTRUCTION

Some call this a future trend. But really, automation is already here — and rural construction is ready for it. The adoption curve we have seen in commercial building is now filtering into sheds, barns, cool stores, and even custom housing on farmland. The question is no longer "if" automation matters in rural construction, but "how" we choose to embrace it.

Light steel construction with automation brings constructors significant commercial advantages. Lightweight material, tensile strength, speed, and ease of construction onsite are inherent benefits. Framing automation provides additional scalability with precision manufacturing, consistency and control — and that is an edge that many builders are seeing as worth investing in.

***Nick Coubray** is CEO of Howick Ltd and a global advocate for framing automation and for more efficient and sustainable construction practices throughout the industry. He speaks regularly at international industry events and founded STEEL HORIZONS, a platform for thought leadership in steel construction.*

Thermal Bridging in Cold-Formed Steel Buildings

Causes and Mitigation

Cold-formed steel (CFS) buildings offer a strong, efficient and durable solution for a wide range of applications. With the right design strategy, they can also deliver outstanding energy performance. One of the most important design considerations for cold-formed structures is thermal bridging — an issue that's easily addressed with modern building practices and insulation technology.

WHAT IS THERMAL BRIDGING?

Thermal bridging occurs when heat travels through more conductive materials, bypassing insulation and reducing energy efficiency. Because steel is more thermally conductive than wood, CFS buildings require a different approach to insulation — but that doesn't mean performance is compromised. In fact, when paired with continuous insulation and smart construction techniques, CFS buildings can meet or exceed energy efficiency targets.

"Today's cold-formed systems are engineered to minimize thermal bridging without sacrificing speed or simplicity," said Tori Smejkal, product marketing director at Cornerstone Building Brands. "Their lightweight framing and advanced design software available through modern solutions like Hypersteel™ cold-formed buildings allows builders to plan and assemble energy-smart structures quickly and confidently."

Hypersteel™ cold-formed building agricultural equipment storage in Almond with Polar White trim. IMAGE COURTESY OF CORNERSTONE BUILDING BRANDS

CAUSES OF THERMAL BRIDGING

High Thermal Conductivity of Steel

Steel naturally transfers heat more easily than materials like wood. That's why CFS buildings benefit from insulation strategies tailored to their strengths — including exterior continuous insulation and thermally broken connection details.

Improper or Incomplete Insulation

In any building, insulation is key — but in CFS construction, it's especially important to use the right type and install it correctly. Even small gaps can reduce the effectiveness of the thermal envelope.

Structural Penetrations and Components

Fasteners, framing members, and utility penetrations can unintentionally carry heat through insulation areas. CFS buildings help mitigate this with streamlined detailing and factory-formed components that support precise, energy-conscious installation.

Building Envelope Connections

Where different building surfaces meet — such as wall-to-roof or slab-to-wall connections — gaps in insulation can occur. Careful attention to detail can help prevent unwanted heat loss by identifying these critical areas and specifying materials to break thermal continuity.

Cladding and Attachments

Exterior cladding support systems like clips and girts can become thermal bridges if not properly isolated. The right design uses thermally broken attachment methods to maintain continuous insulation coverage.

Construction Errors

Omitting insulation or thermal breaks — or leaving gaps during construction can lead to unintended bridging. "The construction process is critical," said Smejkal. "A solution that offers end-to-end support, intuitive software and high-quality materials like Hypersteel™ cold-formed buildings makes it easier for contractors to get the information they need to get the details right."

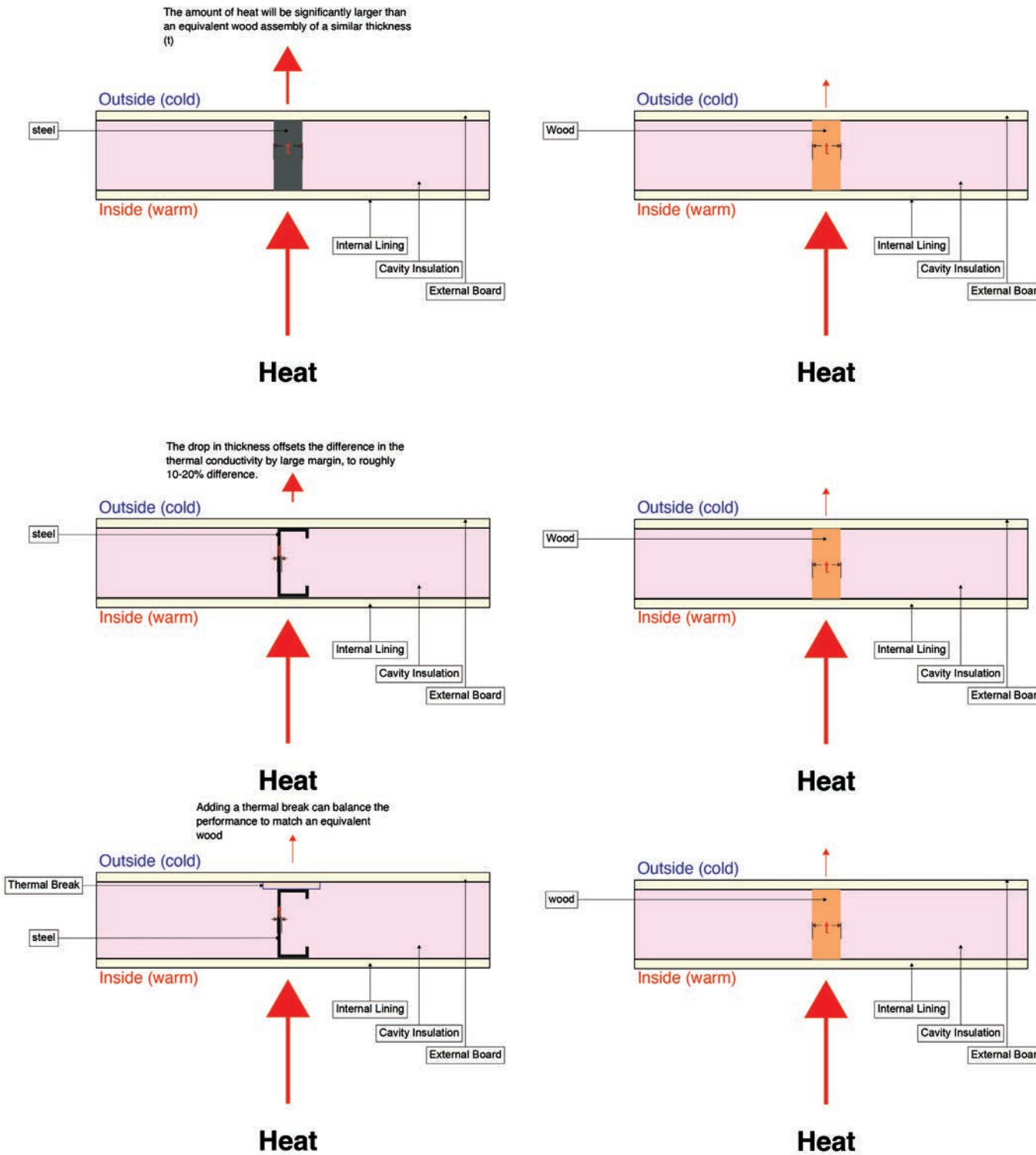
PROVEN MITIGATION STRATEGIES

Continuous Insulation

Exterior continuous insulation (CI) is one of the most effective ways to reduce thermal bridging in CFS buildings. By wrapping the structure in a layer of insulation — using materials such as expanded polystyrene (EPS), extruded polystyrene (XPS), graphite polystyrene (GPS) or polyiso — builders create a consistent

CFS Vs. Wood: A Dimensional Comparison

According to FRAMECAD, a pioneer in the steel framing industry that produces CFS design and engineering software and roll-forming equipment, steel is 300 to 400 times more thermally conductive than wood material, for the same dimensions (i.e. thickness). Nevertheless, given the great strength-to-weight ratio of CFS profiles compared to wood sections, CFS studs are usually formed with very thin thicknesses, which drops that difference significantly to roughly 20% to 30% of heat between wood and CFS structures.
This is illustrated in the diagram below.



THERMAL BREAK DIAGRAM COURTESY OF FRAMECAD.

Hypersteel™ cold-formed building Taconic Distillery in Rustic Red with Burnished Slate trim. IMAGE COURTESY OF CORNERSTONE BUILDING BRANDS

barrier to heat flow. Most cold-formed buildings are designed to accommodate CI with ease, supporting efficient energy performance across every project.

In instances when energy demands are less critical, compressible insulation can also be highly effective in addressing energy efficiency needs.

Thermal Breaks

In addition to CI, thermal breaks are used at key structural connection points to reduce energy loss. These include thermal strips, shims, or slotted studs that reduce the amount of metal in contact with heat-exposed surfaces. Engineered solutions are available for applications where bridging must be minimized without compromising strength.

ADDITIONAL BENEFITS OF MITIGATING THERMAL BRIDGING

Lower Energy Bills

By reducing heat loss, CFS buildings help owners save on heating and cooling costs year-round — adding long-term value with every build.

Less Condensation, Less Mold

Temperature stability reduces the risk of condensation inside wall cavities, helping prevent moisture damage, mold, and insulation failure.

Improved Durability

Controlling condensation also protects against corrosion. CFS frames are built to last, with proper insulation extending their longevity even further.

CONCLUSION

When CFS buildings are designed to mitigate thermal bridging and paired with proper insulation, they deliver a reliable, energy-efficient structure. CFS buildings offer a higher strength-to-weight ratio and greater consistency of material when compared with wood, which has knots, varying moisture, variable grain, and variation within each piece.

CFS is an excellent overall choice for many building applications. Its lasting durability, design flexibility, installation efficiencies, and potential insurance savings, as well as its resistance to fire, rot, and pests, help ensure long-term value. MB

Thermal Breaks: CFS Vs. Timber

According to the Howick Group, a leading manufacturer of roll forming technology based in New Zealand, steel's conductivity is actually one of its best attributes. The FAQ section of the company's website (nashnz.org.nz/faqs) explains this point.

"The reason steel needs a thermal break is because of its high heat conductivity. Without the thermal break it means that when the inside of an external wall is warm compared with the outside, sufficient heat will flow through the steel stud to cool the inside surface of the wall, causing condensation and compromising the wall's insulation rating.

This conductivity is often portrayed as being a weakness with steel. However, it is one of its greatest strengths. It means that when the thermal break is in place, all the steelwork on the inside of the thermal break remains above the temperature at which condensation from moisture in the wall cavity will occur – which ensures long term durability of the stud.

The outside of the timber stud will attract condensation during winter and, with the resulting increase in moisture content, movement that damages linings and potential long-term durability problems. This occurs in timber irrespective of the weather tightness of the external cladding."