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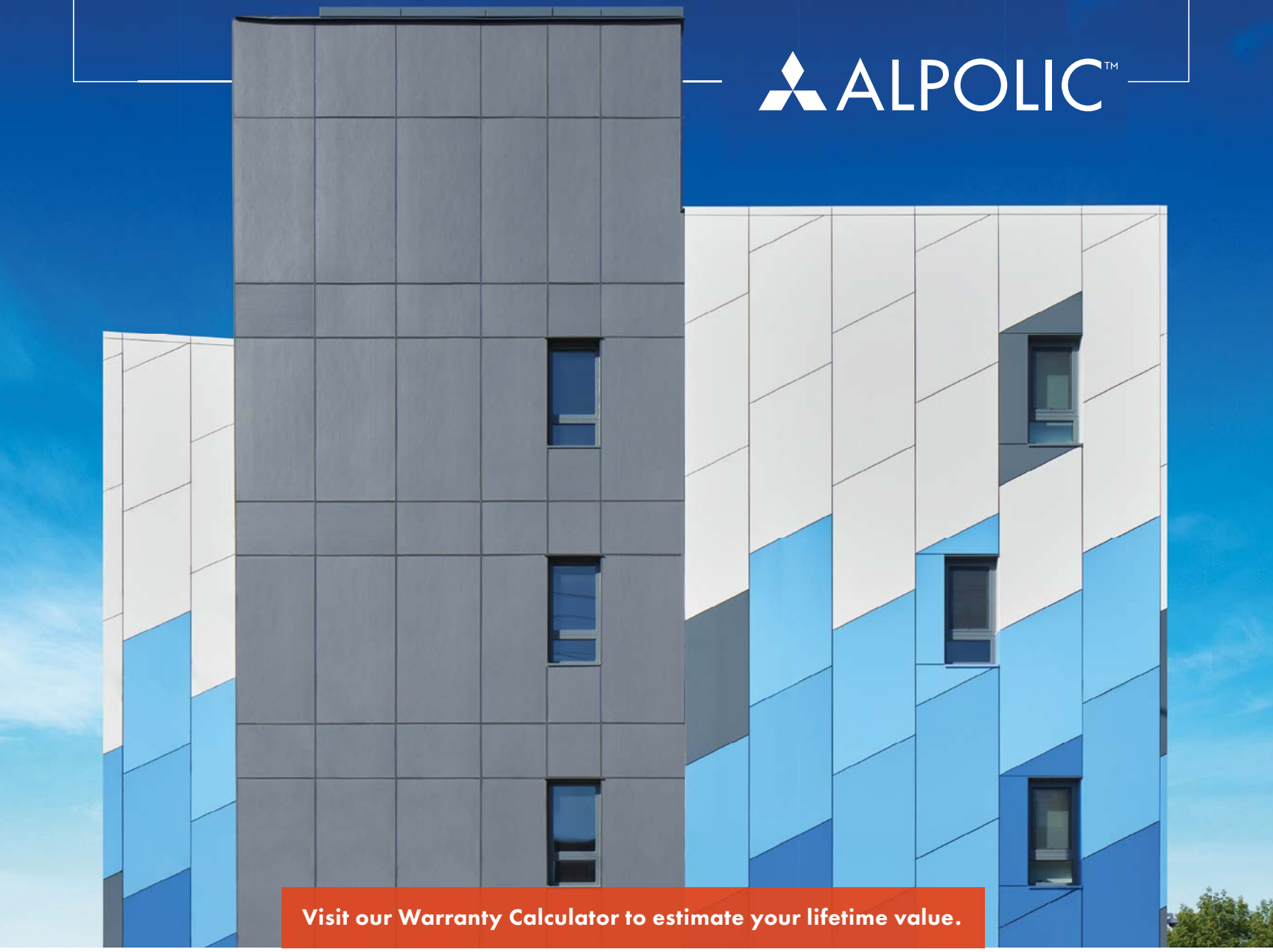

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Designing with Intention in 2026

As we turn the page on another year, I always find myself reflecting on what our industry has weathered, what we've built, and maybe most importantly, what we're preparing to create next.

Every year, our State of the Industry report offers a unique snapshot of where we stand and where we're going. This year's roundtable brings together respected voices, including Eric Pros (DS Architecture), Alan Scott (Intertek), Tony Bouquot (Metal Building Manufacturers Association [MBMA]), Anna Arnot (RODE Architects), Arnold Swanborn (CO Architects), and Mike Weis (Carlisle Architectural Metals [CAM]). From accreditation shifts to evolving trends, the conversation is candid, thoughtful, and full of perspectives you won't find anywhere else.

Alongside this forward-looking analysis, we're diving deep into several technical and aesthetic themes that continue to shape the built environment.

On page 27, John Koury of A M King breaks down the key technical considerations of insulated metal panels (IMPs).

In our metal walls feature, Victoria Scanlon of EXTECH takes us into the world of kinetic facades at the University of Iowa and Marquette University on page 19.

John Calhoon, from Avery Dennison, outlines what architecture, engineering, and design (AED) professionals should consider when incorporating adhesives into metal systems. Further on the topic, Smitha Jayaraman of Amrize Building Envelope examines how sealants reinforce weather-tightness, preserve clean lines, and safeguard the structural integrity of metal systems.

Rounding out the issue is a look toward the future of paints and coatings. Sherwin-Williams' Brynn Wildenauer explores global megatrends and turns them into practical forecasts, including color, finish, material innovation, and more.

As we embark on a new year, I'm reminded of something I've heard many architects say: "We build for both the moment and the long arc of time." This issue mirrors that philosophy, pairing the immediacy of technical guidance with the broader view of industry trajectory.

Thank you for joining us for another year of exploration, innovation, and conversation. I'm looking forward to what we'll build together in 2026.

Melanie Kowal

Melanie Kowal
EXECUTIVE PUBLISHER

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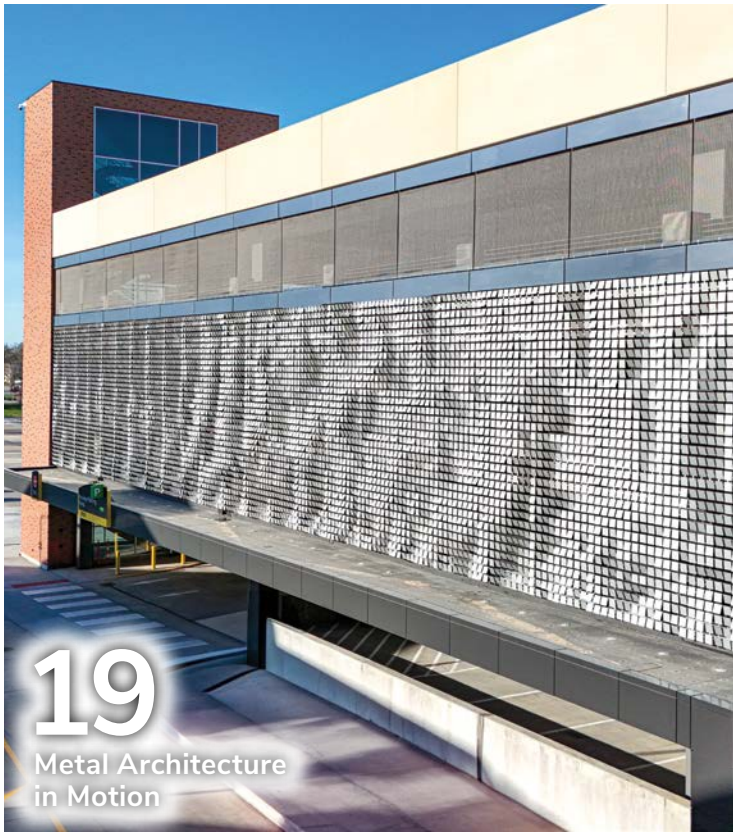

Tech Report:
Coatings, Paints, & Finishes

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On The Cover

The Phoenix Biomedical Campus Health Sciences Education Building showcases the visual and functional appeal of natural metals, a prominent trend highlighted in Metal Architecture's State of the Industry Roundtable. For more information, turn to page 10.

Photo by Bill Timmerman/courtesy CO Architects

Case Engineering

Strength, steel, and structural appeal

By Hanna Kowal

Case Engineering's design of the 1,858 m² (20,000 sf) New Park North Golf Club in Edwardsville, Ill., features steel moment frames.

Photos courtesy Case Engineering

This month, *Metal Architecture* connected with Ardie Mansouri, P.E., principal structural engineer at Case Engineering. The 30-year-old engineering firm, based in Fenton, Mo., employs between 90 and 100 employees working across 50 states and Washington, D.C., in the structural, mechanical, electrical, and plumbing disciplines.

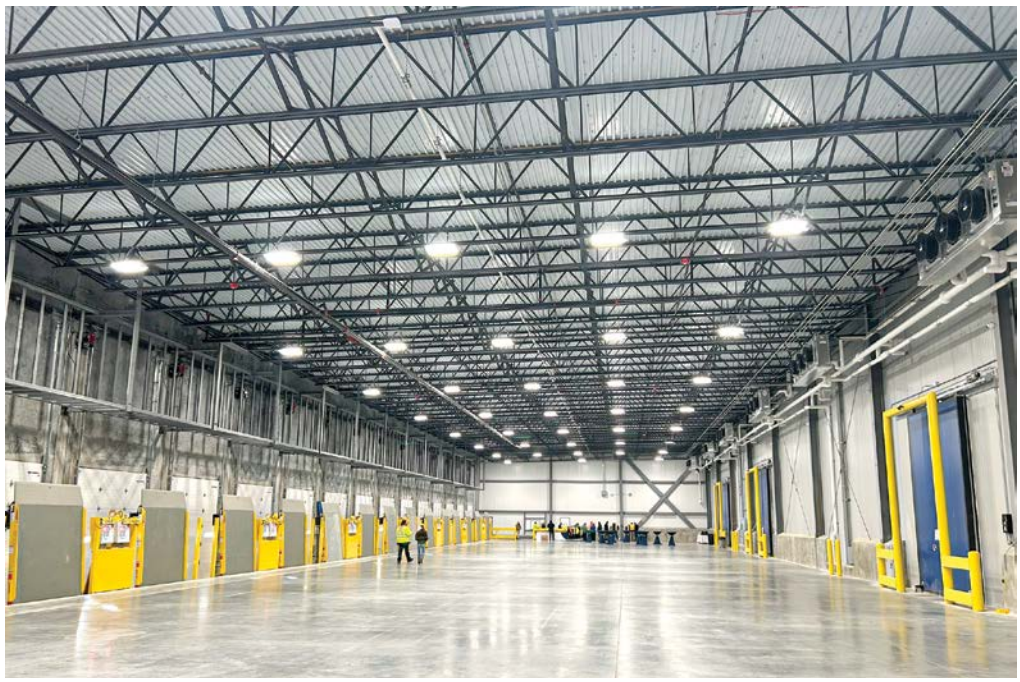
Darrell Case founded the company in 1995, working out of his basement, and the firm has since grown to design and engineer buildings for the commercial, industrial, retail, and educational industries.

Part of the firm's history includes a two-decade-long partnership with AEdifica, a Canadian architecture firm, and promoting partners from within in 2020, allowing positive guidance and growth across U.S. markets.

Integrated employee education

Case Engineering aims to deliver efficient and high-quality structures to its clients. Within this delivery of quality structural plans, the firm presents opportunities for its team to excel within the design space. The supportive workplace fosters a positive environment for employees, ensuring a healthy work-life balance and opportunities for professional growth and development. Mansouri explains the immersive approach to education: the firm takes on large projects with professional development opportunities in mind, sharing the aim to support employees' learning and "pushing their limits as far as what they know and making sure to accommodate them and their ability to expand their knowledge in this profession."

Presenting learning experiences, new employees are empowered to be involved in the full spectrum of a project, from "proposals and having conversations with our clients to being paired off with a more senior engineer and learning through observing." Beyond experiential learning, the firm also provides seminars and monthly discussion meetings. Mansouri excitedly shares a recent seminar example on retaining walls, including design tips and tricks, as well as project examples.



Modernized design processes

The firm incorporates technology into the design and specification processes, using building information modeling (BIM) software instead of relying on traditional two-dimensional drawings. A tangible perspective on plans enables designers and engineers to anticipate certain elements that may complicate the work in advance. Mansouri explains the practical benefits of this process and says, "We're actually modeling all of our elements in conjunction with the architectural team to make sure that we're not clashing and we don't specify something in the drawings that, once they get out in the field, won't actually work."

He emphasizes the significant increase in software tool usage across the architecture, engineering, and design (AED) disciplines over the past decade, resulting in a streamlined and successful collaboration process. The use of standardized tools supports confidence in both a design and its efficiency in several ways. For example, it ensures a quicker planning process, promotes enhanced visualization, and prevents installation mishaps in the construction stage.

Meaty metal solutions

Working with a diverse range of industries, Case Engineering encounters opportunities to use innovative metal solutions. In the expansion of a 1,021.9 m^2 (11,000 sf) Volpi meat-curing, slicing, and processing facility in St. Louis, Mo., steel offers crucial solutions to structural and geotechnical considerations.

The firm opted to use insulated metal panels (IMPs) as cladding, supported by steel framing and girt channels, as well as for the structure's interior. The design features a trolley system to address the facility's unique needs, presenting a specific consideration. With this system, it is critical that the structure experiences minimal deflection, as that would result in a malfunction of the suspended trolley system below. The specified steel beam sizes satisfy this consideration. Metal is the ideal resource for the project, as it provides the required insulation and fire safety that other materials, such as wood and masonry, do not offer in this case.

The positioning of the building on a sloped site added another layer of consideration to the design process for the meat processing facility, which was addressed by using a low-weight structure. The project predominantly used steel in its beams, columns, and braced frames. To ensure stability and facilitate the transfer of wind and seismic forces, the design incorporates tension rod bracing with turnbuckles, clevises, and gusset plates.

Sustainability in practice

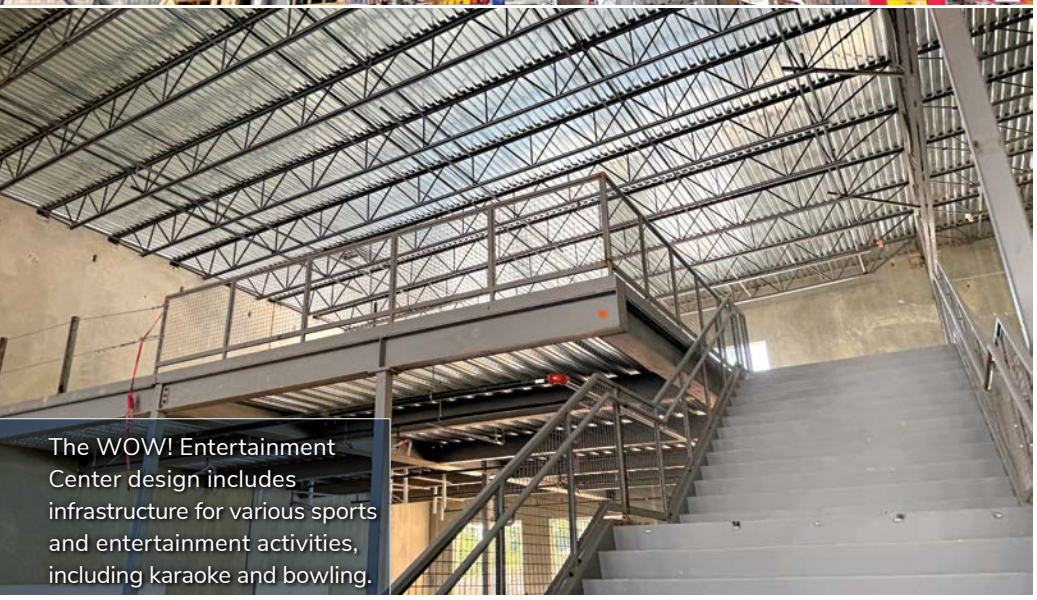
Mansouri makes an important distinction for designs: efficient designs use the least material possible without compromising form or function. Cost-effective, code-compliant, and efficient structures can avoid the overuse of materials.

He offers an overview of the firm's approach: "When we're doing renovations of existing buildings, we will

Left: The 1,021.9 m^2 (11,000 sf) Volpi meat-curing, slicing, and processing facility in St. Louis, Mo., prominently features steel framing.

Right: The 11,148.3 m^2 (120,000 sf) Coastal Carriers cold storage facility in Foristell, Mo., prominently features steel framing.

The design for the 2,229.7 m² (24,000 sf) WOW! Entertainment Center in Fenton, Mo., includes infrastructure for dining and recreation, and uses steel-framed bar joists and joist girders for a strong, high-performing roof.



The WOW! Entertainment Center design includes infrastructure for various sports and entertainment activities, including karaoke and bowling.

absolutely do our best to either take something that's existing, and if it's still code-compliant, we can justify it through calculations, use it in the new capacity in the new proposed modification to the building." He estimates that more than half of the firm's projects are renovations and emphasizes the value in reinforcing structures rather than discarding material.

Steel strength beneath the facade

In many of Case Engineering's designs, steel provides a strong foundation for structures serving a diverse array of functions, from large-scale transportation facilities to recreational spaces. A pivotal aspect of many of their designs, steel aids in promoting stability with geographical concerns without adding too much of a load on the structure. The material is also relatively cost-effective and can be used for aesthetic purposes in a variety of applications. The firm's work at Coastal Carriers' new storage facility in Foristell, Mo., a 11,148.3 m² (120,000 sf) steel-framed cold storage center, relies heavily on steel framing for both walls and roofing beneath an IMP cladding and metal deck roofing. The firm's renovation of an Anytime Fitness facility in San Diego, Calif., involved optimizing space with tight restrictions. Composite steel beams proved vital to this project, enabling a low-profile and lightweight structure that efficiently maximizes the facility's usable area while considering environmental factors.

Case Engineering showcases the versatility of the material in its design for The District in Chesterfield, Mo. This project features outdoor recreation areas that incorporate steel in fencing, seating pergolas, a stage, and an entrance with ornamental steel in the form of tie braces that lean into an industrial aesthetic.

Stylistic elements of metal framing

Embracing structural engineering in aesthetics, Mansouri details his favorite trend with metal: exposed structural steel. Whether it be large X-braces throughout a building or other types of framing details, this eye-catching architectural feature marries the functional composition of a structure with industrial aesthetics. In some cases, exposed framing requires engineering creativity to achieve the right look, as Mansouri says the process can "make us think a little bit harder on our preconceived notions about what steel structures can actually do." MA

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Photo by Bill Timmerman/courtesy CO Architects

State of the Industry

Collaboration, forward-thinking, and open-mindedness in metal architecture

In the 2025 *Metal Architecture* State of the Industry roundtable, a panel of six industry leaders discusses the landscape and trajectory of the metal and architecture industries. This summary provides an overview of the topics covered in the discussion, focusing on three principal themes: associations and accreditations, material and design trends, and contemporary considerations in architectural practice. The full roundtable video is available on the *Metal Architecture* website.

Meet the experts

Eric Pros is the director of design at DS Architecture, where he has dedicated his career to architectural design excellence. Pros has led a collaborative practice based in Northeast Ohio for 14 years, which works nationally through strategic partnerships. He is an active mentor and volunteer, organizing civic design initiatives and supporting professional development for students and peers. He serves as an advisor and juror for the Metal Building Manufacturers Association (MBMA) Student Design Competition, promoting smart, high-performing applications of metal systems while inspiring college students throughout North and Central America. Pros also serves as a presenter for the National Coil Coating Association (NCCA) and other industry organizations, speaking at their annual conferences on material innovation, building envelopes, and lessons learned from public-sector work.

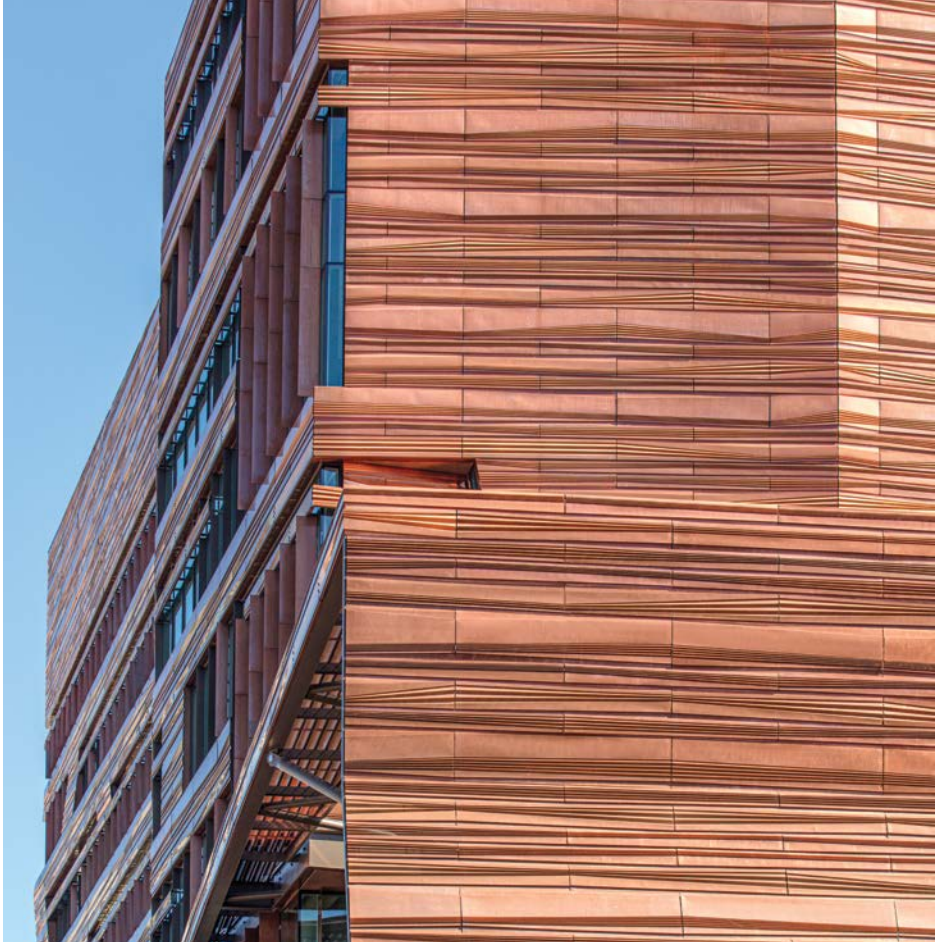
Alan Scott, FAIA, is a registered architect and sustainability practitioner with over 35 years of experience and a lifelong commitment to the environment. He is the director of sustainability with Intertek's Building and Construction division. As a solutionist, his consulting advances sustainability, healthy buildings, and resilience goals for built environment projects. Scott currently serves as vice-chair of the U.S. Green Building Council (USGBC) Resilience Working Group, incoming chair of the AIA Resilience and Disaster Response Committee, and as a member of the LEED Environmental Quality Technical Advisory Group.

Tony Bouquot is the general manager of the Metal Building Manufacturers Association (MBMA). He is also the on-screen talent for the popular "Travels with Tony" YouTube series and speaks regularly at conferences and conventions throughout the U.S.

Anna Arnot, a New Jersey-born architect, joined RODE Architects in 2018. Before becoming a Dorchester resident, she lived, worked, and studied in Washington, D.C. for 10 years. She earned her Master of Architecture and Master of Sustainable Design degrees from Catholic University. As a designer, Arnot is passionate about helping clients through the early stages of design, including developing and understanding the project's program and vision. She focuses on blending building function with strong conceptual design and passive strategies. Outside of architecture, she enjoys traveling, hiking, and exploring the city with her dog and son.

Arnold Swanborn, AIA, principal of CO Architects, has created a diverse portfolio of award-winning projects in his 28-year career that includes university research and academic facilities, academic health sciences facilities, healthcare facilities, and K-12 schools, as well as national and international commercial, residential, and mixed-use facilities ranging from 100,000 to more than 2 million square feet. Swanborn leads and sets design direction within the office and on projects, and he is responsible for developing and integrating those principles into the firm's projects. He received his Master of Science in Advanced Architectural Design from Columbia University and his Bachelor of Architecture from the University of Southern California. He joined CO Architects in 2008.

Mike Weis, vice president of sales at Carlisle Architectural Metals (CAM), began his career at Reynolds Metals Company in 1995. He then joined Petersen Aluminum in 1999 as Southeast sales manager, later advancing to vice president of sales and marketing. With over 30 years of experience in the architectural metals industry, Weis has established himself as a respected leader in architectural metal envelope solutions. In his current role, he oversees sales strategy and execution across Carlisle Architectural Metals' (CAM) portfolio, which includes some of the industry's most recognized brands: PAC-CLAD | Petersen, Drexel Metals, Metal-Era, Hickman Edge Systems, and Citadel Architectural Products. With a steadfast focus on the customer, Weis is committed to delivering high-performance building envelope solutions.



Opening spread (pages 10 & 11) and above: The copper facade of the Phoenix Biomedical Campus Health Sciences Education Building showcases the visual and functional appeal of natural metals. Copper mitigates the impacts of solar exposure and offers an eye-catching appearance with its distinctive coloring.

Photos by Bill Timmerman/ courtesy CO Architects

Associations and accreditations

The foundational support for sustainable advancement and continued excellence in the metal and architecture industry is provided by active engagement with professional associations and participation in rigorous accreditation processes. These elements work in tandem to promote shared knowledge, advocacy, and adaptive solutions to the evolving demands of the built environment.

Members of the metal and architecture industry empower and stimulate the built environment, and fostering connection throughout the community is essential for continued growth and mutual support. Tony Bouquot aptly expresses the power of organizations and associations, saying members hold "a more resounding voice, because we're speaking as one."

Platforms for connection and support: MBMA and MCA

In the context of industry associations, Bouquot, as general manager of the Metal Building Manufacturers Association (MBMA), emphasizes that the organization's key current focus is collaboration. He offers this perspective: "When companies in the same industry come together in a trade association, they are much stronger as a group than they are individually." This collaborative strength is harnessed in a wide range of activities, including collective representation in code hearings, conferences, and marketing efforts.

From the perspective of practitioners, associations like the Metal Construction Association (MCA) are essential advocates. Mike Weis offers a member's point of view on the MCA, calling them "advocates in our industry." These organizations serve as essential forums for promoting the community collectively and provide vital support through a network of passionate and engaged professionals.

The value of associations extends to the integration and synchronization of the entire architecture, engineering, design, and construction (AEDC) process. Eric Pros describes the associations as a "vital bridge between the manufacturers, the suppliers, and the end users," adding, "The architects are a part of that supply chain as well." He further emphasizes the crucial role of associations in publishing technical information and resources that support project-related questions, truly streamlining the integration of metal materials into designs.

Associations amplify collective advocacy at the regulatory and code levels, facilitate the sharing of research and technical expertise, enhance opportunities for industry-specific networking and mentorship, and increase the capacity to respond to market demands as a unified, adaptive entity.

Shared sustainable objectives: LEED and AIA

Professional associations and accreditation frameworks, such as the AIA and LEED, serve not only as support mechanisms but also as guiding pillars for industry progression, emphasizing sustainability, resilience, and lifelong learning. As AIA Ohio president, Pros shares: "It's been a very busy year, and it's been a very effective year as well."

He explains the three-tier AIA structure, comprising national, state, and local levels, each operating under separate guidelines.

Middle and right: Mississippi Children's Museum, allowing light to transfer through while mitigating glare and deflecting heat.

Photos courtesy Petersen | PAC-CLAD

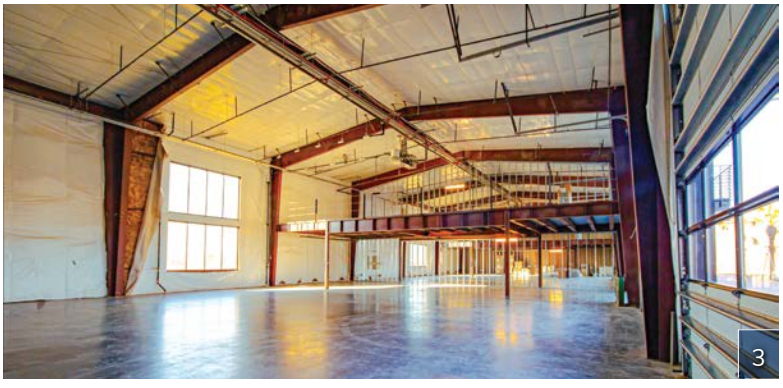
Pros aptly summarizes the current focuses of each tier:

- Nationally, "there's a lot of emphasis on climate change and resiliency; things like housing and equitable practice that affect firms across the country."
- On the state level, "we're much more focused on advocacy and some of the connectivity amongst our members and making sure that the members in Ohio are connected to national resources, as well as some of the local events that are happening."
- Locally, "that's really where you get that one-on-one kind of mentorship and networking." Pros elaborates, "You get things like hard hat tours and things that really make it personal and bring that value back home."

As a LEED fellow, Scott notes the overlap between AIA and LEED objectives. He also offers current updates on LEED certification. LEED version 5 (v5) was released in spring 2025. Currently, there is an overlap period between version 4 and version 5; the ability to register projects in version 4 will end in March 2026. From then on, the projects must be completed within six years, and all new projects will only be able to register with LEED v5. He shares that LEED adoption numbers are still increasing, despite being slower than in past decades. He also explains that there is notable growth in the number of certifications for operation and maintenance.

Scott observes a significant overlap between LEED and AIA updates. He explains, "LEED v5 references the Common Materials Framework (CMF), which is an expanded ranking of the environmentally preferable materials going into LEED certifications." He notes the framework "fits in with the AIA introducing the new AIA Materials Pledge, which is similar to the 2030 challenge that architects have been part of for a while, and now focused on architects committing to specifying more sustainable options for materials and reporting those achievements on an annual basis with their projects moving forward."

The new version also introduces a property resilience assessment prerequisite as well as resilience-related credits. Scott notes, "The AIA recognizes that conducting resilience assessment and informing clients about current and future hazards is part of the architect's evolving standard of care, and so whether they're doing LEED projects or not, architects should be thinking about doing resilience assessments for each project and having that conversation with their owner about their risk tolerance and their concerns moving forward, but for LEED v5 projects, that will be required for every one of them."



Resilience with LEED v5 entails:

- An assessment to identify the hazards a project faces, and which hazards are most significant.
- Qualitative consideration of how the project team can respond to that element.
- Optional credits focused on specific hazards identified in the assessments.

Pros notes, in working with clients, the LEED process encourages the adoption of "energy modeling as a part of our design process to evaluate performance of the project throughout design." He explains that using it as a framework, even with projects not intended for LEED certification, ensures "real-time feedback as we're making design decisions and getting client input."

In forecasting the direction of this process, Scott mentions: "Energy modeling that looks at future climate, using future typical meteorological data as opposed to typical meteorological year data, and modeling might become an important part of that process."

As codes and specifications evolve, they grow towards similar values and metrics used in accreditation. Anna Arnot remarks, "Outside of accreditations, now codes are really requiring these enhanced properties to the buildings." She stresses the importance of integrating accreditation criteria early: "Even if we aren't going through the full accreditation, the understanding of those credits and utilizing them in the design early on, because we are designing against them, is really important."

In response to this industry-wide movement towards sustainable practices, the specification of metals becomes more sophisticated as Arnold Swanborn observes, "There's definitely an impact on how we specify metal now," and adds, "natural materials and plate materials, or gauge materials that can span without oil canning and without plastic substrates are becoming much more popular amongst owners."

Engagement with associations and accreditations thus accelerates innovation, ensures risk mitigation, promotes transparent sustainability metrics, and enriches the profession through powerful networks and mentorship.

Industry trends

Steel stability, aluminum adaptability, and the natural metal movement

Material and design decisions in architecture are highly dynamic, shaped by both evolving aesthetic ideals and increasingly stringent sustainability standards. The evolution of metal as a principal design and construction material is central to this progression. The panel discusses how the AEDC process and metal have complementary evolution. Pros explains that metal has become "a form of expression, and not just a cladding solution."

"Steel is the common denominator in a lot of these projects, but I'm seeing a trend towards aluminum," says Weis on the topic of metal materials that have gained or maintained popularity in 2025. He

Opposite page:
Top 1 & 2: The Fieldhouse+ project displays a double-facade system with insulated metal panels (IMPs) and perforated panels.

Renderings courtesy of RODE Architects

Middle 3 & 4: The Circuit of the Americas Car Condos are an example of the automotive storage and recreation spaces becoming increasingly popular in the built environment.

Photo courtesy Metal Building Manufacturers Association (MBMA)

Below: First Tee Cleveland is now headquartered in an existing metal building, a prime example of adaptive reuse.

Photos by Eric Pros/courtesy DS Architecture

This page:
The First Tee project in Cleveland, Ohio, makes use of existing building stock that was underutilized with minimal exterior work and strategic interior interventions.

Photos by Eric Pros/courtesy DS Architecture

emphasizes the increased demand for aluminum, highlighting its sustainable, lightweight, durable, and high-performance qualities. From corrosion resistance to perforation opportunities, the versatility of aluminum in both functional and aesthetic applications is driving an increased demand.

The appeal of natural metals is also on the rise. Further on Swanborn's observations of sustainability's movement towards natural metals, Weis explains that there is an increased demand for copper and zinc, two timeless materials. These metals are critical for projects with a historic restoration component, describing their value in ensuring "the original design intent is held." Despite the installation challenges, he asserts their worth: these are materials that "will stand the test of time." This renewed appreciation for authentic finishes parallels an owner-driven interest in sustainability, durability, and heritage-driven design.

Beyond historical projects, natural metals are increasingly used in designs to represent local landscapes. Swanborn describes a project in Phoenix, Ariz., in which copper unlocked the opportunity to mimic geological processes. The design utilized a brake press to create diagonal lines, successfully evoking the natural look. He explains the material "allowed us an amount of freedom that not many products would have allowed us to do." The material's light weight, sustainable qualities, and versatility allowed for a truly expressive design.

Metal rainscreens and insulated metal panels (IMPs) are increasingly used in building envelopes, as Arnot emphasizes, due to their provision of high performance in terms of continuous insulation (c.i.) and their support for energy modeling goals. Swanborn highlights the key value of metal sunscreens in enhancing thermal and operational performance.

Offering a perspective from the metal building system standpoint, Bouquot shares that the MBMA's number of IMP manufacturing members has doubled over the last three years, with the largest growth coming from European manufacturers moving into the U.S. market. A testament to the material, he explains that the Davidson Center, home to the Saturn V rocket at the U.S. Space and Rocket Center in Huntsville, Ala., is clad in IMPs. He explains, "Within one product, they were able to get this beautiful white exterior that matches that space look of NASA and this black interior that gives good contrast for all of the displays in the building."

Adaptive reuse, local longevity, and blending function with aesthetic

In keeping with the sustainable movement in associations and accreditations, material, longevity, and versatility are key. Pros notes a spike in the adaptive reuse of existing metal buildings. He mentions an example of the expansion of a local non-profit. Re-designing and adapting a pre-existing structure on the property proved to be the most economical and sustainable option. The project involved recladding and an emphasized focus on the interiors. He draws in the importance of material durability, saying, "It's another way of looking at the kind of life cycle of these products and these buildings that have longevity to them, as they can be reimagined many times." He projects that this emerging trend will continue in future designs.

As design attitudes shift away from temporary trends in favor of enduring, resilient styles, Swanborn offers a critical observation: "Timeless architecture is coming back; trendy architecture needs to be replaced over time because it gets old very quickly." Technological advancements support this movement as Swanborn explains, "The options of choices to clad a building have significantly increased … We can effectively mimic terracotta panels out of metal now. And that wasn't possible five, 10 years ago." Metal now accommodates blended aesthetics as well.

When considering the built environment on a cultural level, metal supports designing for specific building

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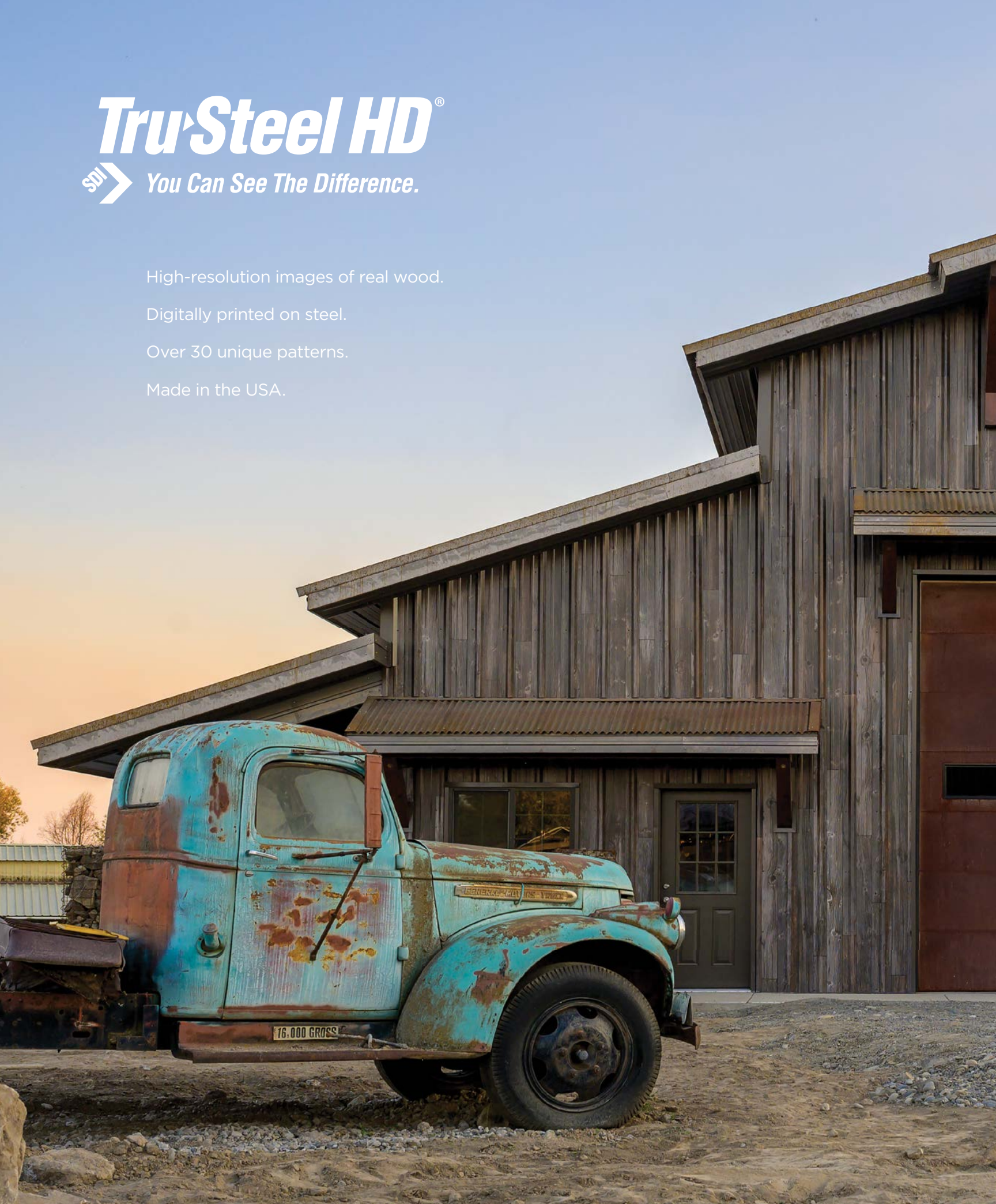

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The Davidson Space Center prominently features insulated metal panels (IMPs).

Photo courtesy U.S. Space & Rocket Center

occupants. With the innovative aesthetic developments and opportunities now available with metal, there is a shift away from metal structures that lack a distinct identity. Arnot expresses the essential considerations of the community's sense of architectural belonging, that "the project is of the place."

Integrating culture into designs is essential on the community level. Pros highlights the importance of authentic structures from material to design. The idea of cultural designs ties in with resilience and sustainability through "working with these municipalities and designing buildings that will outlive them."

A current project, called Fieldhouse+, in Dorchester, Mass., exemplifies the adaptability of metal. This 6,967.7 m^2 (75,000 sf) design is an urban community center developed in collaboration with the local Boys and Girls Club.

Arnot described the balance of function and form that went into the project: "It really needed to be for the kids. It needed to be industrial, though, because it is a huge field house. It needed to have the durability of metal, but then start to feature colors and textures that really represent the community and the colors and methods used by children. It becomes a lot more approachable and a space they feel welcome in." The project features a double-facade system with IMPs, perforated panels, and inviting coating colors.

Forecasting design demands

New developments are also dependent on community demands, and Bouquot notes two widespread phenomena that have led to the erection of many metal buildings over the past few years: indoor pickleball courts and private automotive clubs. These pickleball court structures often hold the capacity for dining as well as recreation, and the auto clubs act as a recreation and event space beyond their transportation storage capacities. Integrating metal prominently into these designs as they increasingly emerge will foster sustainability and style in these niche aspects of the built environment.

Modern-day considerations in architectural practice

Modern architectural practice is characterized by a deeper integration, technological innovation, and a drive to design with foresight in a rapidly changing regulatory and environmental context.

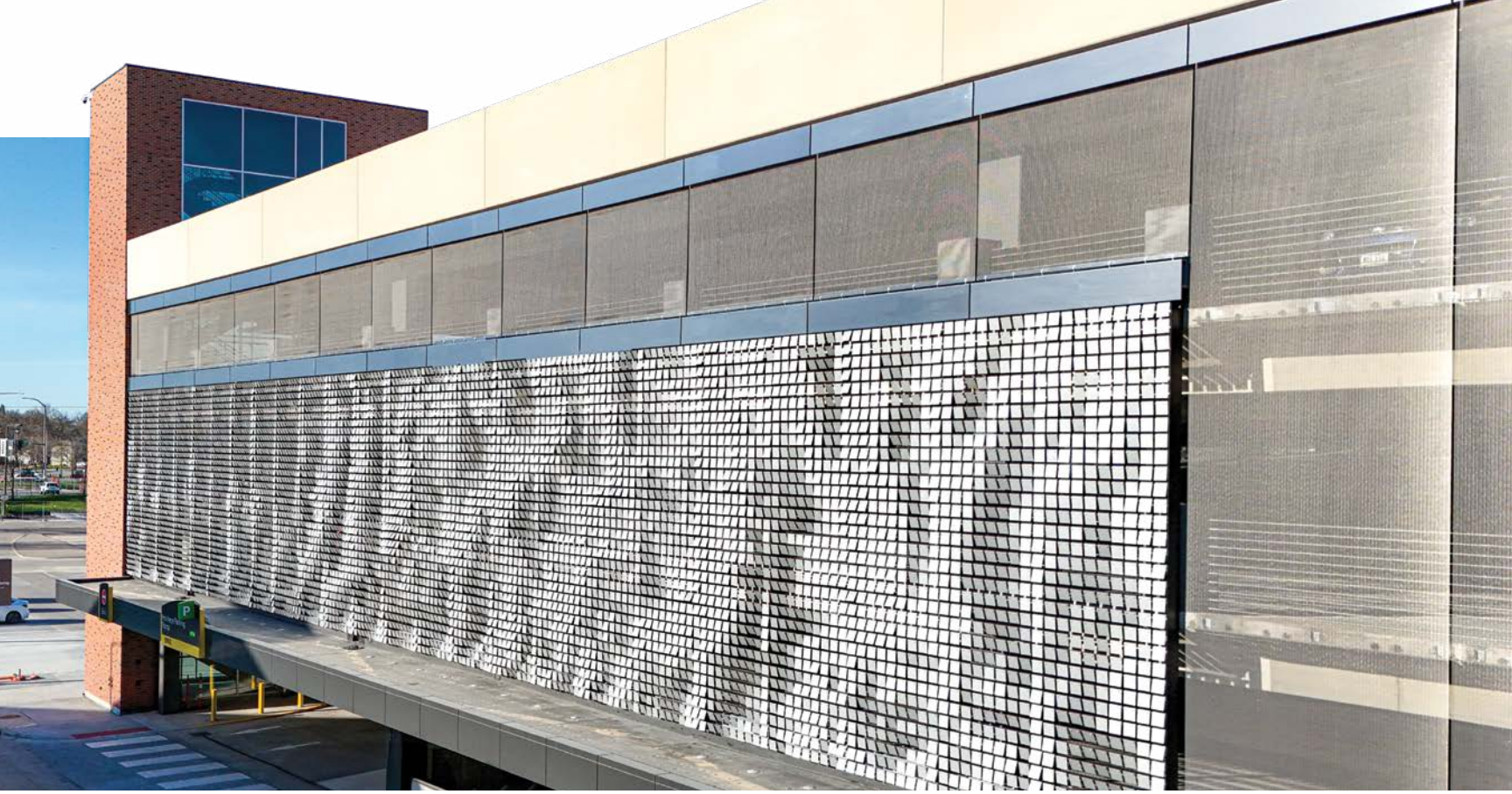
Pros describes this evolution, stating the projects across the industry are "much more integrated these days. Architects are no longer just designing buildings; we're coordinating and collaborating with teams in real time." He identifies cloud models, fast information sharing, and artificial intelligence (AI) as transformative elements in the profession.

The responsibility architects bear is adapting to meet future requirements. Scott observes, "Architects are not just designing for now, but they're designing for the future, and there's an increasing number of municipalities and states are adopting building performance standards, which, while the architect doesn't have to make sure the building complies with that on day one of a new building opening, the owner will have to comply with that in future years." This forward focus necessitates rigorous attention to emerging standards, lifecycle adaptability, and holistic resilience.

The architectural conversation has thus turned strongly toward the enduring: sustainable materials, adaptive reuse, lifecycle design, and a rejection of passing trends in favor of buildings that remain relevant and resilient long into the future.

Conclusion

The current narrative in architecture and metal design is one of heightened unity, foresight, and ethical responsibility. Through associations and accreditations, high-performance and aesthetically versatile materials, and an integrated, future-ready approach to professional practice, the metal architecture industry is equipped not only to meet the needs of today's built environment but to shape one that is sustainable, resilient, and adaptable for generations to come. The full recorded roundtable is available on the *Metal Architecture* website. MA



Metal Architecture in Motion

Kinetic metal facades rise on university campuses

In the evolving landscape of architecture, designers are increasingly seeking dynamic facades that combine aesthetics with performance. Among the most compelling of these innovations are kinetic metal facades—architectural skins that move with the wind. Unlike conventional cladding, these systems rely on natural forces to animate buildings, providing design functionality and reducing environmental impact while producing striking visual effects.

Two recent university projects, the Hawkeye Parking Ramp at the University of Iowa and the Wellness + Helfaer Recreation Facility at Marquette University, highlight how kinetic facades are transforming traditionally utilitarian structures into architectural landmarks and inspiring spaces for communities.

The science and art of kinetic facades

Kinetic facades are designed with arrays of small, lightweight metal panels, sometimes referred to as "flappers" or "kinetic elements," that are mounted to respond to wind currents. As air flows across the surface, the elements rotate back and forth, creating shimmering patterns of movement.

The design intent goes far beyond the visual aesthetic they create. By catching and reflecting light differently throughout the day, kinetic facades elegantly diffuse daylight. They also enable natural ventilation, an essential factor for structures like parking ramps that require adequate air circulation. Since they require no sensors or motorized mechanisms, these facades function as sustainable, low-maintenance systems that harness nature.

Function meets beauty at the University of Iowa

At the University of Iowa, the new Hawkeye Parking Ramp is situated at the heart of the west campus, serving thousands of students, staff, and visitors daily. At first glance, it may appear to be another multilevel garage; however, the building sets itself apart with a kinetic facade that brings movement and life to its exterior.

Spanning nearly 278.7 m^2 (3,000 sf), the facade incorporates thousands of aluminum elements

By Victoria Scanlon

Kinetics reveal wind patterns and create important, energy-efficient ventilation for the Hawkeye Parking Ramp at the University of Iowa.

Photo by Whistler Studios

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On this spread:

Left: Kinetic facade at the Hawkeye Parking Ramp at the University of Iowa.
Photo by Whistler Studios

Middle left: Metal Kinetic facade for the new Wellness + Helfaer Recreation Facility, Marquette University.
Photo by Ned Kahn

Middle right: Individual 152.4 x 152.4 mm (6 x 6 in.) aluminum tiles are coated with a long-lasting coating and custom-manufactured for the facade at Marquette University.
Photo courtesy EXTECH/ Exterior Technologies

Right: The "Breathing Lake" environmental art wall at Marquette University provides a calming design aesthetic and draws inspiration from nearby Lake Michigan.
Photo by Ned Kahn

mounted across prefabricated panels. As wind currents sweep across the building, the surface transforms into silver ripples that both capture the eye and respond to the environment.

Beyond its aesthetic impact, the facade delivers practical benefits. Parking structures require extensive mechanical ventilation, which consumes a significant amount of energy. By integrating a semi-transparent, wind-permeable skin, the design team created a natural ventilation solution that reduces reliance on mechanical systems. The reflective properties of the metal elements, combined with a 25.4 mm (1 in.) spacing between flappers, also help bring daylight into the structure, enhancing visibility and safety.

"Achieving natural ventilation is a major challenge in parking design," says Kevin Smith, president of EXTECH. "The kinetic system meets airflow requirements passively while managing sunlight by reflecting and diffusing natural light, supporting energy efficiency and occupant comfort."

The result is a garage that operates more sustainably while also contributing to the campus identity. "The semi-transparent, wind-moving facade provided ventilation benefits while also contributing to the visual appeal of the structure," notes Victor Ritter, architect at Shive-Hattery, who designed the project. The kinetic system underscores how thoughtful design can elevate even the most utilitarian campus facilities into architectural landmarks.

A healing instrument at Marquette University

While Iowa's project demonstrates the functional strengths of kinetic facades, the new Wellness + Helfaer Recreation Facility at Marquette University reveals their potential as a form of environmental art. There, the facade is not just an enclosure but a therapeutic experience.

The design was developed in collaboration with environmental artist Ned Kahn, whose work often explores natural phenomena through interactive installations. For Marquette, Kahn envisioned the entire building as a "healing instrument": a surface that could reconnect people with the invisible but vital forces of light, air, and motion.

The kinetic facade, covering an area of more than 511 m^2 (5,500 sf), consists of thousands of aluminum elements finished in calming shades of blue to evoke the surface of nearby Lake Michigan. As wind moves across the building, the wall ripples like water, mirroring the rhythms of nature and transforming the structure into a constantly changing artwork.

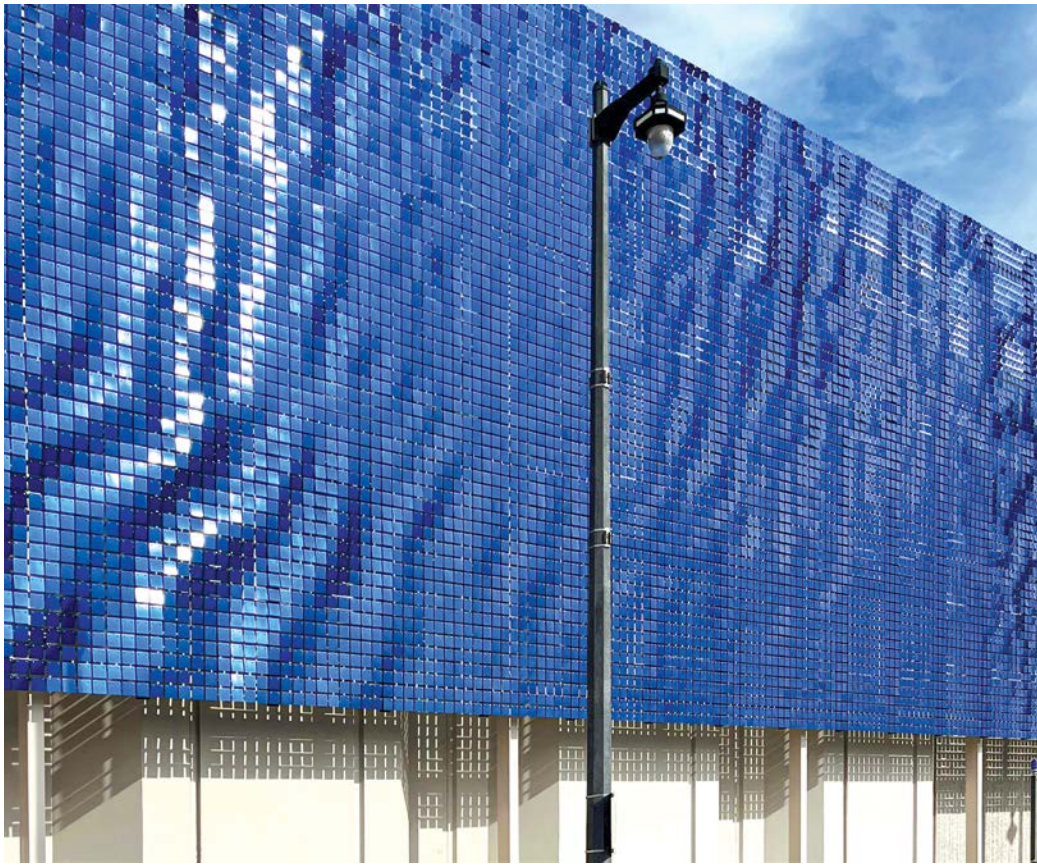
Inside, smaller arrays of kinetic panels echo the same theme, extending the sensory experience into the building's interior. The movement of light and air, both inside and outside, supports the facility's mission to foster physical wellness, as well as mental and emotional benefits.

Kahn described the effect as "visually connecting people to the mysterious and beautiful air that we breathe." For students, staff, and community members, the facade creates a calming backdrop for recreation, reflection, and healing.

Sustainability in motion

The projects at Iowa and Marquette both demonstrate how wind-activated design strategies can advance sustainability goals in higher education and other project applications. Key benefits include:

- Daylight control: Reflecting and diffusing natural light reduces glare and supports interior illumination.



- Ventilation: Semi-transparent surfaces allow air exchange, particularly important in parking structures.
- Energy efficiency: The design allows natural light during the day, and mechanical ventilation lowers operational energy use.
- Durability: Metal elements are resistant to weathering and require minimal maintenance.
- Wellness: The movement and interplay of light create calming effects that benefit occupants through biophilic design.

Collaboration and craft

Behind these kinetic facades lies a highly coordinated process among architects, engineers, fabricators, and contractors. Precision is essential: each panel must be designed to withstand wind loads, thermal expansion, and long-term wear, while maintaining free movement of the individual flappers.

At the University of Iowa, the facade design was realized through close collaboration between Shive-Hattery, Conlon Construction, and glazing contractor Forman Ford Glass & Glazing. At Marquette University, Kahn worked with Workshop Architects and Findorff contractors to ensure the artful vision translated into an exterior that would perform for decades. Both design teams collaborated closely with the manufacturer to create custom facade systems uniquely designed to meet the needs of each project, illustrating the increasingly interdisciplinary nature of design and construction, where artistry, engineering, and sustainability align to deliver transformative results.

A glimpse of the future

As more owners and designers embrace environmentally conscious design, kinetic facades are poised to play a larger role. Their adaptability makes them suitable for a variety of applications, including parking structures, recreation facilities, libraries, student centers, civic buildings, and commercial facilities.

In a design culture increasingly focused on energy efficiency and placemaking, wind-activated facades offer a unique synthesis: they turn ordinary walls into canvases, passive design strategies into public art, and functional enclosures into community landmarks.

The projects at the University of Iowa and Marquette University demonstrate that metal buildings need not be static. They can breathe, shimmer, and respond—inviting viewers to see metal architecture not as a backdrop, but as a living part of the built environment. MA

Victoria Scanlon *is the marketing manager at EXTECH/Exterior Technologies. She leads the company's communications and began her career at EXTECH in May 2021. Headquartered in Pittsburgh, Pa., EXTECH manufactures and designs wall, window, skylight, canopy, and custom facade systems. Her experience spans over 11 years in the manufacturing industry, encompassing various creative and marketing roles. She graduated from PennWest University with a bachelor's degree in journalism and business.*

Getting Started with IMPs

A primer for high-performance enclosures

By Karim Muri

Insulated metal panels (IMPs) were chosen for Walled Lake Central High School for their thermal efficiency and dual barrier against air and water infiltration.

Photos courtesy Kingspan Insulated Panels North America

As construction costs rise and skilled labor remains in short supply, the search for simplified, cost-effective building solutions becomes more urgent. For architects and specifiers, one product is gaining popularity: insulated metal panels (IMPs).

IMPs are designed to provide a combination of air, water, vapor, and thermal protection within a single panel. The panels combine air, water, vapor, and thermal control functions, reducing the number of separate layers typically installed in a wall assembly. With R-values up to eight per 25.4 mm (1 in.), IMPs meet top energy standards without the need for extra insulation or additional materials.

Integrating these control layers within a single panel can also improve enclosure continuity. By integrating these critical components into a single seamless unit, IMPs reduces the number of transitions where discontinuities in the enclosure are most likely to occur. This is especially important in climates with extreme weather conditions, as moisture intrusion can cause mold, mildew, and long-term structural damage.

By limiting air and water intrusion, panels can help reduce maintenance requirements over the building's lifespan.

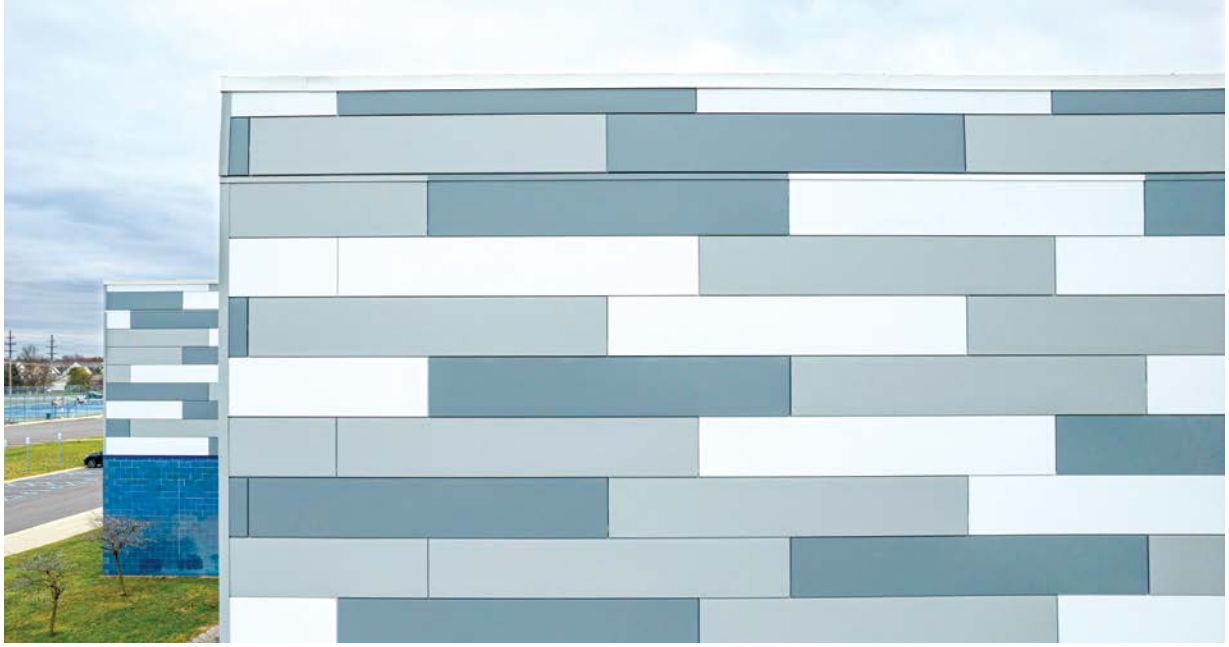
Installation efficiencies

When developing a design, architects and designers must consider the time constraints that come with assembling a project. IMPs are designed to expedite installation by providing a prefabricated solution that eliminates the need for additional steps, such as installing separate insulation, vapor barriers, and air barriers. This can reduce sequencing steps associated with multi-layer assemblies.

Time-lapse footage shows that IMP installation can take half the time of traditional multi-component wall system installations, leading to faster project completion. Shorter installation times can help reduce labor demands on congested project schedules. The streamlined installation process also reduces the risk of delays caused by scheduling conflicts or material shortages. This can help project teams maintain construction schedules, particularly in regions where labor shortages are prevalent.

Reducing long-term maintenance

Panel durability can contribute to lower long-term maintenance requirements for any commercial building. These panels are designed to remain air- and water-tight for many years, even in harsh weather conditions.



The insulation of insulated metal panels (IMPs) keeps indoor temperatures comfortable for Michigan students during harsh winters and reduces heating and cooling costs for the school.

Many IMP systems also come with comprehensive weather-tight warranties. This differs from concrete walls, which may require periodic repainting to maintain their appearance. For example, while traditional concrete walls might require repainting every five to 10 years, IMPs keep their appearance and performance for a longer period.

Improved energy performance

Energy efficiency is a key factor when choosing building materials. Commercial buildings use approximately 17 percent of the U.S.'s energy, making it crucial to focus on energy-saving solutions.

IMPs help reduce thermal bridging by providing continuous insulation (c.i.), which helps prevent heat from escaping through thermal conduits in the building's envelope. This helps maintain more stable indoor temperatures, reduces the load on heating and cooling systems, and results in lower energy bills over the building's lifetime.

Cutting transportation costs

Transporting construction materials can be one of the most costly parts of a project. The weight of materials like precast concrete requires specialized equipment, which increases transportation expenses. IMPs, however, are considerably lighter and easier to handle, making them more economical to transport.

Their streamlined logistics enable more efficient delivery, helping to minimize delays in project timelines. In addition to lowering costs, this simplified logistics process ensures that materials arrive on time and are immediately ready for installation.

Real-world impact

At Seattle's Port Terminal 106, choosing IMPs for the second-floor construction resulted in notable cost savings. The project's architect explained that avoiding tilt-up concrete, which would have been more expensive and logistically complex, helped simplify the project.

The panels' lightweight design made them easier to handle and install, reducing labor and transportation costs. Additionally, the panels' c.i. helped meet Seattle's energy code requirements and lowered energy expenses for heating and cooling. The combination of lighter panel weight, c.i., and straightforward installation contributed to reduced labor demands and simplified sequencing on the project.

Walled Lake Central High School in Walled Lake, Mich., has served students for more than 20 years. Yet, the aging 25-year-old structure began to deteriorate, causing water intrusion problems in the academic wing. To address these issues, a comprehensive retrofit was planned for the building's facade.

During the renovation, IMPs were chosen because of their excellent thermal efficiency, creating a dual barrier that guards against both air and water infiltration. The panels' integrated water-resistive and air-resistive properties eliminated the need for multiple waterproofing layers, simplifying the construction process and reducing overall costs.

The insulated foam core of the panels was one of the most thermally efficient options available, providing strong protection against heat transfer. This insulation helped maintain a comfortable indoor climate for students, even during Michigan's cold winter weather, and reduced heating and cooling costs.

Applications and considerations

For contractors facing labor shortages, tight deadlines, and rising material costs, IMPs offer a streamlined, cost-effective solution. By consolidating multiple enclosure functions into a single panel, IMPs offer an alternative to multi-component wall assemblies. Their efficiency, cost savings, and long-term benefits make them a smart choice for any project seeking high performance and low operating costs. MA

Karim Muri *is the vice president of marketing services and strategy development for Kingspan Insulated Panels North America. Muri has led strategic marketing in the construction products market for nearly 20 years. His global experience encompasses leadership roles in Australia and the United States, spanning both the residential and commercial building sectors.*

Key Design Factors When Employing IMPs

Options for building skins have improved dramatically over the last 20 years. A deeper understanding of thermal and pressure dynamics between interior and exterior building environments has fueled increasingly complex, multicomponent wall assemblies. However, there is another option when it comes to a thermal barrier, exterior building material: insulated metal panels (IMPs). IMPs are single-component weather barrier wall systems that deliver high-performance value in one integrated, easy-to-install system.

There are multiple versions of insulated metal panels, with a variation on the facing materials, internal insulation material, and panel fabrication methods. This article focuses on foamed-in-place cores with fully adhered skins due to their material consistency and high quality. These panels set the standard for this type of building component. This article aims to help specifiers and designers understand the project needs that drive the IMPs facing profile, gauge, color, and insulation thickness selection, as well as the best applications available within the range of IMPs available.

IMPs are sandwich panels of two metal skins with a foamed-in-place core that fully bonds to the interior surface of the metal faces. The panels are used as part of a steel frame structure, an interior liner panel of a concrete or masonry structure, an unbraced interior partition, or suspended ceilings. The exterior orientation of the panels can be either vertical or horizontal, each having its own design criteria for the supporting structure.

Orientation

Horizontally oriented IMPs run perpendicular to the vertical building structure. Often, building column spacing exceeds the required support points. In horizontal IMP installation, cold-formed metal framing, which will likely already be in place for other purposes, can serve as a panel connection point. Functionally, a multicomponent exterior weather barrier, such as an assembly of sheathing, air barrier, exterior insulation and finish systems (EIFS), or other exterior skins, serves the same purpose, with IMP a viable alternative. The IMP system reduces wall assembly components since IMPs act as a weather barrier, as well as an air and vapor barrier.

Horizontal application works well for low-height buildings or multi-story buildings where no

By John Koury, AIA

Horizontally installed architectural insulated metal panels (IMPs) (in red) were used for the low bay office area of this facility, while vertically installed Mesa profile panels were used for the high bay area.

Photos courtesy A M King

Insulated metal panels (IMPs) with light corrugation are a good fit for interior environments such as food storage and processing facilities, which require lower temperatures, sanitary focus, and frequent wash down.

intermediate steel structure is required, such as a typical office building. Often, designers prefer the horizontal orientation of the panels and seams for aesthetic reasons. For high bay buildings greater than 4.5 m (15 ft) floor-to-floor dimensions—approaching the span of economical application of light gauge metal framing—additional structure is required to connect the IMPs to the building, adding construction costs.

Vertically oriented IMPs can extend from the top of the foundation wall to the building parapet, with the maximum panel length available on the market being 22 m (72 ft). Depending on the distance between horizontal connection points (span), intermediate horizontal connections (girts) may be required. These girts will attach to vertical building columns. The vertical application can have light gauge metal framing on the interior, similar to the horizontal orientation, if the interior environment requires it.

If an exposed metal surface on the building interior is appropriate, no light gauge framing is required. As a result, the building columns and secondary framing would be exposed, such as in a high bay warehouse application. This material efficiency makes the vertical orientation a viable option for interior functions in high bay spaces, especially when thermal environments, water resistance, and sanitation are important considerations. For sanitary conditions, exposed structure can be wrapped or tube shapes specified.

Spans

A vertical panel application with increased panel thickness will offer incrementally longer span capabilities between girts. The spacing is also influenced by applicable codes for wind pressure for the building site and geographical location. Conceptually, the spacing between mounting points—usually a horizontal girt—acts as a span, with the IMP serving the function of a beam and the applied horizontal load provided by the wind.

Increasing the spacing between the IMP mounting points will increase the face and panel thickness. Span capacity is affected by multiple factors: facing thickness, thickness of insulation, and fastening pattern of the panel to the girt. Refer to local codes for design wind values and coordinate with specific IMP providers, vertical span tables, and connection patterns as they vary from manufacturer to manufacturer.

Facing profiles

IMPs can be selected for various applications, from Class A office space to industrial cold storage warehouses; however, the facing profile will likely differ for each of these different applications.

A smooth, flat face panel will typically find use in contemporary, institutional, or commercial office applications. The smooth, untextured level of finish surface is consistent with other exterior material applications in these building types, such as stone, glass, concrete, or other types of metal classing. With IMPs, the benefit is an architectural level finish comparable to an aluminum composite material (ACM) panel with backing for the exterior facing panel. These types of panels are often used with an integrated aluminum storefront window system.

Since IMPs act as the exterior skin, insulation, and interior face, where window or door openings occur, the extruded aluminum storefront rough opening can be integrated with the IMP rough opening. This integration works well with simple designs and uncluttered facades of contemporary commercial aesthetics, with the advantage of a long-lasting, consistent exterior finish.

Facing profile choices for IMPs include flat, minor ribs, v-grooves, deeper ribs, and striated profiles. The minor rib is a standard profile with most manufacturers, providing strength from a span standpoint, while hiding steel waviness and avoiding the deep rib "metal building" negative architectural stigma. All the above non-standard profile options provide for different architectural looks.

In general, builders prefer panels in "full height" length, whether it be an exterior or interior application. This saves on installation labor costs, and it is the best aesthetic option. One note of caution: specifiers should contact their IMP supplier to verify panel length production limits and inherent span capabilities between mechanical connections. The recent IMP lines commissioned in the U.S. can make panels up to 22 m (72.2 ft) long. The selected IMP provider can advise on the combination of panel profile, lengths, thickness, and facing gauge

to coordinate a satisfactory installation relative to expected aesthetics and adequate impact resistance for the environment specified.

Facing thicknesses

Interior and exterior metal skin thicknesses are produced in 22, 24, and 26 gauges, with embossed stucco texture or non-embossed surface options dependent on the specific application or preference of the end user. The material used is G-90 galvanized steel, AZ50 aluminum-coated steel, or 304 stainless steel for specific applications. For most applications, 26 gauge is utilized; however, specifiers often need 24 and 22 gauge for flat and striated applications as well as longer panels of 17 m (55 ft) or more. Stainless steel is the choice for food processing projects where employees must wash down panels daily.

Panel thicknesses

The dimension between interior and exterior layers of steel, the foam core thickness, can be found in 25.4 mm (1 in.) increments, including thicknesses from 50.8 to 203.2 mm (2 to 8 in.). Thinner panels, in the 50.8- to 76.2-mm (2- to 3-in.) range, are typically used for curtain wall or liner applications. Temperature-controlled spaces and buildings commonly use 101.6- to 203.2-mm (4- to 8-in.) thick panels.

Several factors play into the selection of panel thickness. Like conventional polyisocyanurate boards commonly used for insulation at foundations and above low sloped roof decks, IMPs with a polyisocyanurate, foamed-in-place urethane panel-based core typically have a nominal R-value of 8 per 25 mm (1 in.) of insulation thickness, making them the most efficient building product available today. R-values increase linearly as the dimension of core insulation increases. Code requirements for R-value are ever-increasing, and IMPs are an easy way to satisfy these increased requirements.

The thermal performance of IMPs, when compared to other exterior materials, is evident after analysis of building energy efficiency. The high insulation values and control of thermal bridging combine for an elevated level of energy efficiency. It should be noted, when architects, builders, designers, or contractors perform an energy analysis, deeply grooved panels will only have the effective R-value of the thinnest section of IMPs. For example, a 152.4-mm (6-in.) maximum thickness panel with a minimum thickness of 101.6 mm (4 in.) will still only have an R-value equal to the 101.6 mm smooth panel.

The same concept of panel span occurs in the horizontal application between the vertical support points. Conventional horizontal installs, as mentioned earlier, often employ the use of metal stud infill framing. Therefore, thicknesses are not typically dictated by span, but rather desired R-value in horizontal applications.

Sanitary performance

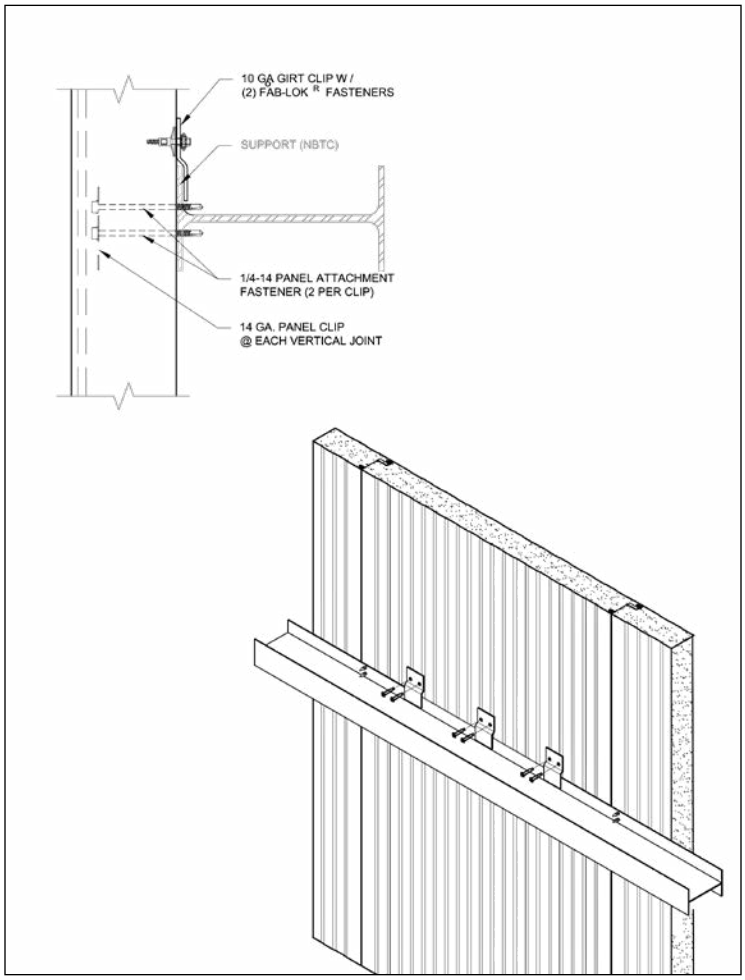
IMPs are the dominant wall and ceiling material used in food processing and food storage buildings due to their thermal performance, ease and speed of installation, and their ability to withstand daily wash down—all traits needed for temperature-controlled facilities. Additionally, the developed and overlapping panel joint conditions are resistant to harboring moisture.

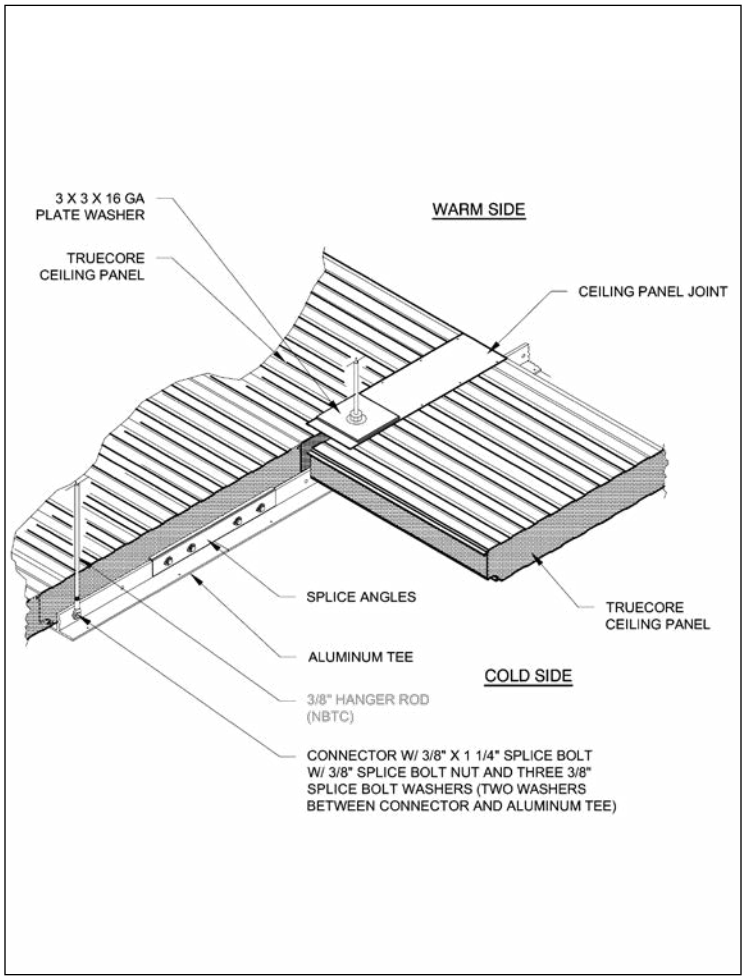
Sanitary, clean room, and process areas often have heavier equipment present. Metal facing panels are prone to dents and punctures in these environments.

Identifying areas of potential impact and damage risk is important in maintaining the performance of the building. Measures such as specifying impact-resistant facing as part of the IMP or using concrete block or poured concrete base in front of the IMP wall in impact-prone areas will contribute to the longevity of the building. A common example is employing precast concrete panels at loading docks where trucks dock against the building and using liner panels at the interior of the dock to maintain cooler dock temperatures. In the absence of heavy impact likelihood, IMPs have a durability similar to aluminum composite material (ACM).

Module widths

The width of IMPs is dictated by the application and specific structural design pressures of a project, as well as the line capabilities of the manufacturer. As a rule of thumb, most projects utilize the widest module of IMP from the specific manufacturer on the project. These widths are 1067-, 1118-, and 1143-mm (42-, 44-, and 45-in.) modules. These wider panels maximize the cost of steel in production and maximize the daily installed footage on a project, reducing labor and rental equipment costs. Specifiers often select IMPs with modules of 610 to 914 mm (24 to 36 in.) for aesthetic reasons, as well as for projects with higher wind design pressures. This latter case is because such panels have more joints and require more fastening per square meter.





Pre-painted finishes

IMPs are finished with exterior coatings made from polyester, siliconized polyester (SMP), polyvinylidene fluoride (PVDF), flurothane (II, IV, V), and plastisol.

A range of colors are available, with a handful of standard colors being the most economical and readily available options. Like other pre-finished exterior metal skins, custom color choices can be limitless; however, there is an upcharge for them, and increased lead times can be expected.

Joint and corner conditions

As covered earlier, high bay buildings generally have a vertical orientation where panels connect along vertical seams, and exterior corners have matching sheet metal trim finishing. A common base detail is the insulated panel anchored to a u-shaped galvanized base track. The top of wall condition is similar, either as a parapet with coping or no parapet condition with a fascia or gutter condition flush with the roof.

Specifiers will need to determine if parapet conditions of greater than 813 mm (32 in.) require bracing on a case-by-case basis. The same factors that inform girt spacing will dictate if bracing is required: design wind speed, panel thickness, and facing gauge. The default trim is surface-mounted, color-matching metal trim for window and door openings, and building corners and soffits.

For architectural series IMPs, trimless options are available for pre-formed corner panels, for when the building aesthetic requires a more monolithic tone. When using the external trim corners versus trimless, it is important to understand the complexity of the building form and the number of corners of the building. Utilizing the surface-mounted corner trims allows installers greater field adjustment and the ability to negotiate field tolerances. Field adjustments to the trimless corners are more limited, thus potentially impacting quality, schedule, or potentially both.

Left: The front-side concealed fastening of an exterior insulated metal panel (IMP) wall, as well as back-fastening to allow for higher wind pressure design.

Right: An isometric view of the ceiling tee support.

Installing a suspended insulated metal panel (IMP) ceiling.

Additional Applications

Standing seam and high-rib IMPs are also available for roof applications, as well as composite roof deck systems where single-ply rubber roofs adhere to insulated deck panels. For retrofit applications, specifiers will need to verify the roof design. IMPs can provide a cost-effective, "box-in-a-box" controlled interior environment, perfect for freezers, coolers, vertical farming, and cannabis grow rooms.

Final Considerations

Design specifications and certifications for IMPs can be found from each manufacturer for fire standards, insurance compliance, thermal performance, air infiltration, water infiltration, and special approvals for select jurisdictions. Most IMP manufacturers have gone through testing to prove compliance with specific criteria required for Date County, FM, UL to list a few; however, there may be specific installation requirements if working within these conditions.

Conclusion

IMPs provide an economical, attractive, high thermal performance option for both interior wall and exterior building envelope applications. IMPs, for example, can be employed in specialized interior environments where thermal performance and sanitation standards are mandatory. Understanding where they are best employed as exterior and installation practices can help the building be constructed closely to the design vision through a predictable process and guarantee a long service life. MA

John Koury, *AIA, is a consulting architect for A M King, providing inspiration and guidance for AMK Design Group. With 25 years of experience in the niche markets of food processing, cold storage distribution, and industrial manufacturing, he thrives on complicated design challenges. Koury excels in material selection, functional space layout, and client/constructor interactions. His practice is based on the belief that regardless of the size of the building, it must relate to the inhabitants, users, and the process within.*

Sealants for Metal Building Systems

Strengthening structures from the inside out

In the world of metal architecture, the conversation often revolves around structure, span, and style. Designers and builders alike focus on panel profiles, fastening methods, insulation values, and aesthetics. Beneath those visible decisions lies a quieter contributor to performance: the sealant.

While small in quantity and nearly invisible once applied, sealants play a significant role in determining how a metal building system functions over its decades of use. They protect against moisture ingress, preserve thermal integrity, and ensure panels perform as designed across changing temperatures and environments. Without the right sealant, even the most advanced metal system can lose its efficiency and resilience.

Rethinking the role of sealants in metal design

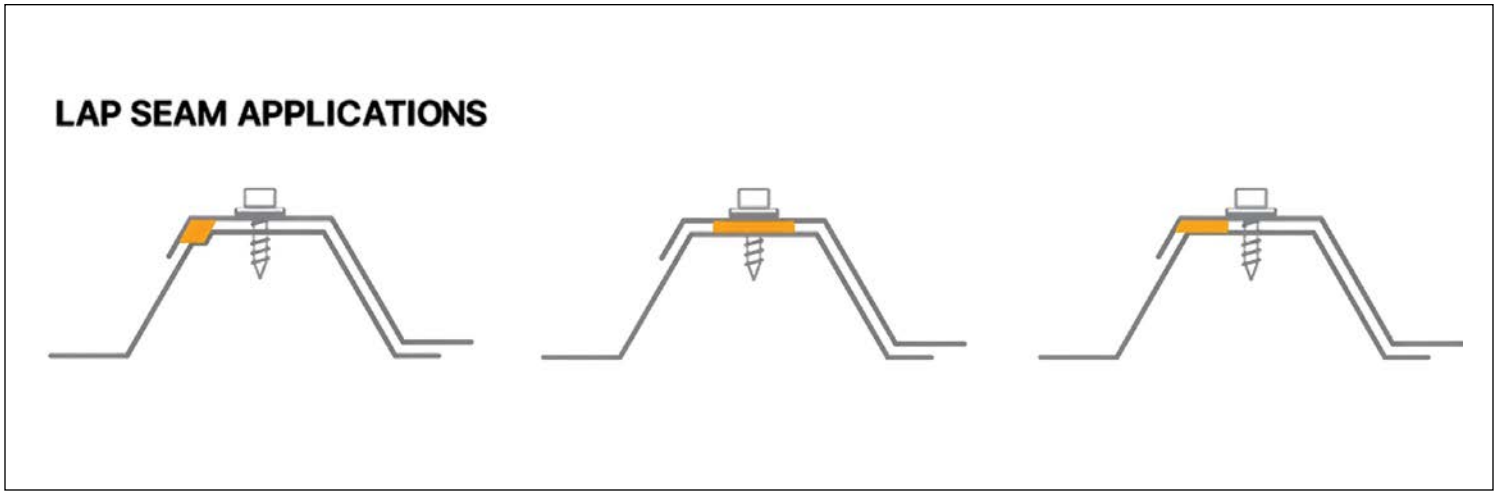
For architects and specifiers, a metal building's longevity is measured not only by its structural stability but by its ability to remain weather-tight and energy-efficient. That reliability begins at the seams, laps, and joints: areas constantly challenged by thermal movement, wind, and water.

Sealants are the connective tissue of a metal building, supporting every detail where two components meet. Their function is less about visual impact and more about safeguarding the building envelope's performance. When properly selected and applied, they maintain continuous protection against air and

By Smitha Jayaraman

Sealants are widely trusted in metal building systems for their strong adhesion, long-term flexibility, and resistance to the elements.

Photos courtesy Amrize Building Envelope



This image demonstrates lap seam applications.

moisture movement without hardening or cracking, even as surrounding materials expand and contract.

In this sense, the choice of sealant is a design decision as much as a construction one. It directly influences the building's ability to meet performance codes, sustain aesthetics, and reduce maintenance throughout its lifecycle.

Environmental and structural challenges at the seams

As modern metal systems are engineered for precision and endurance, several inherent challenges test the resilience of their connections:

- Thermal movement: Metal panels expand and contract daily with temperature fluctuations. This repetitive motion stresses fasteners and joints, potentially opening gaps that compromise weather protection.
- Moisture infiltration: Joints, laps, and penetrations create natural entry points for water. Over time, even minor leaks can lead to corrosion and damage to adjacent materials.
- Air leakage: Unsealed connections allow uncontrolled airflow, diminishing insulation performance, and driving up energy use.
- Environmental exposure: UV radiation, wind, and temperature extremes accelerate the breakdown of less durable sealants, reducing protection where it is most needed.

Addressing these factors through thoughtful specification of sealant type and placement ensures that metal building systems deliver the performance their design promises.

A closer look at butyl and non-skinning sealants

Within the metal construction industry, two primary sealant categories dominate: butyl tape sealants and non-skinning sealants. Each serves a distinct purpose based on application method and expected movement in the joint.

Butyl tape sealants

Butyl tape sealants are pre-formed rolls of pliable material designed for clean, tool-free installation. Their tacky composition adheres firmly to coated metal substrates. These tapes are widely used in rib joints, end laps, roof curbs, and skylight perimeters; locations that demand reliable adhesion with minimal cleanup.

A major advantage of butyl tape is its stability across temperatures ranging from -20.6 to 48.9 C (-5 to 120 F), maintaining flexibility and adhesion without cracking or flowing. With an 18-month shelf life and multiple sizes available, these sealants provide a predictable and repeatable solution for builders and fabricators alike.

In design terms, they help preserve the sleekness of the finished assembly, remaining concealed between joined surfaces while ensuring structural continuity.

Non-skinning sealants

Non-skinning sealants differ fundamentally in form and behavior. Supplied as a fluid in caulk tubes, sausage packs, pails, or drums, they are applied by gun or pump rather than by hand. Once placed, the material never fully cures or hardens; it remains permanently flexible, adapting to joint movement without loss of adhesion.

This performance makes non-skinning sealants ideal for dynamic areas such as insulated metal panel (IMP) joints, concealed seams, and roll-forming connections or other applications where panels move more dramatically due to temperature cycles or structural flexing.

Unlike many reactive sealants, non-skinning formulations typically require no primer, reducing the number of steps during both factory assembly and field installation. Their non-stringing consistency allows for clean application and repositioning of panels before fasteners are secured, an advantage in settings where a precise fit is paramount.

Comparative design considerations

When viewed from a systems perspective, butyl tape and non-skinning sealants complement rather than compete with one another. Their differences align with specific design priorities:

Feature	Butyl Tape Sealants	Non-skinning Sealants
Form	Pre-formed tape roll	Fluid, gunned, or pumped
Typical Use	Rib joints, end laps, skylights, or curbs	Panel joints, concealed seams, or roll-forming lines
Installation	Peel-and-stick, no tools	Applied with a pump or a gun
Movement Tolerance	Moderate	High, ideal for dynamic joints
Repositioning	Limited after placement	Easily repositionable during install
Priming	Not required	Not required
Residue / Cleanup	Minimal	Clean, no webbing
Visibility	Hidden between surfaces	Hidden within seams

This distinction allows architects to specify sealant combinations that match the movement characteristics and exposure conditions of each part of the building envelope.

Performance risks of improper selection

Neglecting sealant specification—or relying on the wrong type—can undermine even the most carefully engineered system. Observable consequences include:

Photo © EyeMark/courtesy Bigstockphoto.com

- Water penetration, leading to corrosion at panel laps and fasteners.
- Reduced thermal efficiency, as air leaks diminish insulation value.
- Premature degradation of coatings and substrates.
- Frequent maintenance or warranty claims, adding cost and client frustration.

From a design standpoint, improper sealing can also result in visual imperfections over time, such as streaking from trapped moisture or movement gaps along critical joints. These outcomes affect performance and erode the long-term perception of quality in a completed project.

Integrating sealants into the building design process

Specifying sealants early in the design phase ensures they work in harmony with panel geometry, fastener placement, and building performance goals. Considerations include:

- Joint design: Selecting sealants that accommodate anticipated movement without loss of adhesion.
- Material compatibility: Ensuring adhesion to specific coatings and finishes used on the panels.

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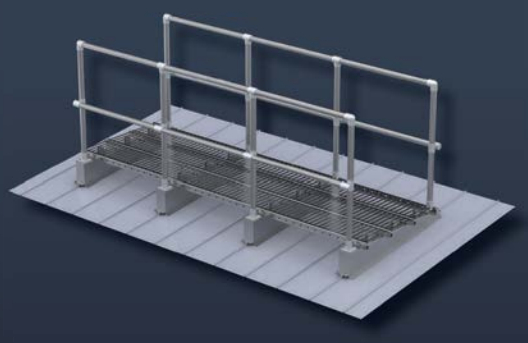

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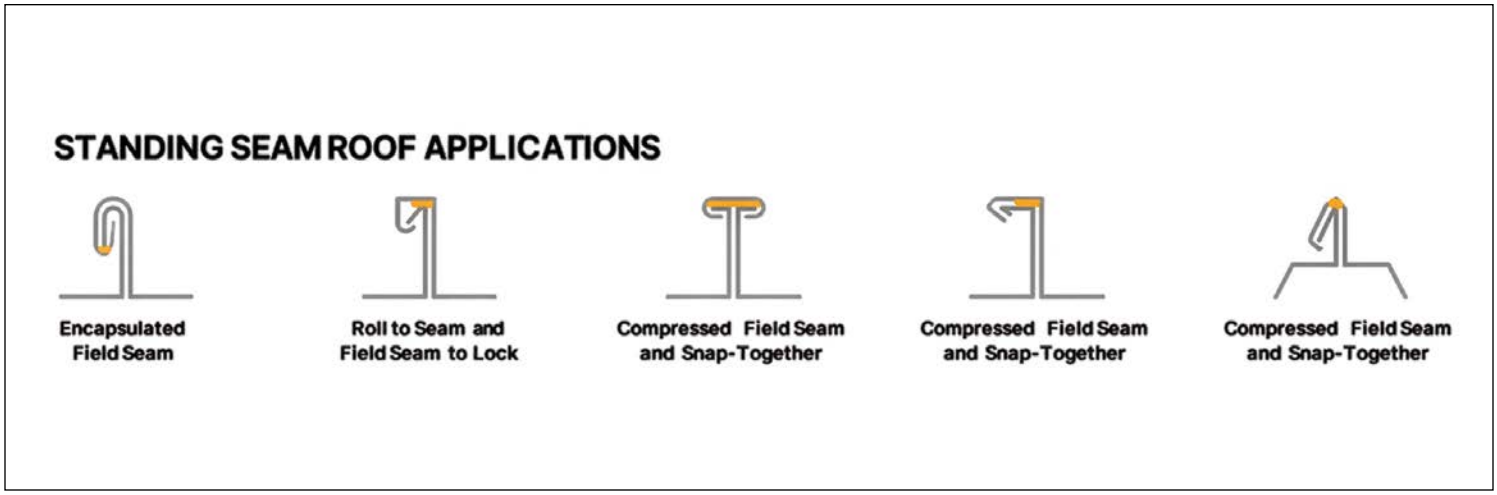

This image demonstrates standing seam roof applications.

- Application environment: Accounting for factory versus field conditions, including temperature and humidity.
- Service accessibility: Choosing sealants that can be replaced or re-sealed as part of future maintenance.

By incorporating sealant decisions alongside structural and aesthetic design, architects strengthen the entire system's resilience without compromising its appearance.

Enhancing architectural outcomes through material integrity

Although rarely featured in renderings or specifications meetings, sealants shape how a metal building feels and performs long after completion. The right formulation safeguards the clean lines and precision detailing that define metal architecture, preventing distortions or damage that compromise both appearance and performance.

By viewing sealants not as a finishing accessory but as a functional design material, architects reinforce the synergy between engineering intent and built reality. The outcome is a building that stands resilient against time, weather, and movement without compromising its design integrity.

Why specification discipline matters

In practice, the decision to specify one sealant over another can determine whether a building remains efficient and leak-free or faces early maintenance cycles. Each roof seam and panel lap is a point of potential weakness; the chosen sealant defines how that joint behaves under expansion, contraction, and exposure.

Architects and contractors who emphasize sealant quality help protect both the structural components and the reputation of their design. The consistency and longevity of a properly sealed joint echo the same precision expected from the broader system.

Building systems that endure

Metal architecture thrives on the idea of durability, structures capable of withstanding environmental extremes while expressing clean, contemporary form. Achieving that durability requires more than metal thickness or coating technology; it demands meticulous attention to how every component connects.

Butyl and non-skinning sealants, when used strategically, preserve that integrity from the inside out. They form a continuous, invisible line of defense that enables panels to move naturally, resist intrusion, and maintain performance for decades.

In the end, a well-designed building is only as strong as its weakest joint. By understanding and specifying the right sealant solutions, architects ensure their metal systems perform as beautifully as they look. MA

Smitha Jayaraman *is a product manager at Amrize Building Envelope. She manages product strategy and brand communication for the specialty segment, supporting a portfolio that includes GacoBond, GacoSeal, Tacky Tape, PolySpec, and American Safety Technologies. With a strong background in marketing, branding, and project management in the chemicals and building materials industries, Jayaraman brings a creative and strategic perspective to product development and positioning.*

Adhesive Innovation

Pressure-sensitive tapes support metal architecture

In the evolving world of architectural design, metal continues to capture the imagination of architects, engineers, and builders alike. Its sleek aesthetic, exceptional durability, and sustainability credentials have made it a mainstay in modern construction—from high-performance roofing systems to facades, cladding, and prefabricated modules. Working with metal, however, introduces unique challenges. Thermal expansion and contraction, condensation, vibration, and exposure to ultraviolet (UV) radiation or extreme cold can compromise seals, weaken joints, and accelerate material degradation.

Enter the next generation of pressure-sensitive adhesive (PSA) tapes—engineered materials that are transforming how metal buildings are designed, assembled, and maintained. No longer substitutes for sealants or screws, advanced PSA tapes have emerged as high-performance bonding systems that enhance structural integrity and design flexibility.

Engineered for environmental extremes

Metal structures are constantly at war with the elements. Panels expand under intense heat, contract sharply in subzero cold, and are battered by rain, snow, and wind.

By John Calhoon

Pressure-sensitive adhesive (PSA) tapes provide a continuous, flexible seal that absorbs vibration, resists corrosion, and eliminates the need for drilling.

Photos courtesy Avery Dennison

Self-adhered, "peel and stick" ethylene propylene diene monomer (EPDM) roofing membrane is installed.

Traditional mechanical fasteners and liquid adhesives can fail under these dynamic stresses. In contrast, PSA tapes maintain reliable adhesion through temperature swings, freeze-thaw cycles, and high humidity, a result of advanced acrylic and butyl chemistries.

Modern PSA tapes demonstrate this capability with formulations tested for installation temperatures as low as -18 C (-0.4 F) and operational service down to -40 C (-40 F). Such low-temperature performance is vital for northern climates and winter construction schedules, allowing builders to continue work without resorting to heat-assisted bonding.

Beyond cold resistance, UV stability is another hallmark of modern PSA technology. Constant sunlight can degrade conventional adhesives, causing embrittlement or delamination. Today's UV-stable backings and polymers resist photodegradation, making them ideal for exposed metal roofing and facade systems where longevity and color stability are as important as function.

Strong bonding—even on a range of difficult substrates

One of the most significant breakthroughs in PSA design is its ability to adhere to a wide range of substrates—from high-energy metals like galvanized steel and aluminum to low-energy plastics and coatings.

Where mechanical fastening can puncture panels and create paths for water ingress, PSA tapes provide a continuous, flexible seal that absorbs vibration, resists corrosion, and eliminates the need for drilling. Advanced acrylic formulations, for instance, maintain cohesive strength even under constant shear stress or movement, ensuring long-term durability without fatigue cracking.

This strength makes PSA tapes invaluable in metal building assemblies, where panel overlaps, roof-to-wall transitions, and gutters demand tight, long-lasting seals despite constant structural motion.

Ease of use and labor efficiency

Construction efficiency has become as critical as material performance. Labor shortages, rising costs, and compressed project schedules are prompting architects and contractors to seek materials that install quickly and reliably. PSA tapes excel in this domain.

Unlike liquid adhesives, PSAs require no mixing, curing, or cleanup. Application is simple—peel, position, and press—yielding an instant bond. This eliminates downtime associated with mechanical fastening or thermal welding. Contractors working in challenging environments, such as roof edges or elevated panels, benefit from faster, safer installations with fewer tools and a lower risk of error.

Additionally, PSAs are repositionable and conformable, making them particularly suited to the irregular geometries common in architectural metalwork. Whether sealing around fasteners, corners, or complex joints, PSA tapes adapt to contours without sacrificing adhesion. The result is a cleaner aesthetic and a more uniform seal—key advantages in visible architectural applications.

Custom configurations for specific design needs

Every building project presents a unique combination of materials, environmental conditions, and performance expectations. Recognizing this, manufacturers now offer custom adhesive configurations to meet specialized design criteria.

Product lines include high-tack, "quick-stick" adhesives, single-coated foam tapes, and hybrid constructions for different bonding priorities. Foam-based tapes add thickness for surface compensation and vibration damping, while hybrid acrylics deliver strength and elasticity.

Architects can specify tapes that balance immediate adhesion with long-term holding power, or select from varying liner materials and widths for either factory or field applications. This level of customization not

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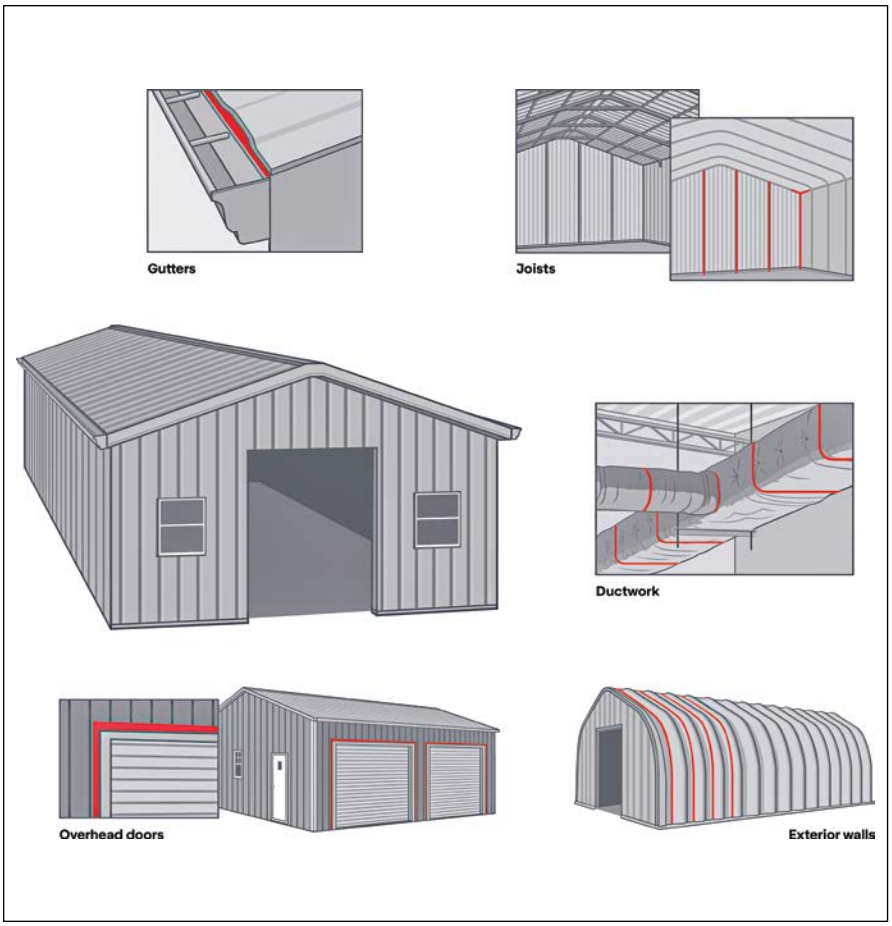

Pressure-sensitive adhesive (PSA) tapes are invaluable in metal building assemblies that demand tight, long-lasting seals despite constant structural motion.

only enhances performance but also integrates seamlessly into prefabrication workflows, where tapes can be applied in controlled conditions, resulting in faster on-site assembly.

Thermal and acoustic benefits

Beyond adhesion, PSA tapes contribute to thermal management and insulation, which is a vital factor in metal construction. Metal, while strong and recyclable, is also a highly conductive material, prone to heat loss in winter and heat gain in summer. Specialized PSA tapes act as thermal breaks, reducing heat transfer between framing members, roof panels, and wall assemblies.

These insulative tapes not only improve energy efficiency but also mitigate condensation—a frequent challenge in metal roofs and walls where warm interior air meets cold exterior surfaces. By interrupting conductive pathways, PSA systems help maintain consistent interior temperatures and extend the lifespan of the building envelope.

Some formulations further provide acoustic damping, reducing noise transmission caused by rain impact or structural vibration. This is a growing consideration in mixed-use and residential metal architecture.

Supporting sustainability and worker safety

As the construction sector embraces sustainable practices, PSA tapes provide measurable environmental and safety benefits. Low- and zero-volatile organic compound (VOC) formulations minimize off-gassing and improve indoor air quality (IAQ). PSAs also eliminate the need for fuel-powered welding or solvent-based bonding, which further enhances on-site safety.

As PSA tapes deliver long-lasting seals with minimal waste, they extend the life of roofing and cladding systems, reducing the need for premature repairs or replacements. This contributes directly to reduced landfill waste and lower embodied carbon over the building's lifecycle.

Enabling prefabrication and modular construction

One of the most promising applications for PSA tapes lies in the prefabrication and modular construction sector, both of which are transforming how buildings are designed and delivered. The clean, consistent nature of adhesive tape bonding lends itself perfectly to factory-applied sealing, where precision and repeatability are paramount.

By applying PSA tapes to panels and modules in a controlled environment, manufacturers ensure uniform quality, reduce field labor, and accelerate project timelines once materials arrive on-site. This approach aligns perfectly with the industry's drive toward higher productivity and consistent performance across multiple installations.

The future of metal bonding

As architects push the boundaries of form and performance, PSA tapes are evolving alongside them. Next-generation adhesives are integrating nanotechnology, hybrid polymers, and self-healing properties, promising even greater adaptability and durability in extreme conditions. Future innovations are expected to offer enhanced fire resistance, recyclability, and smart sensing capabilities, allowing tapes to play an even larger role in sustainable building envelopes. MA

John Calhoon *is the business development manager of Building & Construction at Avery Dennison Performance Tapes North America. With more than two decades of experience in the construction materials industry, he works closely with manufacturers, architects, and contractors to develop and implement advanced adhesive solutions that enhance building performance. Learn more at https://tapes.averydennison.com. Contact him on LinkedIn at https://www.linkedin.com/in/johncalhoon/.*

Forecasting the Future of Color

Translating global trends into architectural innovation

In an industry where aesthetics and performance converge, color is more than a design choice—it is a strategic advantage. This article transforms global megatrends into actionable color and finish forecasts that shape the architectural environment for years to come.

From global concepts to architectural applications

Broad, global concepts—cultural, technological, and environmental shifts—influence how people live and interact with spaces. While megatrends in coatings and paints do not change overnight, their subtle evolutions reveal where innovation is headed. Tracking these shifts on a macro level offers insights into emerging behaviors and material preferences, which are then distilled into color stories that resonate with architects and specifiers.

Trend forecasting is cyclical and constantly moving. The role of color designers is to interpret these movements early, so that specifiers and architects can stay ahead of upcoming market shifts.

The science behind color behavior

Color forecasting is not just about aesthetics; it is rooted in consumer behavior. How people perceive color is influenced by their surroundings, lifestyle, and even the textures they encounter daily. This holistic approach enables predictions of what will feel relevant and desirable in the years to come.

By Brynn Wildenauer

An exterior view of Lakeshore Lofts with distinctive color coatings

Photo by Michael Muraz/ courtesy ALPOLIC

These images display the neutral coating colors at the Alaska Native Medical Center.

Photos courtesy ALPOLIC

Beyond perception, color plays a critical role in shaping experiences across different environments. In commercial spaces, color can serve as a powerful branding tool, guiding wayfinding and reinforcing performance-driven design. Eighty percent of the information assimilated through the senses is visual, and the first thing consumers see is color. Research has shown that consistent presentation of a brand increases revenue by 23 percent,[1] illustrating a significant correlation between tactful design and business value.

Residential applications lean toward self-expression, allowing homeowners to reflect their personality and regional preferences. Educational settings use color strategically to foster engagement and focus, while industrial environments prioritize durability and safety without sacrificing visual impact. As color is deeply emotional and often tied to cultural and regional identity, its application in coatings becomes a nuanced balance of function and feeling—making forecasting an essential part of creating spaces that resonate with people's lives as they evolve.

For example, finish trends have shifted dramatically. High-shine, high-sparkle coatings once dominated, but today's preferences lean toward satin and mica finishes that mimic natural elements. This evolution reflects a growing desire for authenticity and tactile experiences—textures that evoke nature and invite interaction. Designers and specifiers increasingly look to natural materials for inspiration, drawing from stones, gems, and mineral surfaces to create finishes that feel organic yet distinctive. Satin and mica coatings offer subtle shimmer and depth, echoing the complexity of granite or the iridescence of quartz, while maintaining durability and performance.

This shift away from glossy, reflective surfaces stems from changing consumer priorities: high-shine finishes often feel artificial and less aligned with the biophilic

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design movement, which emphasizes connection to nature. Today, coatings are not just about color—they integrate texture and tone to either complement or contrast their surroundings. A building in a dense metropolitan area might use a deep, matte black to stand out among silver facades. At the same time, another project could choose earthy mica tones to harmonize with its natural surroundings. These nuanced changes allow architects to craft environments that either blend in seamlessly or make a bold statement, reinforcing the role of finish as a critical design element.

Fluoroethylene vinyl ether (FEVE)-based finishes "have the largest range of colors and gloss in the industry. It can make both bold and bright statements or sophisticated and earthy tones," explains Renee Mullins, senior marketing manager for ALPOLIC.

Mullins knows firsthand how even small changes in hue can alter an intended visual story.

On the necessity of hundreds of shades of white in a selection, Mullins expresses the importance of variety: "Are you looking for something clinical or comforting? Color tells that story."

With a dozen stocked shades of white alone, most designers and architects can find a suitable match that meets their required lead time and budget. Major manufacturers in the paints and coatings industry enable the creation of a wide variety of custom colors on demand, providing designers and architects with unparalleled creative freedom. This versatility empowers specifiers to push boundaries and tailor finishes to any vision, showcasing capability and flexibility in an era where individuality and contextual design matter more than ever.

Why forecasting matters

Looking three to five years ahead gives manufacturers, architects, and specifiers a competitive edge. By aligning

This collection exemplifies a trend-driven palette of neutral colors.

product development with future trends, they can meet market demands before they peak. This foresight ensures that projects remain relevant and compelling long after they are completed.

At its core, trend foresight is about creating spaces that feel timeless yet forward-thinking. When it comes to metal coatings, timelessness is critical—not only to prevent designs from feeling dated but also to ensure adaptability for multi-use spaces and evolving architectural needs. Coatings must deliver durability while satisfying aesthetic expectations, standing the test of time both physically and visually. For this reason, specifiers rely on experts in color and finish forecasting, allowing architects to focus on their craft with confidence that the coatings they choose will maintain relevance and performance for decades.

Durability

Color innovation is only part of the story. Ensuring that color lasts, through sun, rain, heat, and time, is what transforms inspiration into impact. To support longevity and durability, coatings must undergo extensive testing in both real-world environments and accelerated laboratory conditions. These tests help confirm that the colors selected in the present will remain true and vibrant for years to come, even in the harshest climates.

Architectural coatings must withstand the demands of fabrication, installation, and long-term exposure. Durability is not only about resisting wear, but also about preserving beauty and maintaining its aesthetic appeal. For product longevity, it is essential to specify paints and coatings designed to protect against fading, chalking, and cracking, so the color stays consistent across every panel, every angle, and every project.

This commitment to performance gives architects and builders confidence that their design vision will endure, both visually and structurally.

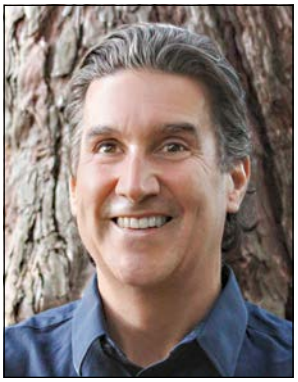
By blending research and creativity, global trends, material innovations, and consumer insights, architects and designers can create color narratives that shape the possibilities of architectural design. The result is coatings that protect metal surfaces and elevate them into bold, expressive design statements. MA

Notes

[1] Read more on the statistics: Kate Smith, *Color Confidence: Home Interior* (Color Institute, 2001), https:/color.institute/color-confidence-home-interior-ebook/.

Brynn Wildenauer *is a senior architectural color designer at Sherwin-Williams Coil Coatings, where she specializes in color, material, and finish (CMF) development. With a strong foundation in industrial, product, and architectural design, she brings a keen eye and a solution-driven mindset to every project. Wildenauer's passion for innovation and fascination with the dynamic world of color fuel her work, from trend research to transforming spaces. Collaborating closely with cross-functional teams, she ensures seamless execution and intentional design that elevates the built environment.*

Designing for Resilience, Circularity, and a Changing Climate



By Alan Scott

Greenbuild International Conference and Expo 2025 was held in the Los Angeles Convention Center (LACC).

Photo © Alexandre Fagundes De Fagundes | Dreamstime.com

Lessons from Greenbuild 2025 to bring into the new year

Greenbuild International Conference and Expo 2025, held in Los Angeles in early November, delivered a rich convergence of familiar themes, sustainable design, high-performance operations, and community-scale planning, alongside a pronounced push into emerging territories: circularity and embodied-carbon frameworks, digital twins and artificial intelligence (AI), and, most notably for the industry, the embedding of resilience across pre-design, construction, and operations.

The recent event marked a pivotal moment: the debut of the newly released LEED version 5 (v5) rating system, a comprehensive overhaul that integrates climate-risk assessment, embodied-carbon accounting, and social equity directly into the certification framework.

LEED v5, circularity, carbon, and intelligent systems

The conference sessions and exhibition hall reflected a mature, systems-based understanding of sustainability. LEED v5 introduces new credits that require teams to assess a project's vulnerability to hazards such as extreme heat, flooding, and wildfire. A resilience assessment performed in the pre-design phase helps teams not only identify hazards but also consider and prioritize resilient design and operations strategies. The Resilient Design Summit, a full-day pre-conference session, emphasized this expanded practice with an overview of the assessment process, followed by panel presentations on designing for specific hazards, including wildfire, extreme heat, and flooding. Overall, the summit highlighted the benefits of resilient design, highlighting occupant safety and well-being, continuity of operations, and preservation of asset values.

Circularity and embodied carbon were also recurring themes. Across various sessions, speakers emphasized that the climate impact of a building begins before occupancy, extending to the extraction, manufacturing, and transportation of materials used in its construction. Increasingly, project teams are asked to demonstrate not only performance in operation but also in reuse and end-of-life recoverability.

Technology rounded out the picture. A pre-conference summit and several sessions explored how AI and digital twins are transforming the design process, providing predictive analytics for energy, carbon, and resilience. Presenters showcased AI-driven design platforms that integrate live climate modeling, hazard data, and material databases, enabling architects and engineers to quickly test multiple scenarios and make more resilient, low-carbon decisions. They also discussed digital twin applications to optimize asset management and building operations.

Resilience moves to the center

Resilience was a major thread that ran through Greenbuild 2025. From the Resilient Design Summit that opened the week to the inspiring closing keynote conversation, "The Intersection of Climate, Equity, and Community Empowerment," nearly every discussion acknowledged that sustainability without resilience is incomplete.

Sessions such as "Resilience in Design: Integrating Future Climate Data into Practice" emphasized that designing for historic weather no longer suffices. Modeling future heat, rainfall, and wind conditions using downscaled climate data must become a standard practice.

For architects, this evolution represents a new standard of care: understanding climate risk and communicating this to clients is now a professional obligation. For owners, it is an essential component of asset risk management and insurance strategy. One session, "The Resilience Dividend: Unlocking Insurance–Real Estate Synergies," explored how resilience planning can reduce premiums and increase property value by lowering risk exposure.

Designing for thermal safety as heat risks rise

Of all climate risks, extreme heat drew particular attention. In sessions such as "Don't Sweat It: Designing for Extreme Heat and Resilience" and "From Wildfires to Floods: Integrating LEED v5 Climate-Risk Assessment into Design," experts warned that prolonged heat waves, combined with grid instability, pose the most immediate threat to occupant health and continuity of operations.

The concept of thermal resilience, also referred to as thermal safety, was highlighted as a critical new design performance metric. The goal is not only comfort but survivability, maintaining safe indoor temperatures when power and cooling fail. Presenters shared modeling of the combined benefits of passive strategies (high-performance envelopes, shading, reflective materials, cross-ventilation) as well as mechanical redundancy, such as battery-backed ventilation fans to maintain safe indoor conditions. This aligns with LEED v5's new "Resilient Spaces" credit that includes a thermal safety option, encouraging designers to designate and design interior areas that maintain habitable temperatures during extended power outages or heat emergencies.

One important takeaway: thermal resilience must be designed, not assumed. A building may meet the code-required thermal performance yet still reach unsafe indoor temperatures during a multi-day heatwave.

This emphasis on heat safety also reinforces the growing intersection between sustainability and public health, linking energy efficiency, occupant well-being, and climate adaptation in a single performance narrative.

Schools and community anchors as resilience hubs

A second powerful thread running through the conference was the connection between resilience and equity, most visibly illustrated in sessions such as "Resilient Community Anchors: A Home, A Church, A Bank, A School" and "Designing for Resilience and Equity: Climate-Ready Schools in Practice."

Speakers described how everyday institutions, especially schools, can serve as "resilience hubs" during and after disasters. When designed with robust envelopes, redundant systems, and community-accessible layouts, schools can provide safe refuge during extreme heat, smoke events, storms, and power outages. They also function as trusted community centers for communication, relief distribution, and emotional recovery.

In the Los Angeles Unified School District's Climate-Ready Schools initiative, new and renovated campuses incorporate high-albedo roofs, shaded outdoor learning spaces, micro-grids, and enhanced air filtration.

Faith institutions, as well as businesses such as restaurants and banks, were similarly cited as potential resilience anchors, especially in under-resourced communities. The common denominator: community cohesion, familiarity, and trust are as important as resilient infrastructure to create resilience. These presentations were a perfect example of why the new Human Impact Assessment prerequisite was added to LEED v5.

A converging agenda for architects and builders

For the architecture and construction community, the message from Greenbuild 2025 was unambiguous:

- Integrate climate-risk assessment early. Factor future heat, storm, and fire data into concept design.
- Pursue circularity and low-carbon materials. Track embodied carbon and design for deconstruction and reuse.
- Adopt AI and digital twins. Use data to predict and optimize performance, maintenance, and resilience outcomes.
- Prioritize occupant safety. Design for passive survivability and indoor environmental quality during disruptions.
- Think at the community scale. View projects as part of resilience networks, not isolated assets.

Closing reflection

As architecture, engineering, and design professionals move into 2026, it is critical to recognize that sustainability, equity, and resilience have merged. Designing for carbon emissions reduction, circularity, and community are now inseparable goals. This message is reinforced by the memory of the devastating Southern California urban conflagration earlier in 2025, with communities still grappling with the loss and working on recovery.

With these insights, every project can contribute to a safer and more adaptable built environment. MA

Alan Scott, *FAIA, LEED Fellow, LEED AP BD+C, O+M, WELL AP, CEM, is an architect and consultant with more than 36 years of experience in sustainable building design. He is the director of sustainability with Intertek Building Science Solutions in Portland, Ore. To learn more, follow him on LinkedIn at www.linkedin.com/in/alanscottfaia/.*

Letting the Light Shine Through

An Art Deco aluminum installation

By Hanna Kowal

Photos by Anton Grassl

Art Deco defines the style of 75 State Street in Boston, Mass., embodied by a pre-existing stylish facade. A recent installation showcases the artistic capabilities of metal, creating a welcoming common area within this 31-story office space and meeting the challenge of matching the essence of the exterior's aesthetic within. Stemming from a collaboration between NELSON Worldwide and Móz Designs, this 72-panel, eye-catching wall uses its pattern to evoke the movement of birds in flight.

The medium bronze-hued grounding focal point uses 130.9 m^2 (1,409 sf) of custom aluminum 3.2 mm (0.13 in.) panels, featuring distinct chevron patterns that provide synergy with the structure's exterior patterns. To unlock a glowing aesthetic potential, the distinct perforations were made with precision laser cutting. Backlighting complements the aesthetic perforations with an LED lighting system, allowing the installation to act as a living art piece with custom lighting colors that can support different palettes and seasons. A concealed fastening system provides a seamless look while custom brackets ensure the installation does not conflict with the pre-existing setting. With its warm-toned metal color, dynamic backlighting capabilities, and chevron pattern that offers an appealing nod to nature, this installation revitalizes the 75 State Street common area with immense visual interest. MA

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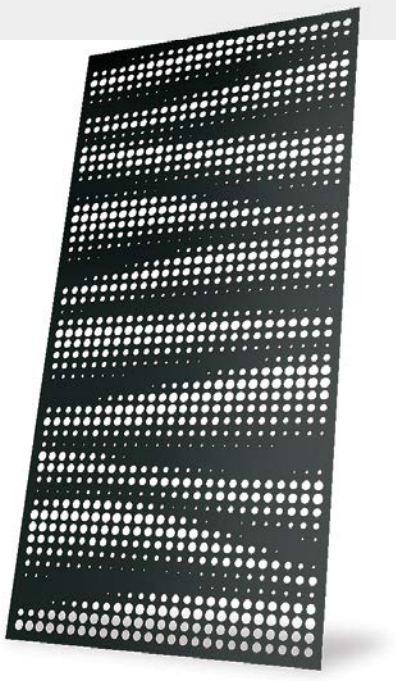

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