

2021 NCN Project Excellence Awards

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A New Look, A New Approach, A New Attitude

In January, you'll see something new in your mailboxes and your inboxes. *Metal Construction News* will debut its new design, and I want to let our loyal readers know what we're doing and why.

The why is easy. Times change. The metal construction industry is evolving rapidly, and we want to address the new needs of our audience. Going forward, you'll see more technical information from industry experts and a lot more analysis of news and events influencing all of our businesses.

Let's face it; with the last year and a half we've all experienced, it's more important than ever to dig into what's happening in the industry. Why is the supply chain broken? Why are some markets soaring and others declining rapidly? Why are prices so volatile? MCN has a unique understanding of the metal construction industry because of our decades of serving it and being the leading voice. We'll bring that to bare in the new MCN.

That new attitude will be wrapped in a new package. From front to back and top to bottom, you will see a new MCN, starting with the logo. Most notable, though, will be the size of the magazine. We'll still be bigger than most magazines, but we just won't be quite as big as we are now. There's a simple reason for that change, and it's one I'm sure



all of you struggling with product availability will appreciate. The paper size we've been using for 42 years is in scant supply, and we can no longer rely on its availability.

Rather than throw ourselves into vast uncertainty, we've grasped this opportunity to rethink how we serve you, and we're excited about what we've created.

The new MCN will go beyond its pages, though. I've been around this magazine since its inception when my father, John Lawrence, and Sam Milnark founded it. The first issue was laid out on the kitchen table in my house. A lot has changed in the publishing industry in that time, and one of the most exciting things is the ability to create a community to share ideas and allow others to have a voice. Look to our social media—LinkedIn, Twitter and Facebook—as we take this new attitude to the streets—or the internet.

MCN has always been an important part of the metal construction industry. We hope these changes will provide more opportunities for the conversations that are so vital to the growth and success of the market we love.

MCN serves the metal construction industry and no other trade magazine does.



John Paul Lawrence Publisher jplawrence@moderntrade.com

December 2021 Vol. 42 No.13









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The Stavros Niarchos Foundation Library Rooftop Terrace, New York City, is the 2021 MCN Project Excellence Awards' Grand Award Winner and New Metal Roofs category winner.

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inting Kits Available For Standing Seam Roofs



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Social Media

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The Metal Directory (www.TheMetalDirectory.com) Search our extensive online database for:

- Metal product suppliers
- Manufacturers
- Services that fit your needs

Industry Events

For the latest event information, go to www.metalconstructionnews.com/mcn-events

2022

January 18-20 National Frame Building Association 2022 Frame Building Expo Nashville, Tenn. www.nfba.org

January 24-26 Metal Construction Association Winter Meeting Scottsdale, Ariz. www.metalconstruction.org

January 29-February 2 ASHRAE Winter Conference Las Vegas www.ashrae.org

February 1-3 International Roofing Expo New Orleans www.theroofingexpo.com

February 8-10 NAHB International Builders' Show Orlando, Fla. www.buildersshow.com/Home

March 9-11 Self Storage Association Spring Conference & Trade Show Orlando, Fla. www.selfstorage.org

March 17-22 IIBEC International Convention & Trade Show Orlando, Fla. www.rci-online.org

March 23-25 NASCC: The Steel Conference Denver www.aisc.org/nascc March 28-31 Associated General Contractors of America Convention Grapevine, Texas convention.agc.org

March 30-April 1 National Insulation Association Annual Convention San Antonio www.insulation.org

April 5-8 Steel Erectors Association of America Annual Convention & Trade Show Charleston, S.C. www.seaa.net

April 24-26 National Coil Coating Association Annual Meeting Sonoma, Calif. www.coilcoating.org

April 25-27 World Adhesive & Sealant Conference & EXPO Chicago www.ascouncil.org

April 27-28 Reflective Insulation Manufacturers Association International Bi-Annual Membership Meetings Spring 2021 Seattle www.rimainternational.org

April 27-29 Annual MBCEA Conference Tucson, Ariz. www.mbcea.org



all the news, products & strategies driving the metal construction industry



Full Steam Ahead! The metal building market is primed for great growth

Recently, I spent several weeks in front of many metal builders and contractors, and I was impressed by one thing-their unyielding resiliency. These professionals have adapted to the challenges of COVID-19 and have managed to successfully run businesses in an environment of constant change, volatility, supply

chain shortages and a labor crunch unlike any we've seen in our lifetimes.

Despite the difficulties, the overwhelming feedback from these construction professionals was enthusiastic, and they projected a positive outlook, fueled by a robust economy and a confidence that investment growth will continue through 2022.

Here are some facts to back up their confidence

 According to the American Institute of Architects (AIA), design activity is roaring back as more and more places reopen-and this is happening despite ballooning costs for construction materials and persistent delivery delays.

 Dodge Data & Analytics reports that construction starts are forecast to continue to rise in our key active segments (commercial, industrial and institutional) through 2024.

 Moody's Investors Service is touting that the acceleration in inflation is transitory, despite recent Consumer Price Index spikes. The bond credit rating company is also reporting that the global gross domestic product growth will soon surpass 5%, though they express some concern.

• Multiple steel producers have announced that they are expanding or have plans to expand production.

Look Back to Plan for the Future

As we look ahead, it helps to first look back to understand what we gained in the pandemic environment. First of all, we learned that we are essential. Our work matters. Companies need us. The government needs us. Economic growth is impacted by the buildings our industry puts in place and the speed with which we manufacture and build them. Secondly, we have learned to be

more flexible. We have adjusted to abrupt changes in customer expectations, we've adapted when employees have COVID-19 diagnoses and have learned how to immediately implement measures to protect other staff.

We have changed communication paradigms that have resulted in great efficiencies, such as

VIDEO RESOURCES

www.youtube.com/MBMAmedia

Learn or share about metal building systems by using mbma's informational, educational and training video resources by clicking on the title or visiting our youtube channel

HOW-DO VIDEOS

How Its Built: Raising the Bar for Low-rise Commercial Structures How Its Made: Metal Building Innovations Revolutionize Low-Rise Commercial Construction

- How Metal Buildings Compete in Today's Market Part 1 Economical Design & Construction
- How Metal Buildings Compete in Today's Market -Part 2 Accelerated Construction

How Metal Buildings Compete in Today's Market – Part 3 Benefits of Metal Building Systems

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CAREERS IN METAL BUILDING INDUSTRY I am a Project Estimato

I am a Project Clarifier I am a Detailer in Training I am a Project Detailer I am a Detailing Supervisor I am a Design Engineer I am a Design Engineer 2 I am an Engineering Manage I am a Material Handler I am a Roll Former Operato I am a Roll Former Floater Metal Building Careers Come Build Your Future

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online meetings and training, attending virtual conferences, changing work schedules to accommodate both in-office and home office efficiencies. (And, speaking of online training, be sure to check out the 50+ video resources available at youtube.com/mbmamedia. You can download a list of all videos by category from the MBMA blog, mbma.com/blog.)

We have also improved our understanding of the importance of diversity within the workplace. For many, it's taken a critical labor shortage to change the perception of what a metal building

employee looks like. We've opened our eyes to a much broader view and have found that our

openness has led to changes that make our companies stronger, more future focused and better equipped to be inclusive and open minded.

Labor remains a critical issue across the country, and especially in our industry. Are you

advocating for your employees? Are you developing a culture that will attract and retain an enthused, reliable and engaged workforce? This focus will ensure our companies and our industry grow and remain relevant for generations.

What Now?

So, what does all this mean for the metal building industry? I believe that, as we continue to adapt to the current trends in business and the challenges exacerbated by a worldwide pandemic, we need to re-double our efforts to enhance our stronghold in the low-rise building market. Now, more than ever, it's time to roll up our sleeves.

A good friend in the industry likes to point out that in every vehicle you drive, you'll always see one thing that never changes-the rearview mirror is only a fraction the size of the windshield. That analogy reminds us that we need to remember what's behind us, but that our focus clearly needs to be on what is in front of us, on the bigger picture—and plan strategically to deal with whatever is ahead. So, let's not lose sight of the

past, and use what we learned in a once-ina-lifetime pandemic to push us forward. Let's be diligent in educating our customers and our potential customers on the advantages of metal buildings. Rather than sit back and relax, it is time to push ourselves forward to take advantage of the abundant market opportunities ahead.

Greg Pasley, Ph.D., PE, is chairman of the Metal Building Manufacturers Association. More information about the association is available at www.mbma.com.

By Greg Pasley, Ph.D., PE, Chairman, Metal Building Manufacturers Association

METAL CONSTRUCTION NEWS December 2021 8



By George Hedley

Estimating is Not About Winning Work!

You know what I really hate as a general

contractor? It's when we negotiate a nice project to build with a loyal customer at a great price and good contractor fee. Then after the job is completed, we spent more money than our estimated budget and didn't make the gross profit we should have. When we negotiated the guaranteed maximum price contract, the customer trusted us and didn't question our costs. And then after project completion, the final job costs significantly exceeded the budget. This is a contractor's worst nightmare!

What's Your Estimator's #1 Priority?

- 1. Estimate jobs
- 2. Price jobs
- 3. Win work
- 4. Negotiate jobs
- 5. Be competitive
- 6. Make a profit
- 7. Don't miss anything
- 8. Good subcontractor and supplier coverage
- 9. Know what things cost
- 10. Accuracy

Winning Work is NOT the Estimator's Top Priority

The #1 priority for all estimators must be accuracy! A perfect bid estimate is when the final job cost is exactly the same as the estimate. As a contractor, your estimator's top priority must be to calculate accurate job costs and not miss anything required to complete the contract scope of work. Winning work is not the role of estimators.

Profit Builder Circle to Develop Accurate Estimating

1. Calculate Accurate Estimates

Accurate estimates are based on the real field production costs of labor and equipment to complete each task required by the project plus materials, tools, supplies, supervision and subcontractors. The estimated costs are based on a detailed take-off of all the parts and pieces combined with accurate field labor production rates with no guesses.

To calculate accurate estimated costs of work, the labor and equipment required must be based on similar past jobs and what it took to complete them. Estimators must keep a detailed, up-to-date cost history library of all past jobs sorted by job type, difficulty, special conditions, city, customers and inspectors. A. Accurate Labor Burden Rate—An accurate labor burden rate is essential. If your rate is padded, your bids will be too expensive, and if it's not complete you'll bid too cheap. Each employee has a different burden rate based on their benefits, age, dependents or tenure at the company. Be sure to include accurate taxes, worker's compensation insurance, medical insurance, liability insurance, vacation, union dues, safety training, small tools, overtime and downtime.

B. Accurate Crew Bid Rate-Excellent

estimators use different crew rates to bid different projects based on what or who the job needs to perform different types of work. A crew on a difficult job needs more experienced workers, while a larger simple project can use less trained crew members. Figure different crew sizes and make-ups to determine your accurate man-hour crew bid rate.

C. Accurate Equipment Rates—Good estimators know what equipment can perform per hour and what it really costs. Calculate the actual ownership cost for each piece of equipment from pickup trucks to compressors, cranes, backhoes or forklifts. Total the initial purchase price for each piece of equipment plus interest cost, maintenance, gas and insurance over the life of the equipment. Divide this total lifetime equipment ownership cost of by the expected number of billable hours you will be able to job charge over the life of the equipment. Add your overhead and profit markup, then keep track of how much work or production a typical piece of equipment can perform per hour.

D. Accurate General Conditions and

Mobilization—Accurate estimating must include a review of what general conditions or mobilization actually costs utilizing input from the field.

E. Accurate Overhead—Your company overhead is a fixed amount of money spent for the year to run your business. Starting with your total annual overhead cost, divide it by your total projected annual job costs for every job you will build (not sales volume). This percentage will equal the actual overhead recovery markup you need to use to recover all your overhead expenses for the year. F. Accurate Profit Markup—Profit is the annual fixed amount of money you want to earn for the year. Start every year by deciding how much pre-tax net profit you want to make over the next year. A good rule of thumb is to aim at a net profit mark of 40% to 50% return on your total annual overhead budget. To determine the profit markup required to hit your goal, divide your total annual projected costs by your annual profit goal to determine the profit markup you need to use.

2. Job Start-Up

Hold a pre-job turnover meeting where you turn the job over from estimating to the project team. Gather the estimator, project manager, superintendent and foreman together to review the estimate, scope of work, inclusions, exclusions, schedule and contract terms. Develop the project goals, set the budget, select the required cost codes to track, and develop the job specific timecard for the labor production items you want to track.

3. Track and Review Job Costs

To develop accurate cost information for current job costs and estimating data to bid future jobs, job hours must be current and correct. Step one is to insist your timecard is divided into the cost codes you want to estimate with and keep track of. Then, it's the project manager's responsibility to ensure field workers and foreman are filling out timecards correctly.

4. Completed Job Cost Review

At the completion of every project, the estimator and project team must get together to review and discuss the actual final costs and hours spent versus the job budget and bid production rates estimated for each cost code. This will allow the estimator to adjust the cost history library and improve the estimated bid production rates utilized on future bids. Making this process a priority will develop increasingly more accurate bids.

George Hedley, CSP, CPBC, helps contractors grow and profit as a professional business coach, popular speaker and peer group leader. He is the author of "Get Your Construction Business to Always Make a Profit!" and "Hardhat BIZSCHOOL Online University," available on his website. Visit **www.** hardhatbizschool.com for more information.

By Josh Quinter, construction attorney, Offit Kurman

5th U.S. Circuit Court of Appeals Utterly Vitiates President Biden's Vaccine Mandate for Private Employers

The recent opinion issued by the 5th U.S. Circuit Court of Appeals in New Orleans obliterated the Emergency Temporary Standard (ETS) published by OSHA and is intended to enforce President Joseph Biden's vaccine mandate for private employers.

This is a statement based on legal analysis and not a political one. Regardless of one's politics or feelings about COVID vaccines, the legality of the administration's approach was thoroughly debunked on both legal and practical grounds.

The court signaled its early inclinations when it issued a preliminary injunction temporarily staying enforcement of the ETS until further briefing could be completed. The requested briefs were submitted by the various parties involved less than a week after the preliminary injunction went into effect; and the decision to enter an injunction staying enforcement of the ETS until the case can

be decided on the merits was entered less than a week later. That order was accompanied by a 22-page opinion that pointed out a number of flaws in OSHA's attempts to enforce President Biden's vaccine mandate.

At the outset, the court was quick to point out that OSHA has only used an ETS on 10

occasions since its inception 50 years ago. Six of those 10 ETS' were challenged in court; and only one of those challenged in court survived scrutiny. As the court pointed out, the use of an ETS is an "extraordinary power" that is not to be wielded lightly. The standard required to impose one is exceptionally high and the use of such power should be "delicately exercised" as a result.

In a well-written opinion rich with cutting language, the court determined that the challenge was likely to succeed on the merits. This likely foreshadows where the court will land when it issues its ultimate opinion on the merits and suggests the Biden Administration will not be successful in defending its policy. The core issue in this regard relates to the ability—or, rather, the inability—of the federal government to regulate personal conduct when there is no direct economic impact in play. Stated differently, the court correctly concluded that the federal government does not have police powers and can only regulate this kind of conduct through interstate commerce under the Commerce Clause of the Constitution. Because the mandate and the accompanying ETS relate to public health and not interstate commerce, the ETS is invalid in the court's eyes.

In addition to what the court called "grave" constitutional questions, the court called into question whether the issue even qualified as an emergency. Among the things it evaluated to

reach this conclusion

was the fact that

President Biden

had been in office

for nearly 9 months

before he issued the

policy and it took two

months to come out

he declared a private

with the ETS after

employer vaccine

mandate. Perhaps

the most damning

part of this analysis

use of OSHA's own

pronouncements to

was the court's

The court correctly concluded that the federal government does not have police powers and can only regulate this kind of conduct through interstate commerce under the Commerce Clause of the Constitution. Because the mandate and the accompanying ETS relate to public health and not interstate commerce, the ETS is invalid in the court's eyes.

> other courts and the public indicating that this was not the kind of emergency OSHA was designed to address and that it was better to leave private employers to deal with the situation as they deemed appropriate.

> After questioning the constitutionality of the mandate as applied, the court went on to question the validity of the ETS otherwise. It concluded that OSHA was not created and was unqualified to deal with public health emergencies. In indicating that the policy is not in the public interest, the

court pointed out that "health agencies do not make housing policy, and occupational safety administrations do not make health policy." OSHA overreached with the ETS from both a practical and a legal perspective. Additionally, the enabling portion of the federal law creating OSHA does not give it the legal power to regulate conduct in the realm of health care; and application of the standard by definition treats various employers and employees differently depending on their circumstances. Why, for instance, is protection of people in companies with 100 or more employees more important than those with only 10 employees?

In concise summary form, the 5th Circuit determined that the pandemic was a public health emergency that OSHA was not designed to tackle. In addition to the pandemic being outside the bounds of what OSHA can legally do, it is impractical for OSHA to implement the policy it put out, and it contradicts positions OSHA took on the very same issue less than a year prior. Because the regulations are not an emergency and will not likely survive closer scrutiny by the court, a stay on both implementation and enforcement was put in place until the issue can ultimately be decided.

For its part, the Biden Administration maintains it has the power to undertake this regulatory framework. The fight, including possible appeals, is likely to continue as a result. Given the current posture of the case, however, it seems unlikely that the private employer mandate will survive in its current form.

Josh Quinter is a commercial litigation attorney, with a focus on construction law. He is also a member of the Board of Directors and a department chair at his law firm, Offit Kurman. Active in a number of construction trade and business organizations, he presently serves as the president of the Mid-Atlantic Chapter of the Metal Building Contractors & Erectors Association (MBCEA), serves on the MBCEA national board and is the organization's general counsel. Contact him at jquinter@offitkurman.com or for more information go to www.offitkurman.com/ attorney/joshua-quinter.



MBMA releases case studies on educational and government facilities

The Metal Building Manufacturers Association (MBMA) published two new case studies, Educational Campus Facilities and Government Facilities. These reports profile 14 educational campuses and 15 government facilities, all of which are metal buildings.

"It's more important than ever for school districts, colleges and universities, and government agencies to get the high-quality buildings they need without breaking the bank," says Tony Bouquot, MBMA's general manager. "As these new case studies show, metal buildings are the common denominator in providing great-looking, energy-efficient and cost-effective buildings for these organizations."

Both case studies are available for free and can be downloaded from MBMA's website at www.mbma.com/Case_Studies.html.



Apple Inc., Cupertino, Calif.

MCA releases metal roofing, solar systems white papers

The Metal Construction Association (MCA) released a three-part white paper series, "Metal Roofing and PV Solar Systems Parts 1, 2 and 3." Part one had been published earlier this year. Parts two and three were recently added to expand on the original paper and supply additional technical guidance for optimal installation and mounting of photovoltaic (PV) solar systems on metal roofing.

"For residential and commercial rooftop electric power, PV systems are environmentally friendly and a sound economic investment," said Andy Williams, MCA's director of codes and standards. "These white papers go beyond the advantages of these systems and look at the durability of the roof, along with mounting and installation practices that provide the optimal foundation for these advanced systems."

Part one details the benefits of metal roofing as a solar mounting platform. Included are important but frequently overlooked topics, such as service life and durability comparisons for metal roofing and PV systems. For instance, solar PV has a service life of more than 30 years. Metal is one of the only roofing materials that outlives the PV system. Part two discusses how to mount solar PV to metal rooftops to provide the most benefit for building owners and solar contractors. This information is integral to lower installation costs and lengthen the product life cycle for the greatest return on investment. Topics include preserving the integrity of the roof and PV system, and code compliance.

Part three calls attention to the mounting system that marries the expensive PV array to the host roof and how metal roofs enable solar PV systems to perform at their best. The roles of careful planning, high-quality materials, design and installation are highlighted.

To view the white papers, go to **www**. metalconstruction.org/index.php/onlineeducation/metal-roofing--pv-systems-1-2-3



MRA announces Q3 award winners Metal Roofing Alliance (MRA) has named a beautiful reroofing project featuring Irvine, Calif.-based Boral Roofing LLC's Boral Steel brand stone-coated metal and installed by Full Service Roofing and Remodeling in Quincy, III., as the winner of its Best Metal Roofing Project competition for the third quarter.

Located in Quincy, the award-winning metal roof was installed on the 3,500 square-foot home this spring after the home's original asphalt roof failed prematurely. The lightweight but exceptionally strong new metal roof was able to be installed right over the top of the old roof, saving on tear-off costs and increasing the home's energy efficiency.

Given the home's location on a golf course, there also was a need to make sure the roofing material was durable enough to withstand damage against potential errant golf shots. Boral Steel PINE-CREST Shake with a stone-coated finish was selected for its stunning traditional appearance and great performance capabilities. The roof offers Class-4 hail impact and hurricane wind uplift resistance, best-in-class fire resistance and is exceptionally long lasting, with a transferable 50year limited warranty.

Quality installation also set the project apart. The old roof had failed after just 12 years due in part to a sub-par installation job. Many of the flimsy asphalt shingles had detached, sliding all the way off, which put the structural integrity of the home in jeopardy. Full Service Roofing and Remodeling made sure the new metal roof was installed correctly, paying close attention to small details such as the ridge cap along the rakes and the dormers, which add greatly to the home's curb appeal and will ensure outstanding performance for decades.

"We love installing roofs that allow customers to have a cosmetically-appealing roof that stands out from similar homes in a subdivision setting, while still providing the durability of metal for many years to come," said Kevin Phillips of Full Service Roofing and Remodeling.

To enter MRA's Best Metal Roofing competition, visit **www.metalroofing.com**.

Center for Green Schools releases IAQ fact sheets

The Center for Green Schools at the U.S. Green Building Council (USGBC) released a series of fact sheets with strategies for improving indoor air quality (IAQ) in schools. The IAQ Fact Sheet Series is designed to help people without a technical background—such as school board members, teachers and parents—to understand details about IAQ so that they can make important decisions for their schools.

While schools across the country are debating important public health measures to help curb the spread of COVID-19, indoor air quality measures offer a non-controversial way to take concrete action to increase protection for everyone in schools. In response to feedback from teachers, parents, school board members and others about the confusing messages they're getting about indoor air quality strategies, the Center for Green Schools brought together dozens of experts to create simple straightforward resources about the most pressing topics.

Studies have shown that good indoor air quality and proper ventilation in schools can improve the health of students, teachers and staff, potentially decreasing sick days and also improve student learning.

"Indoor air quality in schools has a real impact on students' health and ability to learn in the classroom," said Anisa Heming, director of the Center for Green Schools. "The IAQ Fact Sheet Series provides educators, parents and other members of the community simple and straightforward resources to understand indoor air quality strategies and use that information to take concrete action for their students."

When combined with other best practices recommended by the Center for Disease Control, such as masks, physical distancing, and handwashing, proper air ventilation and filtration protects staff and students from indoor airborne contaminants such as COVID-19.

Earlier this year, the Center released survey

Market Trends

State construction unemployment rates down in 49 states from a year ago, says ABC

The not seasonally adjusted national construction unemployment rate dropped 2.6% in September from a year ago while 49 states had lower unemployment rates over the same period, according to state-by-state analysis of U.S. Bureau of Labor Statistics data released by Associated Builders and Contractors (ABC). Only one state, Alaska, had a higher estimated rate than it did in September 2020. While not fully recovered to its pre-pandemic level, national NSA construction employment was up 209,000 from September 2020. Seasonally adjusted construction employment remained at 201,000, or 2.6% below its February 2020 peak, before the impact of the COVID-19 pandemic began to affect the employment numbers. This was better than national, seasonally adjusted nonfarm payroll employment, which was 3.3% below its February 2020 peak as of September.

Supply chain challenges, labor shortages drive engineering and construction cost increases

Engineering and construction costs continued to rise in October, according to IHS Markit and the Procurement Executive Group (PEG). The October headline IHS Markit PEG Engineering and Construction Cost Index increased 8.6 index points to 74.2 from September, indicating price increases were more widespread in October than the month prior. The subindex for materials and equipment costs rose to 77.4, while the subcontractor labor index registered at reading of 66.5 this month.

 Pear-over-Year Change in September 2021 Estimated NSA State Construction Unemployment Rates

 Image: Image:

| IHS Markit PEG ECCI - October 2021 | October | September | Difference | Direction | Rate of Change | Trend (Months) |
|--------------------------------------|---------------|-----------|---------------|-----------|----------------|------------------|
| Current Pricing | | 2.2 | 9 9 97 | | 1955 | 00 4. 60 |
| Headline Cost Index | 74.2 | 65.6 | +8.6 | | Faster | 12 |
| Materials/Equipment | 77.4 | 67.5 | +9.9 | A | Faster | 11 |
| Subcontractor Labor | 66.5 | 61.0 | +5.6 | A | Faster | 12 |
| Expected Pricing in 6 Months | | -11 | | | | |
| Headline Cost Index | 76.6 | 60.6 | +16 | A | Faster | 17 |
| Materials/Equipment | 75.0 | 57.1 | +17.9 | | Faster | 17 |
| Subcontractor Labor | 80.3 | 68.7 | +11.6 | A | Faster | 14 |
| 🔺 = Higher Prices 🕨 = Neutral Prices | 🔻 = Lower Pri | ces | | | | |
| Source: IHS Markit | | | | | | © 2021 IHS Marki |

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results from school districts across the country about how they have implemented air quality measures during the pandemic. The survey found that the majority of schools have acted to address air quality, but they struggled with outdated infrastructure and high costs. The survey is the first known national view of IAQ in schools during the pandemic and included responses representing over 4,000 schools serving over 2.5 million students in 24 states.

With the passage of the American Rescue Plan and ongoing negotiations of a national infrastructure bill, school districts across the country have an enormous opportunity to improve and invest in school infrastructure and address persistent inequalities. The fact sheet series gives community advocates and school decision-makers clear information to act in support of student health and to direct funding to positively impact all students.

To view the fact sheets, visit **www.usgbc.org/** resources/school-iaq-fact-sheets-entire-series.

AISI announces recipients of 2021 market development award

The American Iron and Steel Institute (AISI) recently presented 2021 Market Development Achievement Awards to Richard (Rick) Haws, PE, engineer, RBH Consulting LLC, and David Stoddard, senior applications engineer at SSAB Americas, and the Market Development Industry Leadership Award to Dajun Zhou, Ph.D., manufacturing specialist, Stellantis North America. The awards were presented by Leon Topalian, president and CEO of Nucor and chairman of AISI, during AISI's General Meeting held at the InterContinental Hotel–The Wharf in Washington, D.C. The market development awards were established in 2007 to recognize individuals who have made significant contributions to advancing the competitive use of steel in the marketplace.

CDA names president, CEO

The Copper Development Association Inc. (CDA) announced the appointment of Andrew G. Kireta Jr. as the association's next president and CEO. He succeeds Thomas S. Passek, who will retire at the end of 2021 after nearly seven years with the organization.

Kireta brings nearly 30

years of copper industry experience to the role. He has been with CDA since 1992, having previously served multiple roles in market development, strategy, and organizational management in regional and national roles, most recently as vice president of market development across all copper and copper alloy product and market areas. In addition, Kireta has served in various team roles with the International Copper Association (ICA), including time as the leader of the global strategy team, and as a Board member with various roles on the executive committee of ASTM International including a term as the 2020 Chair of the Board.

FGIA hires training specialist Aaron Blom

The Fenestration and Glazing Industry Alliance (FGIA) hired Aaron Blom as technical

training specialist. Blom will be responsible for conducting and developing FGIA's professional education and technical training programs.

Blom most recently served as director of preconstruction for Architectural Preconstruction LLC. He is well-versed in the





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The 2021 *Metal Construction News* Project Excellence Awards

The Grand Award winner in the 2021 Metal Construction News Project Excellence Awards and the New Metal Roofs category winner is the New York City-based Stavros Niarchos Foundation Library Rooftop Terrace. The project is noteworthy for its wizard's hat-shaped roof that gracefully disguises the rooftop mechanical equipment above the public terrace. In a strong group of projects covering diverse applications, the judges selected it calling it a "brilliant solution for urban design building detail," citing its roof that was "not typically expected on a historic building."

The other category winners in the MCN Project Excellence Awards featured on the following pages are:

- Metal Walls-New Construction: Buddy Holly Hall of Performing Arts & Sciences
- Metal Walls-Retrofit: Pennsylvania

State Police Department Headquarters

- Metal Building Systems Buildings: Mesa Rim
- Metal Craftsmanship: Mississippi County Courthouse Dome
- Metal Roofing-Retrofit: Museum of Science and Curiosity
- Judges Award: Facebook HQ
- Judges Award: Milestone Residence
- Judges Award: 4141 Fairbanks



A historic library's new rooftop crown is crowned the Grand Award Winner

The unique wizard's hat roof design on top of the \$200 million renovation of the Stavros Niarchos Foundation Library is the 2021 *Metal Construction News* Project Excellence Awards' Grand Award winner and New Metal Roofs category winner.

The 106-year-old library in Midtown Manhattan—actually first designed as a department store—hadn't been renovated since 1978. The revamped library boasts hundreds of thousands of books, spaces for programs and classes, new, expansive areas dedicated to children and teens, the Pasculano Learning Center offering career services, English language and literacy classes, media and technology training, a multimedia studio, and a world-class business center.

Adding a new, visually stunning seventh floor to the library's formerly unused roof, a L-shaped terrace features meeting venues that host the library's robust suite of public programs. This utilitarian, publicly accessible, wraparound outdoor terrace showcases city views, and includes a roof garden and an adjacent indoor café.

However, its most prominent feature, and the thing the award judges admired and awarded is its sculptural, perforated metal rooftop. This new geometrical aluminum crown slopes up to cover mechanical equipment, reaching 184 feet above street level. Its angled pitches and patinated copper-colored aluminum surface are inspired by midtown Manhattan's Beaux Art copper-clad mansard roofs, two 1904 examples of which are visible from the terrace.

A Dynamic Architectural Cap

Awards judge Matthew Kruntorád, AIA, LEED AP, dubbed the terrace roof an urban design solution in its form and scale. "It's really a comprehensive solution all the way down to its detailing needs."

Judge Steve Dumez, FAIA, was impressed by the variety of functions it serves. "It's providing a public space, it's providing a mechanical space, and it's providing an architectural cap that's very dynamic. The lighting creates drama at night and all of it adds up to a pretty wonderful piece."

The full-scale renovation project, designed by Delft, Netherlands-based Mecanoo and New York City-based Beyer Blinder Belle, expands the building to 180,000 square feet. "Several of the team's design choices solve the functional needs of the bustling central circulating library with iconic architectural gestures," says Beyer Blinder Belle marketing manager Bisela Garrett. "Relocating some of the building's mechanical equipment to the penthouse level above the new seventh floor frees up the valuable rooftop space for public uses. These volumes are wrapped with the painted and perforated metal Wizard's Hat. [It's] unique structure creates an expressive ceiling for the rooms below, while also contributing a dynamic and unmistakable form to the Fifth Avenue roofline."

Metal Roof

Metal played a part in several inventive approaches that allowed the Wizard's Hat to float over the building below. "The composite-manufactured metal roof panels were designed with their own plywood substrate, insulation and structural studs, the latter of which have a heavier gauge than would be expected," Garrett says. "As a result, there was no need for additional structural supports to be added on-site. These physically streamlined panels connect to slope structural steel beams, which are spaced with an intentionally rhythmic pattern that seamlessly integrates with the seventh floor's glassenclosed spaces."

From the beginning of the project, Beyer Blinder Belle considered its many physical and logistical challenges. It collaborated with multiple manufacturers up front to design a composite roof structure, 80% of which was fabricated and assembled off-site to speed up installation. "Instead of a piecemeal approach to framing where there is both structural framing and miscellaneous framing, a prefabricated composite structural framing system by Webster, N.Y.-based Duraframe Solutions was chosen," says Denis D'Ambreville, senior associate at Beyer Blinder Belle. "This decision alone saved the construction manager two months by eliminating the need to coordinate multiple framing installations



on a job site limited in space. This framing system tripled the deflection performance when compared to traditional methods. With enough strength to support both the roof and the mechanical equipment, it solved many of the challenges upfront and allowed for the roof to be closed in much quicker than usual."

For the metal panels, 6,400 square feet of perforated ZIP-RIB screen wall panels, and 9,500 square feet of solid ZIP-RIB roof and wall panels were supplied by Burlington, N.J.based Merchant & Evans Co. Inc. (M&E), now Norcross, Ga.-based Innovative Metals Co. Inc. (IMETCO). A 16-inch-wide module matched the spacing of the prefabricated framing system. The perforated panels allow airflow while hiding unsightly rooftop equipment. "The ZIP-RIB panel is a 2 1/2-inch

deep mechanically seamed cladding system for roofs and walls that can be factory formed or field formed depending on the demands of the project," says Josh Younger, marketing manager at IMETCO. "ZIP-RIB panels accommodate complex roof configurations including convex and concave curves and tapers." In addition to metal panels and trim, M&E provided tapered stainless steel internal gutters, fall protection, snow guards and custom light brackets painted to match the roof.

"The engineering team at M&E worked closely with the design team and with the metal installer, Hauppauge, N.Y.-based The Jobin Organization Inc., during installation providing demanding engineering needs, excellent client service and panels manufactured to the highest standards," says Dan McAuliffe, project manager at IMETCO.

A challenge faced on this project was the extra care and collaboration required by all contributors and suppliers to ensure that all products would fit together seamlessly when installed properly in the field. IMETCO engineering technician David Norwood explains Beyer Blinder Belle took this into consideration by designing the roof using BIM modeling and choosing products with the same module size, taking the smallest details into account before the project was even out for bid. Iowa Park, Texas-based S-5! supplied its Colorgard snow retention system for the library and Cleveland-based Sherwin Williams' Fluropon coating in Patina Green was used.

A Geometrically Inclined Project

"As you can imagine, a geometrically inclined

project such as this, coupled with the fact that it needed to be built on the roof of an existing building came with its own set of challenges," says Nithin Reddy, project manager at The Jobin Organization. "[It was an] aggressive schedule and 100 feet above ground. How do you get materials there, how do you install? A lot of planning, thought, engineering and effort went to overcome these challenges and execute this project."

Since this project was designed to fit together perfectly, special care was taken by Jobin during installation as the smallest of mistakes would result in the entire roof being off. "During installation, Jobin compared the BIM and our own 3-D modeling of the existing structure to ensure that the desired outcome was on track throughout installation," Reddy says. "[The] module had to be right on the money during installation; a small mistake would throw everything off."

On top of the pressure of limiting installation mistakes, the team at Jobin was also challenged to keep its team safe during installation. Jobin says by sequencing the project correctly and providing anchored footing for its workers, it safely navigated the 45-degree slope while installing the roof quickly and without incident.

Stavros Niarchos Foundation Library Rooftop Terrace, New York City

Completed: June 2021 Size: 180,000 square feet Owner: New York Public Library Architects: Mecanoo, Delft, Netherlands,

www.mecanoo.nl,

and Beyer Blinder Belle, New York City,

www.beyerblinderbelle.com

General contractor: Tishman Realty & Construction, New York City,

www.tishman.com Metal installer: The Jobin Organization Inc.,

Hauppauge, N.Y., (631) 694-2111

Coatings: Sherwin-Williams Coil Coatings, Minneapolis,

www.sherwin-williams.com, Circle #25

Framing system: Duraframe Solutions, Webster, N.Y.,

www.duraframesolutions.com, Circle #26

Metal panels and accessories: Merchant & Evans Co. Inc. (M&E), Burlington, N.J., now Innovative Metals Co. Inc. (IMETCO), Norcross, Ga., www.imetco.com, Circle #27

Snow retention system: S-5!, Colorado Springs, Colo., www.s-5.com, Circle #28

Judges

William S. Duff Jr., AIA, LEED AP, founder and managing principal, William Duff Architects, San Francisco

Duff founded William Duff Architects in 1998—an innovative, award-winning practice that is nationally recognized for responsive, sustainable architecture that lives well. His work is known for its elegant simplicity both in plan and detail, and for a sophisticated use



of space, light and materials. Duff received his Bachelor of Architecture from Cornell University, Ithaca, N.Y., and his Master's in Construction Management from Colorado State University, Fort Collins, Colo.

Matthew S. Kruntorád, AIA, LEED AP, principal architect and partner with MSR Design, Minneapolis

Kruntorád has been with MSR Design since 2003 and has worked on a wide variety of project types with a focus on cultural institutions. In addition to his professional practice, Kruntorád was adjunct assistant professor at the University of Minnesota College



of Design, Minneapolis, from 2003-2010 and assistant professor at the Oklahoma State University School of Architecture, Stillwater, Okla., from 2000 to 2003. Kruntorád holds a Master of Architecture and Bachelor of Science in Architectural Studies from the University of Nebraska, Lincoln, Neb.

Steve Dumez, FAIA, principal and director of design of New Orleans-based EskewDumezRipple

Dumez's design leadership has helped EskewDumezRipple received numerous prestigious awards for design excellence, including more than 50 national awards and over 100 additional awards at the local, state and regional levels. In recognition of the firm's significant contributions to the profession,



EskewDumezRipple was recognized with the 2014 Architecture Firm Award, the highest honor bestowed on a practice by the American Institute of Architects. Dumez has been a frequent lecturer, guest critic and speaker. He has served as president of both AIA Louisiana and AIA New Orleans. Dumez received a Master of Architecture degree from Yale University, New Haven, Conn., in 1989 and a Bachelor of Architecture from Louisiana State University, Baton Rouge, La., in 1982. **New Metal Walls Award**

Honoring a Musical Icon

By Marcy Marro, Editor

New center is inspired by the surrounding landscape

Part of downtown Lubbock, Texas' revitalization efforts, the new Buddy Holly Hall of Performing Arts and Sciences honors the area's musical heritage of the 1950s. A native to Lubbock, the center honors Holly's iconic rock 'n' roll sound and style, and his impact on American culture. The award judges, who were impressed with its use of metal panels, named it the winner in the New Metal Walls category.

Calling it a strong project, William S. Duff Jr., AIA, LEED AP, says, "There's a nice sense of control in terms of how the different architectural elements are used together and proportioned in this project." Matthew S. Kruntorád, AIA, LEED AP, notes that the building really is beautiful, and was impressed with how daylight and shadow are used to create activation of the material.

LUBBOCK INDEPENDENT SCHOOL DIS

Completed in January 2021, the 220,000-square-foot facility was designed by Diamond Schmitt Architects, Toronto, along with architect of record Parkhill, Lubbock, and associate architect MWM Architects, Lubbock.

The state-of-the-art campus features a variety of unique spaces including two indoor theaters, rehearsal spaces, a restaurant and an outdoor amphitheater. The facility can accommodate large touring musicals as well as intimate dance performances, and is home to Ballet Lubbock, the Lubbock Symphony Orchestra, Lubbock Independent School District Visual and Performing Arts, and Broadway producer The American Theater Guild.

"We designed a building that is both open and outward looking and yet simultaneously invites the public to engage with all the activity happening inside," explains Matthew Lella, principal at Diamond Schmitt. "Dissolving the threshold between indoors and outdoors, the Hall's use of glass at ground-level entrances creates an inviting and seamless transition for visitors entering and exiting the hall."

Modern Design

Inspired by the colors and shapes of the West Texas landscape, the building's modern design reflects the prismatic and layered rock formations of Texas canyons. "We were particularly inspired by the qualities and colors of the soil and local flora, the shapes of arroyos and the layered rock formations of the canyons into the Llano Estacado," says Mike Lukasik, senior associate at Diamond Schmitt.

The West Texas landscape is defined by its desert-like climate, large open spaces, dramatic rock formations and rich color. There is also a deep connection with the people that live there, and during the design phase, Lella and Lukasik note that they were able to experience the environment, abstract it and make it architecture.

Extreme Climate

According to the architects, the extreme climate presented a design challenge for the building. "In particular, the combination of very hot sun and potential for torrential rains made the design of the façades a particular challenge," says Lukasik. "Also, its uncommon to build basements in Lubbock, but a basement provides very valuable space in a theater and is critical for locating much of the technical infrastructure."

Targeting LEED Silver, the building's façade meticulously combines three approaches to creating shade to counter the South Plains Region of Texas' extreme temperature fluctuations. "A long overhang, angled fibre-reinforced resin fins, and deep-set fritted ribbon windows all act as architectural drapery to cool the building and filter southern light without obstructing the views of the wide surrounding vistas," notes Lella.

Reflections in Metal

The metal panels reflect the morning sunrises and afternoon sunsets, mimicking the nearby painted canyons. For the project, CENTRIA, Moon Township, Pa., supplied its Formawall Insulated Metal Panels and Formavue Integrated Windows, which were installed by EWS Texas Inc., Richland Hills, Texas. Additionally, polished metal soffits at the main entrance canopy in the bistro are from Lindner Facades Inc., Colmar, Pa.

"We wanted a really clean and crisp look, and it was also important to us that the building would be well insulated for energy savings," says Lukasik. "These insulated metal panels were a good solution. We could control the design and they fit together and address all these needs in a clever way. The panels offer efficiencies in terms of subdividing with the many horizontal reveals."

Additionally, YKK AP America Inc., Austell, Ga., supplied 25,000 square feet of doors and glazing, including its YCW 750 SSG 2.5 x 10.5, 50XT thermal doors, YCW 750 SSG 2.5 x 7.5, YWW 45TU window wall 2 x 4.5, 35XT thermal doors, YWE 60T 2.25 x 6-inch, 35D doors and YSK 750 sloped glazing.









Buddy Holly Hall of Performing Arts and Sciences, Lubbock, Texas Completed: January 2021 Size: 220,000 square feet **Owner:** Lubbock Entertainment and Performing Arts Association Developer: Garfield Public/Private LLC, Dallas. www.garfieldpublicprivate.com Design architect: Diamond Schmitt Architects, Toronto. www.dsai.ca Architect of record: Parkhill, Lubbock, www.parkhill.com Associate architect: MWM Architects, Lubbock. www.mwm-arch.com General contractor: Lee Lewis Construction, Lubbock www.leelewis.com Façade consultant: Curtainwall Design Consulting, Dallas www.cdc-usa.com Glazing contractor: Texas Industrial Glass, Euless, Texas, www.indglass.com Metal installer: EWS Texas Inc., Richland Hills, Texas, www.ewstx.com Glazing: YKK AP America Inc., Austell, Ga., www.ykkap.com, Circle #29 Insulated metal panels: CENTRIA,

Moon Township, Pa.,

www.centria.com, Circle #30 Metal soffits: Lindner Façades Inc., Colmar, Pa.,

www.lindner-group.com, Circle #31



New metal wall panel façade reshapes image of police headquarters

A project's expression of craft, attention to detail and the way metal was used were all points of interest to the 2021 *Metal Construction News* Awards judges when picking a winner. Calling the project an amazing transformation, the judges named the Pennsylvania State Police Department Headquarters in Harrisburg, Pa., the winner in the Retrofit Metal Walls category.

An Aging Façade

Established in 1905, the Pennsylvania State Police (PSP) was the first uniformed police organization of its kind in the nation. However, it wasn't until Sept. 12, 1978, when the department was given its own building in Harrisburg. Now, 40 years later, the three-story, 190,000-square-foot limestone and brick-clad, steel-framed building was showing its age. Chris Dardis, architect at VITETTA Architects and Engineers, Lemoyne, Pa., says the worst issue was leaking windows that allowed water inside the cavity wall, compromising the steel anchoring clips that supported the limestone panels. "The potential for structural failure was real and understandably the PSP's primary concern was safety, so the first goal was to fix all the façade issues and weatherize the entire building with a new roof, all new windows, rip all of the limestone panels off the building and replace with a new material to be determined during design," he explains. "The second goal was to update the aesthetics and image of PSP Headquarters building to the extent possible while focusing on the façade repairs and weatherization work."

VITETTA performed forensic work to assess the extent of damage to the steel limestone clips, determining that only the head sections of the limestone panels needed to be removed. This was just a fraction of the overall quantity of limestone, meaning that the majority of limestone could remain. "This was a tremendous cost savings and it allowed us to focus on both the weatherization and a complete aesthetic make-over of the building and still stay within budget," Dardis says. "Our approach quickly settled on a new aluminum metal skin to cover the entire building because it provided the best opportunity to update the overall esthetic and reshape the image of the PSP Headquarters, while addressing all the existing water infiltration and resultant façade issues."

Custom Profile

The existing building had three stories of stacked ribbon windows and limestone panels with brick bookends at all the corners. According to Dardis, "We wanted to totally change those proportions and re-invent the rhythm of the building so even if you knew what the building looked like before, you'd be hard-pressed not to believe it was a brand-new building after the renovation."

The designers chose aluminum for its flexibility, ability to not rust, lightweight, profile and color options, as well as its longevity and relatively low cost, making it a perfect fit for reskinning the large building. The VITETTA design team worked with Norcross, Ga.-based IMETCO's (Innovative Metals Co. Inc.) engineering team to develop 8-, 12- and 16-inch-high Latitude profiles.

For the project, IMETCO supplied a custom profile of its 0.063-inch aluminum Latitude Concealed Fastener wall panels in three widths, as well as 0.08-inch aluminum custom window trim and metal coping. A total of 20,000 square feet of products were coating in Minneapolis-based Sherwin-Williams Coil Coatings' Fluropon coating in Charcoal Gray and Pre-weathered Galvalume.

The police department had recently gone through vehicle color upgrades as part of a branding refresh. "The entire team wanted the building aesthetic to be sympathetic to this effort and the use of these two colors together does that, plus it creates movement, our interpretation of driving on the highway with the dividing lines passing by at speed," adds Dardis.

To create a sense of movement and a whole new look for the building, the designers used a linear aesthetic composed of randomly mixedheight panels that moved across each façade and seamlessly turned the corners. "Furthermore," Dardis says, "the new profile has a small triangular projection at the end which creates a subtle shadow line and provides depth and texture."

The VITETTA team worked directly with IMETCO's designers and detailers during the design to make sure the systems would not only look great but would work and install easily. "The biggest challenge during design was detailing how the Latitude panels terminate at the existing openings," Dardis explains. "Special termination flashing channels had to be developed with IMETCO for each type of opening to ensure proper weathertightness. During construction and from our point of view, the process and install went remarkably well, even with the building being partially occupied (partially due to COVID-19) that did not delay the project in any way, in fact it finished ahead of schedule."

Pennsylvania State Police Department Headquarters, Harrisburg, Pa.

Completed: October 2020 Total square footage: 20,000 square feet Owner: Commonwealth of Pennsylvania Architect: VITETTA, Lemoyne, Pa., **www.vitetta.com** General contractor: eci Construction, Dillsburg, Pa., **www.eciconstruction.us** Metal installer: Progressive Services Inc. (now Houck Group Inc.), Harrisburg, Pa., **www.houcks.com** Coatings: Sherwin-Williams Coil Coatings,

Minneapolis, **www.coil.sherwin.com, Circle #32** Metal wall panels: IMETCO (Innovative Metals Co.

Inc.), Norcross, Ga., www.imetco.com, Circle #33







Metal Buildings

A Simple Form Becomes Architecture

By Paul Deffenbaugh, Editorial Direct

Distinguishing fenestration reveals a metal building's structure

"It's almost like a school studio exercise," says *Metal Construction News* Project Excellence Awards judge William S. Duff Jr., AIA, LEED AP. "Take a rectangular box and show what you can do with it to make it more interesting."

The Mesa Rim Climbing Center, San Marcos, Calif., is just a simple box, but Richard and Richard Construction, San Marcos, working as a design/ build firm, carved out the corners of the building to let in light and reveal the structure itself, and pulled several tricks out of the box to turn this box into a piece of architecture.

"They took a conventional metal building system and found a way to create architecture out of it and drama," says judge Steve Dumez, FAIA. "The way in which the openings were cut into it were a little unexpected. I thought it was just a really nice example of how you can take a relatively straightforward set of building systems and materials and create drama."

Judge Matthew S. Kruntorád, AIA, LEED AP,

says, "The proportioning of the exterior to scale is really well done and it stems from this very simple approach to structure."

An elegant solution such as that is just one of the reasons the judges selected this project the best in category for metal buildings.

Gary Seward, LEED AP, was the architect for Richard and Richard Construction, and he says, "Inside it's all climbing walls and there's not a lot of room for windows. So, we had to sneak them into the corners and made them asymmetrical. We didn't want it to be so symmetrical because the building is boxy. We wanted to play with that and create more angles."

One Step Down and Another Building

The building sits on a slope in the middle of the revitalized downtown area of San Marcos. It's part of a redevelopment project in an area that included several aging metal buildings, which provided some inspiration for the project. "For a long time, the area has been old industrial buildings and worndown houses," says Seward. "Now, it's going to be the center core of the city. What they wanted to do is create some synergy there and give some interest. That's why we picked a metal building."

MESARIN

The metal building system was supplied by American Buildings Co., Eufaula, Ala., and erected by G&W Builders Inc., Brea, Calif. In fact, it's two buildings. Bill Greer, vice president at G&W Builders explains. "The main tower is 60 feet tall, and the attached building is 40 feet, which is a pretty good height for a metal building in Southern California. Because of the loads, we couldn't do a lean-to building, connecting the rafters to the columns. We had to have another set of columns and make the buildings independent of each other."

The building is on a slope, so the lower building features a full mezzanine with the welcome desk, shop, office and other facilities on the first floor, while the second floor is dominated by the bouldering room. In addition to the slope driving the need for two buildings, there were also the seismic requirements, requiring the two structures to be independent of each and forcing a gap between the buildings. The building had to be rated for more than 300 occupants, so it required the building to be in risk category 3 for seismic codes because it takes longer for people to exit the building. That meant special consideration to frame movement.

One of the solutions, besides creating two buildings instead of one, was to use a unique restraint system. "With the seismic loadings as well as all the climbing walls and boulders," says Greer, "we couldn't do ordinary moment frames. We had to use buckle-restrained bracing." A buckle-restrained brace consists of a slender steel core and a concrete casing that supports the core and prevents it from buckling.

Interior and Exterior

Adding to the loading issues were the climbing walls, some of which were 60 feet tall and attached to the metal frame. In addition to the normal bracing required for a metal building system, G&W Builders needed to install horizontal bracings that the climbing walls could tie into. "The climbing wall company did a great job of laying out what we needed," says Greer. "They told us exact locations and we just needed to provide tube steel



at those elevations. Once they gave us the loads, it was really making sure we had those columns in the correct locations."

Because all those loads required two buildings, it would have been easy to let the structure read that way, but it actually reads as one complete building because of the metal skin and the roofing. Both roofs are single slope that shed toward the downhill side of the building. The lower building includes an internal gutter to capture the water runoff. A parapet wall hides the slopes and makes the buildings integrate more seamlessly.

On the exterior wall, insulated metal panels define the separate structures yet keep them united as one cohesive whole. Careful use of palette and ribbing help clarify the definition of the building.

Roll-up sectionals on the mezzanine in the bouldering area open the interior to the exterior and provide more natural light. Combined with skylights from Solatube International Inc., Vista, Calif., the roll-ups allow the interior to be flooded with natural light, further blending the indoor and the outdoors.

Mesa Rim Climbing Center, San Marcos, Calif. Completed: October 2020

Size: 28,000 square feet Owner: Mesa Rim Climbing Centers Design-builder: Richard and Richard Construction Co. Inc., San Marcos, www.rrconstruction.com Metal erector: G&W Builders Inc., Brea, Calif.,

www.gwbuilders.com Doors: Overhead Doors, Lewisville, Texas, www.overheaddoor.com, Circle #34 Metal building system: American Buildings Co., Eufaula, Ala., www.americanbuildings.com, Circle #35

Metal roof panels: All Weather Insulated Panels Inc., Vacaville, Calif.,

www.awipanels.com, Circle #36 Metal wall panels: Metal Sales Manufacturing

Corp., Louisville, Ky.,

www.metalsales.us.com, Circle #37 and Metl-Span,

Lewisville,

www.metlspan.com, Circle #38

Skylights: Solatube International Inc., Vista, Calif.,

www.solatube.com, Circle #39 Solar panels/installer: Core Energy Group, San Jose, Calif., www.coreenergy.group, Circle #40 Craftsmanship

Copper Craft By Paul Deffenbaugh, Editorial Director

Replacing a copper dome showcases the craftmanship in the metal arts

It took a year to replace the copper dome of the Mississippi County Courthouse in Osceola, Ark., but true craftsmanship takes time. From scaffolding up to scaffolding down, the craftsmen on the job and in the shop at Renaissance Historic Exteriors Inc., Rockford, III., devoted themselves to replicating the look of the dome and improving the quality of its installation.

The *Metal Construction News* Project Excellence Awards judges noticed. "You just don't see this kind of handiwork or replication," says Steve Dumez, FAIA, "It's a really beautiful replacement."

Pointing to the devotion to the craft, judge William S. Duff, AIA, LEED AP, says, "In an era of manufactured materials and assembly of those manufactured materials, there is a handmade quality to what we're seeing and a by-hand application of these elements, and that to me is synonymous with craftsmanship."

For Matthew S. Kruntorád, AIA, LEED AP,

interest in the project was more than just aesthetic. "I want to spend several months with them as they fabricate this stuff because I think it would just be fascinating. It's really inspiring to see the dedication and commitment to do this type of work."

The Project

The revival work on the dome was overseen by Aaron Ruby, AIA, LEED AP, Revival Architecture, Scott, Ark., who has worked across Arkansas on numerous historic renovation projects. He explains there are two county courthouses in Mississippi County, the second in Blytheville in the north end of the county. The original plan was to just build a new courthouse, but as one can imagine there is considerable rivalry between the two county seats so when they wanted to build new, Osceola sued the county. With a poor economy, declining population and a struggling downtown, the courthouse was an important centerpiece to the town. Osceola won the suit. The compromise was to renovate both courthouses.

"There are more than a hundred courthouses in the state, but the courthouse in Osceola in my opinion is one of the most beautiful," says Ruby. "It's full of subtle detail the way they finished it originally." The dome has eight sides that taper up to a cupola with a finial on top. The hips are smooth and have buttons tracing up them that taper in size as well. The copper isn't smooth, but textured. "The texture of the sheets," says Ruby, "reflects the light and helps give it richness." At the bottom of the dome are large copper scrolls, lending weight and a foundation to the dome.

It was behind those scrolls where most of the serious damage had occurred. There was evidence of a fire at one point that nobody can explain, but because the scrolls were used as cladding that is where water infiltrated and caused damage. The domes' wooden frame remained intact; only the sheathing needed to be replaced. The final element of the dome replacement was an internal copper gutter.

The Craftsmanship

Working with copper is an old craft but is still technical and modern at the same time. Many of the same techniques that have been used for centuries to form copper, such as hand-pounding it, were used on the dome. But modern techniques of stamping and annealing the scrolls were required. All the work was done by the craftsmen at Renaissance Historic Exteriors, who Ruby credits for their abilities and communication of the details.

"Anything that needs to be custom fabricated is shipped back to us in our shop," says Chuck McLean, copper studio manager for Renaissance. "I basically reverse engineer it and try to improve it in terms of the way it was constructed to begin with."

One significant area of improvement was how the seams along the hips were joined. Originally, they were just butt jointed and soldered. "Nine times out of 10, that's where things fail," says



McLean. "It's not the copper, it's the seam that's not done correctly." Renaissance used a double lock system with the copper double folded along the length of the hip. "There's no way water's going to penetrate that," says McLean.

That kind of craftsmanship isn't easy. In fact, it's painstaking. Kai Loema is the operations manager at Renaissance. "Originally, they used a lot of face nailing," he says. "But each hip required about 200 pieces of copper, and there were more than 2,000 pieces used on the dome altogether. All of those pieces were hand seamed, hand folded and hand pounded."

Two other significant challenges faced the craftsmen, among a myriad of other simpler ones. The giant scrolls at the bottom of the dome needed to be duplicated exactly, so they were stamped and annealed in the shop. That, too, was a painstaking process. "As we stamp it, we actually have to anneal it ourselves," says McLean. "We heat it up to cherry red and then stamp it a little bit. Sometimes we can only move the copper an eighth of an inch at a time before it works hard, and we have to anneal it again to keep as many wrinkles out of it as we can."

McLean points to another remarkable bit of copper craftsmanship, and that is the sphere on the top of the finial. It is made from 1/8-inch-thick copper and is 36 inches in diameter. "That's a pretty big sphere to be turned," he says.

Because of the craft of these artisans, the dome has been replaced, the courthouse preserved, and the square still retains its role as the center of the town. The good news in all this besides the devotion to excellence and craftsmanship is that Mississippi county has become a mecca for the growing steel industry in the United States with firms such as Nucor-Yamato Steel Co. and Big River Steel providing more than 5,000 manufacturing jobs in an area the new economy has missed. There's a lot to be proud of in the county and the dome on the courthouse is one of them.

Mississippi County Courthouse, Osceola, Miss.

Completed: July 2021 Total square footage: 2,800 square feet Owner: Mississippi County Architect: Revival Architectures, Scott, Ark.,

www.revivalarch.com

General contractor and metal installer: Renaissance Historic Exteriors, Belvidere, III., www.historicexteriors.com Copper: Revere Copper Products Inc., Rome, N.Y.,

www.reverecopper.com, Circle #41





Precise design, fabrication and installation make zinc dome a showstopper

Driving on Interstate 5 along the Sacramento River north of downtown Sacramento in California, travelers see an unusual looking building with angled stripes on its walls and topped with a giant, glossy silver-gray dome. It is no coincidence the gray dome looks like a planet emerging over a horizon, and the angled, dark stripes, called vectors, allude to space and mathematics. Inside the dome, there is a planetarium. And inside the building, visitors to the SMUD Museum of Science and Curiosity (formerly the Powerhouse Science Center) learn about science, technology, engineering, arts and mathematics (STEAM).

The judging panel for the 2021 *Metal Construction News* Project Excellence Awards notes the zinc cladding on the dome was expertly and precisely designed and built. The zinc dome is a beautiful object constructed with highly skilled craftsmanship, the panel agreed, and they gave the project the award in the metal roofing retrofit category.

Chris Holt, AIA, LEED BD+C, associate project manager at Dreyfuss + Blackford Architecture in Sacramento, says, in part, the dome communicates the building's use to passersby, and the museum's significance. "We wanted to be able to express the unique program from the inside of the building to the outside. We wanted the dome to be one of those beacons, something people would look at and say, that's interesting. You don't see that every day."

In terms of its form, from some viewpoints, the curve of the dome, which is placed on an addition portion of the museum building, appears balanced with arched windows on the other half of the museum building, a renovated, historic power station built in 1912, PG&E River Station B.

"The dome plays off the arching of the

windows; it's very interesting you have this very rectilinear form of a building and then these little arches that play off of each other," Holt says. "It really helps that planetarium sing, and it also shows how the historic and the new interplay at so many different angles."

To clad the dome, Rua and Son Mechanical Inc. in Rocklin, Calif., fabricated and installed 0.8-mm-thick prePATINA zinc tiles in Graphite Grey from RHEINZINK America Inc., Woburn, Mass.

The flat-lock tiles gradually get narrower as they ascend the dome. The tiles are also tapered on each end to form to the dome's curve, says Louie Rua, president at Rua and Son Mechanical. "Each tile tapers inward as they go up; this ensured the tiles stayed consistently tight to the shape of the dome."

The tiles have a running bond pattern, which allows expansion and contraction of the tiles. Installing them on the dome required frequent adjustments to precisely align the tiles and make them tight against the dome. Over the course of a row, the ways the tiles interlock can cause them to slightly grow or shrink, called panel creep.

"Our fabricators/installers measured, laid out and installed about half the tiles needed for a complete ring around the dome," Rua says. "After installing them, our team measured and cut the second batch of tiles to complete the ring, and adjusted sizes accordingly to ensure a consistent pattern as well as a tight fit to the curvature of the dome. You don't get too far ahead at doing this to allow for inconsistencies in the dome frame too."

Sacramento Municipal Utility District (SMUD) Museum of Science and Curiosity, Sacramento, Calif.

Completed: April 2021

Size: 42,000 square feet General contractor: Otto Construction Inc., Sacramento,

www.ottoconstruction.com

Architect: Dreyfuss + Blackford Architecture, Sacramento.

www.dreyfussblackford.com

Zinc distributor: Sheet Metal Supply Ltd., Grayslake, III.,

www.sheetmetalsupplyltd.com

Fabricator/installer: Rua and Son Mechanical Inc., Rocklin, Calif.,

www.ruainc.com, Circle #42

Roof underlayment: GCP Applied Technologies Inc., Cambridge, Mass.,

www.gcpat.com, Circle #43

Zinc: RHEINZINK America Inc.,

Woburn, Mass.,

www.rheinzink.us, Circle #44



Fluidity, Façades and Finishes

By Mark Robins, Senior Editor

Facebook building has visually stunning exterior design

Menlo Park, Calif.-based tech giant Facebook's Bellevue, Wash.'s Spring District campus promotes accessibility and openness with the surrounding environment. The campus is lined with pedestrian paths and outdoor spaces, blending workspaces with the natural world. It also promotes energy efficiency and employee health by maximizing daylight, and incorporates an abundance of native plants.

The building's unique massing uses mechanical doors to integrate the interior and exterior spaces, as well as exterior staircases and walkways to travel between floors and parts of the building. This fluidity between spaces and large windows maximizes natural light and access to the outdoors for employees. The project is built horizontally, instead of a typical vertical office tower, allowing people to have different indoor/ outdoor experiences with space.

The 2021 *Metal Construction News* Project Excellence Awards judges were so impressed by it they awarded it a Judges Award. William S. Duff Jr., AIA, LEED AP, believes the Facebook project is a really successful use of metal in architecture and is integral to its solution. Steve Dumez, FAIA, says the metal applications add great richness.

Matthew S. Kruntorád, AIA, LEED AP, calls it a spectacular project. "The façade—which is really well-detailed, proportioned and developed—is a backdrop in a really beautiful way. It gives justice to the outdoor spaces. It's a nice balance and sensibility. There are tall spaces. It could be an imposing building, especially in metal, but it's not. It has really very delightful spaces to be in and is supported in the ways the materials are used."

Aluminum Cladding, Custom Finishes

The project's architect NBBJ, Seattle, and the project team wanted something unique for the façade design that would be visually stunning while meeting their sustainability goals. To contextualize the façade, aluminum cladding was fabricated in a super-tight shark fin corrugation. The general contractor was Turner Construction Co., New York City, and the installer was Northshore Exteriors Inc., Everett, Wash.

"Corrugated and bent metal, especially when paired with a luminescent clear coat, offers the ability to create façade texture and visual diversity," says Geoff Hahn, creative director at Pure + FreeForm, St. Paul, Minn. "For this project, we created two custom micro-corrugated profiles to pair with two different custom finishes: Washington Steel and Twilight Bronze. Light hits these panels at various angles due to the differences in the corrugations, offering varied tones, textures and shadow lines. The finishes used on these panels were totally custom to the site, making it more locally relevant than a predesigned material."

The history of Bellevue's Spring District inspired the different custom finishes that call upon the former industrial nature of the community. "Using locally significant blackened steel and rust as bases, we created contemporized versions in the right tones," says Will Pilkington, operations manager at Pure + FreeForm. "But to modernize the topcoat and offer more luminosity and glint than the archetype, we added a clear coat (Crystal Basecoat) to the surface which brings out the natural variation in the metal substrate. When light hits the surface at different angles, the onlooker may experience a major shift in color and texture on the same plane, achieved by the luminosity of the metal itself and not the depth of the coating."

Facebook Building, Bellevue, Wash.

Completed: June 2020 Size: 390,000 square feet Owner: Facebook, Menlo Park, Calif. Architect: NBBJ, Seattle, www.nbbj.com General contractor: Turner Construction Co.,

New York City,

www.turnerconstruction.com

Installer: Northshore Exteriors Inc., Everett, Wash.,

www.northshoreext.com

Metal wall panels/finisher: Pure + FreeForm, St. Paul, Minn.,

www.purefreeform.com, Circle #45



Deliberately proportioned metal panels, architectural elements balance house design

Elegant, restrained and refined are some terms the judging panel for the 2021 Metal Construction News Project Excellence Awards used to describe the Milestone residence in East Hampton, N.Y. Evenly spaced, vertical metal panels encase three volumes, which are themselves evenly spaced apart and connected by two open, protruding volumes with large, horizontal spaces, a porch and living room. The judging panel lauded the contemporary design for defining its own design vocabulary and gave it a Judges Award.

The house is named Milestone for an old stone mile marker the owner and its designer, Aaron Zalneraitis, found on the property. With respect to the restraint of the design, Zalneraitis, an architect at Bates Masi + Architects in East Hampton, says, "The design was restrained by a tight budget and by a mindfulness of the neighborhood of relatively modest suburban and rural homes in which it is sited. Both of these demands required a compact and efficient organization. By alternating groups of private and service spaces with public and entertaining spaces, and using the latter for circulation, the house has almost no conventional hallways. Restraint also comes in the form of a limited material palette: metal, wood and glass that clearly defines zones of solid and void."

Relative to the house's overall architectural composition, Zalneraitis says there are two basic building blocks that comprise the house. "Tall, compact, solid volumes clad with vertically striated metal panels suggest vertical pins inserted into the earth, much in the same way that the milestones along the road, one of which is in the corner of the property, are pushed into the earth. The glass and screened-in spaces between these pins are lower, wider, horizontal and trimmed with natural wood, suggesting their connection to the ground plane, horizon and the landscape."

Importantly, the design of Milestone has its own, specific vocabulary expressed in building materials and spaces organized for connections between the interior and exterior. Zalneraitis explains, "The vocabulary represents a dialogue between the man-made, permanent, and the natural and weathering. Each of the solid volumes is finished with man-made materials: aluminum siding, rubber roof, linoleum floors and painted walls. These materials all support the analogy between these volumes and the permanent, man-hewn, granite milestone. Open spaces between the solid volumes are bound by glass on either end, wood floors and ceilings that weather naturally outside, and the exterior walls of the solid volumes on either side. In the case of the living room, this means that the exterior aluminum siding extends onto the walls of the interior conditioned space, reinforcing the idea that it is part of the outdoors and nature."

Furthermore, the vertical metal panels on the walls reinforce the verticality of the house's solid volumes and emphasize their insertion into the earth, Zalneraitis says. "The vertical ribs also cast shadows onto the flat surfaces of the metal panels that animate the façade as the sun tracks across the sky during the day and through the seasons. Elegant detailing is further enhanced by custom working all corner conditions and wall caps."

To complete the project, Dan Loos Inc., East Hampton, general contractor, installed 2,800 square feet of Allentown, Pa.-based ATAS International Inc.'s Standing Seam Shingles. The 16-inch by 60-inch, 0.032-inch-thick aluminum panels have four-way interlocking edges and a 70% PVDF gray painted finish.

Milestone, East Hampton, N.Y.

Completed: January 2019 Size: 1,028 square feet Architect: Bates Masi + Architects, East Hampton,

www.batesmasi.com

General contractor/installer: Dan Loos Inc.,

East Hampton, (516) 857-9571

Structural engineer: S.L. Maresca and Associates, Hampton Bays, N.Y.,

www.slmaresca.com

Metal wall panels: ATAS International Inc., Allentown, Pa.,

www.atas.com, Circle #46



Transforming an old block building into a piece of art

It used to be a dog food factory, now retrofitted, it's the envy of our Metal Construction News Project Excellence Awards judges who honored it with a Judges Award. The 4141 Fairbanks building in Kansas City, Kan., is the new headquarters of Delta Innovative Services Inc., a commercial roofing contractor, and its sister architectural sheet metal company DB2 Services Inc.

"I thought it was fantastic," says awards judge Steve Dumez, FAIA, "the craft and the detailing and the way in which metal was used. Awards judge Matthew Kruntorád called the retrofitted building "an interesting expression of craft, and a really beautiful expression of craft and assembly. The material—really beautiful pieces—speak to how the material can be used."

Awards judge William S. Duff Jr., AIA, LEED AP, believes the retrofit shows, "ambitious use of metal panels to give texture and definition to an otherwise rectangular box building. It's a beautiful design concept, going onto a brick building creative stretching in ways to use metal in an innovative manner."

Retrofitted Building

The unique 86,000-square-foot building, sits in a prime location for accessing public transportation, and houses new modern offices and amenities, a

huge fabrication floor, specialty fabrication areas and plenty of warehouse space.

"Undoubtedly, this renovated building has brought diversity to the industrial zone of the city. I would call this project an emerald in the heart of the industrial park located on the edge of the Kansas City metropolitan area," says Aldar Gilyandikov, project manager, DB2 Services.

"Everything was designed, drawn, fabricated and installed in house," says Dan Doty, We Care manager, Delta Innovative Services. "We wanted to showcase what is possible so owners and architects can be more creative. We wanted to transform an old block building in to a piece of art. DB2 oversaw everything but the major challenge was creating something new that hadn't been done locally before."

The retrofit really began when new windows and entrances were punched into the masonry wall sections. Parapets were framed and sheathed. The panel elevations were furred out with vertical metal hat sections and screening prior to being covered with Zip System Wall Sheathing. This outer wall configuration allowed for easy installation of the rain screen panels and ample air circulation behind the new assembly. Field dimensions were fused with the challenging design intent, and after several iterations, a working mockup was constructed, and the design and layout were finalized, in-house programming and fabrication could begin.

A Billboard of Potential

As an architectural metal fabricator, DB2's goal was that the new facility radiated not just its capabilities, but also its unique personality. Aluminum composite material (ACM) panels were the panel of choice because throughout the COVID-19 pandemic, it has been the easiest for DB2 to procure, as lead times and availability have changed little. Gilyandikov calls the retrofit, "an industrial estate that received a unique metal skin with bright colors and shapes." Also, Doty adds, "Keeping the building block and brick is boring. Using over 850 unique panels in conjunction with those repeated achieved our goal of being a billboard of potential."

A total of five different colors and finishes were used in the final architectural layout. Chesapeake, Va.-based Mitsubishi Chemical America Inc.'s ALPOLIC ACM panels in MFS Gray and CLR Clear Anodized finishes, while Manning, S.C.-based Alucoil's Larson ACMs in three custom color greens matched the company logo and identity. All ACMs were 4-mm-thick, with fireresistant cores. The ACM sheets were routed on one of two CNC routing tables, and panel legs were returned on imported panel folding brake tables. Finally, the panels are fitted with perimeter lineal extrusions and stiffeners. Extra care was taken to properly reinforce and bracket the unique 3-D panel shapes.

"As for the metal panel's framing, we used Atlanta-based SAF's SAF Extrusion System C-4000," Gilyandikov says. "The challenges we had were to transfer 3-D shaped panels' layout diagonally on the substrates and blend four different design ideas."

4141 Fairbanks building, Kansas City, Kan.

Completed: August 2020 Size: 86,000 square feet **Owner:** Boyle Midwest Architect: bnb Design Architecture and Interiors, Bonner Springs, Kan., www.bnbdesign.com General contractor: Cobalt Construction Co. LLC, Kansas City, Mo., www.cobaltconstructionkc.com Metal installer: DB2 Services Inc., Kansas City, Kan., www.db2services.com Metal panel framing: SAF, Atlanta, www.saf.com, circle #47 Metal wall panels: Mitsubishi Chemical Composites America Inc., Chesapeake, Va.,

www.alpolic-americas.com, circle #48, and Alucoil, Manning, S.C., www.alucoil.com, circle #49

(Photo courtesy of Advant Steel)



Steel joists are open-web, lightweight steel trusses consisting of parallel chords and a triangulated web system, proportioned to span between bearing points. They provide direct support for the roof or floor deck, and transfer the load imposed on the deck to the structural frame's beams and columns. Typically comprised of hot-rolled or cold-formed steel (CFS) with yield strength of 50 ksi, steel joists are designed and constructed in accordance with standards developed by the Steel Joist Institute (SJI).

Many factors must be considered during the handling and installation of joists. These can include the size of the joists, the sheer quantity of joists, the height and reach of available equipment, and the need for temporary bracing. "Some joist installs have special requirements, such as requiring the application of loads to the joists before the bottom cords can be tied in," says Trent Tyler, field service technician, Chief Buildings, Grand Island, Neb. "Certified welders must be at the ready when connections require a final weld in lieu of a bolted connection. Strict adherence to the manufacturer's prescribed installation method is necessary to assure that it is structurally sound. When welding is required a verification process must also be in place to inspect welds and document all work is correct per plans and specs."

Steel joist installations are primarily driven by the stability of the joist and its specific use in the overall structure. Joseph Voigt, PE, sales engineer at New Millennium Building Systems, Hope, Ark., explains OSHA 1926.757 must be followed when installing steel joists and the Steel Joist Institute's Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders," is an excellent resource for any steel erector.

Joist Girders

Joist girders are primary structural members that are normally supported by columns but can also be supported by other structural elements. "They must be installed one at a time and the manufacturer is required to design the joist girder to be installed without the need for bridging during erection," Voigt says. "The bottom chords of joist girders extend past a vertical stabilizer plate at the column to help prevent overturning. Attachment of the bottom chord to the stabilizer plate should not be made unless specified on the joist placement plans or the contract documents."

Column Joists

Joists bearing at steel columns that are not already framed in two directions are referred to as column joists, tie-joists, strut joists or OC joists. "Column joists must be field-bolted to the column to provide stability to the column during erection," Voigt says. "When spanning over 60 feet, column joists must be set in tandem with an adjacent joist with all bridging installed unless an alternate method of erection is used that provides the same stability and is included in the site-specific erection plan (see OSHA 1926.752(e)). Where constructability doesn't allow a joist to be installed directly at the column, an alternate means of stabilizing the

(Photo courtesy of Cascade Manufacturing Co.)



Mezzanine floor Bolts with washers over slots in joist Decking Floor Depth Seat Depth ezzanine Elevat 50+ Clearance >=3.50" 6 0 "Near OSHA Column Joist" "Near OSHA Column Joist" 3-Joist chords to set astride stabilizer Support beam clip no welding is permitted (May be continuous s column) Clip to be installed prior to erecting Support column pipe, or tube (Beyond, Not fully shown for 13/16" hole provided for erection guying or plumbing cables. ection clarity)

Near OSHA Column Joist to Support Beam with Stabilizer Plate Located 3.50" Equal to or Greater Than from the Inside of the Bottom Support Beam Flange to Bottom Chord of Joist

(Diagram courtesy of Chief Buildings)

column joists shall be installed on both sides near the column (see OSHA 1926.757(a)(2))."

Short Span Joists-K-Series

"Short span joists can be landed in bundles if they do not require erection bridging (see OSHA 1926.757(d))," Voigt says. "All joists in the bundle must be oriented with the top chord up and tagends at the same end of the bundle. The joists in the bundle must also be the same length and they cannot be staggered lengthwise in the bundle. Joist bundles cannot be lifted by attachment to joist web members or bundle straps. Installers should land bundles on the structure near the center of the bay, ensure adequate bearing of the joists, and hold the cables clear from the bundle when releasing them so they don't get caught in the bundle."

Bolt-Up Style Joist versus Typical Weld Seat

Cory Baxter, president of Cory Enterprises Inc., Davidsonville, Md., explains joists with bolted seats can be erected while structural steel erection is taking place and will aide in plumbing and stabilizing of bays. "Joists with welded only seats need to wait until a bay is plumb and stabilized with guy wires before they should be erected. Depending on the bearing condition you may have, some joists at the SJI minimum of 2 1/2 inches of bearing are at a center beam line condition. This can create a dangerous condition if the joists have been set and structural steel needs to be moved to get columns plumb. An important note is all joists over 40 feet per OSHA are required to have slotted seats for erection bolts. This can be avoided/worked around if the joists are being welded in place before the hoisting cables are removed and done one at a time."

Joist Handling and Bridging

According to Tyler, handling of bar joists is usually best when left in the bundles provided by the manufacturer as long as possible. "This will allow for safe storage and efficient movement around the job site. Granted there will be exception to this and breaking apart the bundles is always inevitable. It is always a best practice to always set bundles of joists on blocking for two reasons: to keep them clean and out of the dirt and to allow rigging to be attached without complications when install time comes. If possible, locate the bundles as convenient as you can for your hoisting of them into place. Most times a crane is used to place joists, but sometimes some form of a telehandler or rough terrain fork lift is needed because of low overhead clearance issues or other site-specific conditions. Many criteria must be considered at every job site to be able to move and lift joists in a safe manner. Every job site will be unique."

In terms of actual joist spacing, Tim

INSTALLATION FEATURE



(Photo courtesy of Chief Buildings)

Liescheidt, PE, managing member of Advant Steel LLC, Midland, N.C., explains that designers will use the joist's published capacity to determine spacing required. "Normally red iron joists will be spaced further apart than a comparable CFS joist. For a project that requires red iron joists at 6 feet off center for instance, when it is converted to CFS might be required to be spaced 4 feet oc. Spacing of the supporting structural element is critical because the support member is designed for a specific tributary area. If the support member spacing results in an area carried that is greater than what the member is designed for then the member cannot act as intended."

Joists should be secured at both ends before being released from rigging on either a full install or some other means of temporary bracing. After the joists are in place next comes the bridging for them and it runs in the webs horizontally. This bridging ties one joist to the next and provides a means to set spacing, provide racking stability, and it keeps them in the proper position vertically.

"Bolted bridging is by far the quickest and safest for a project," explains Nick Weiss, senior project manager, O'Donnell Metal Deck, Elkridge, Md. "It can be installed before hoisting cables are released and will stabilize joist for bundles of decking to be set on. If there is additional welded horizontal, X, or uplift bridging it can be installed as decking crewing is working in another area on the job. Joists should also be plumb before bridging is tightened or welded in place. If not, this can create unintended lateral loads on the joists which could cause it to fail under a snow load, uplift, rooftop unit or other roof loads. From a supplier standpoint, bolted bridging is more expensive than traditional welded bridging due to the extra engineering, material, and fabrication time. So, it's a tradeoff like most things in construction but it can be a useful thing to know about when looking at a new project."

The Rise of CFS Trusses

CFS trusses historically have been utilized for pitched roof applications and floor trusses on mid-rise construction projects. Installing CFS trusses in joist type applications is common. The one major difference between steel joist and CFS truss installation is the attachment of the metal deck to the top chords.

"CFS trusses have always been a viable replacement product for steel joists yet historically the price point was not favorable due to the larger joist manufacturers being owned by steel producing mills," says David C. Dunbar, PE, TrusSteel national sales manager, Alpine TrusSteel, Orlando, Fla. "Then, in 2021 the demand for large warehouses and mega-retail distribution centers caused lead times for joists to approach and even exceed one

(Photo courtesy of Alpine TrusSteel)

year. Simultaneously, the price of steel rising by two to three times from pre-pandemic levels has made CFS trusses a competitive replacement product in most standard (K-Series, LH-Series) joist applications. Many steel joist applications have the deck attached via puddle welds which is acceptable due to the steel thickness of the chord material. Installing CFS trusses as a replacement for joists is not affected by the physical properties of the building. Delivering a detailed truss placement plan as part of the job-site package is another standard industry practice. Streamlined connection details for the truss to structure have recently been developed for ease of installation."

CFS trusses are lighter than bar joist and therefore may be easier to handle in the field. "They offer a wide range of joist bearing conditions that can be custom tailored to the specific project: top chord bearing, bottom chord bearing, mid chord bearing, plus options to weld or mechanically fasten connections," says Tim Noonan, president, Cascade Manufacturing Co., Cascade, Iowa. "The best application for CFS trusses as an alternate to bar joist are in spans of 60 feet or less. Depending on the span, CFS trusses will likely need more depth to accomplish the same span/spacing/load capabilities as bar joists, but involving a CFS truss designer up front can result in the optimal design for the particular application."

Choosing the Appropriate Sealant

A continuous layer of protection for a weatherproof building envelope

By Arnold Corbin

Contractors and designers frequently specify metal building materials for their superior protection against the elements.

While metal panels comprise much of the air and water barrier of a building envelope, to achieve a continuous layer of protection one vital component cannot be overlooked: proper installation of the appropriate sealant.

Selecting the Correct Sealant

When specifying a sealant for a metal construction application, the best practice is to follow the metal building component manufacturer's recommendations, especially to attain weathertight warranties that may be available. Not all sealants and sealant manufacturers are created equally. When a sealant is inadequate, significant failures can compromise the barrier resulting in water leaks, frost and ice accumulation, and air and dust infiltration. To ensure a weathertight barrier, professionals should understand the sealant options available, as well as the performance capabilities of each.

Generally, three major types of sealants are used in metal building applications: butyl, silicone and polyurethane. Additionally, polyether is a newer type of sealant that is gaining popularity.



Top of wall detail with pumpable butyl sealant.



Roof end lap with both forms of Butyl sealant: tape and pumpable.

Butyl Sealants

Butyl sealants are non-curing and remain flexible after installation, allowing for dynamic joint movement. Available in both tape and pumpable grades, pumpable butyl sealants are commonly applied to panel seams in the factory, while butyl tape is more frequently applied in the field to seal static joints. The flexibility and self-healing properties of butyl sealants allow panels to expand and contract without compromising sealant integrity, making butyl ideal for use inside joints or panel seams. However, butyl sealants are not UV resistant and should not be used in applications where the sealant is exposed to sunlight because the product will deteriorate leading to sealant failure. When properly installed in appropriate applications such as in standing seam roofs and metal panel joints, butyl sealants offer durable performance and can provide a long life span, often 25 years or more.

Polyurethane Sealants

Polyurethane sealants are curing sealants that offer excellent adhesive qualities, as well as UV resistance and long-term durability. Typically applied in the field, polyurethane sealants are available in a pumpable, gun grade. With strong adhesive properties, polyurethane sealants are commonly used to adjoin dissimilar materials such as metal trim to a concrete foundation. In roof applications where there is a risk of standing water, polyurethane sealants provide a long-lasting, watertight seal. Unlike butyl sealants, polyurethane is UV stable and available in various colors, making it an ideal sealant for exposed applications. However, polyurethane sealants are not self-healing like butyl sealants and can easily fail when subjected to excessive shear movement.

Silicone

Silicone is a pumpable sealant known for its ease of application and clean up. Silicone sealants typically cure within 15 to 20 minutes after application, so they must be installed in the field. Frequently used inside window applications, silicone is long-lasting and can withstand a wide range of temperature conditions. Silicone is noncombustible, making it the standard sealant for firerated assemblies. In addition, it is USDA compliant and commonly used inside food-processing facilities. However, silicone's bonding properties are not as strong as other types of sealants and can fail under excessive shear force. Like polyurethane, most silicone sealants are not paintable but are available in a variety of colors and are UV stable.

Polyether Sealants

Polyether sealants combine some of the best qualities of polyurethane and silicone, although they are not yet widely used in the industry. With similar curing times to polyurethane sealants, polyether is a field-applied, gun-grade sealant. Polyether sealants have strong bonding properties like polyurethane but are more flexible like silicone. Available in a wide variety of colors, polyether sealants are a good choice for exposed applications where the sealant is color matched to the exterior.

With a variety of sealants available, contractors should carefully evaluate all product qualities to select the sealant that best meets the performance requirements of the project. Relative to overall construction costs, sealants are a minor expense, typically less than 1% of the cost of a building. While it may be tempting to cut costs on a less expensive sealant, it is not worth the risk of thousands of dollars in damage and repairs from sealant failure. By following manufacturers' recommendations and selecting the appropriate sealant for the application, you can avoid sealant failure and achieve a long service life on metal roof and wall projects.

Arnold Corbin is technical services manager for Metl-Span, Lewisville, Texas. To learn more, visit **www.metlspan.com.**

Sealants for Metal Roofs

Keeping metal panels in place with an attractive watertight seal

By Brad Macoubrie

Metal is a durable material. That's why offering a 25-year warranty on your metal roof is a no-brainer. But while it's easy for the metal panels to pull off this kind of longevity, it's not always so easy for the sealant keeping them in place while providing an attractive, watertight seal.

That's where you need to apply some real thought. Here's what to consider when choosing from the following five types of sealants.

Water-based Sealants

These include latex and acrylic sealants, which are great for general construction purposes requiring easy application and smooth tooling. But their formulation requires water, and what does water do? Right! It evaporates while curing. This evaporation will naturally cause the sealant to shrink. In fact, it can shrink up to 40%-to nearly half the size as when it was gunned out-which then leads to cracking.

Shrunken and cracked sealant does not add up to a long performance life, and you're sure to get an earful about the shoddy appearance. And, if clouds are gathering during installation? Don't even think about it! Latex and acrylics can wash away if it rains within 48 hours after application.

Sealant Performance Hierarchy

Silicones

Inorganic - Will not degrade over time Permanently flexible Extrudes down to -20°F Through cure time: 24 hours

Modified Silicones Organic - Carbon Based: Will degrade over time Paintable | Low shrinkage

Gets hard after cure

Poly-Urethanes o work with /pull away/crack from substrat primer before applying on many substrates Stiff in colder temperatures

Solvent Based

nic - Will degrade over time | Hard to work with and clean up porate - Cause shrinking and/or cracking | Stiff in colder temperatures

Latex / Acrylics / Water Based

Organic - Will degrade over time Needs water in formulation. Water evaporates, causing shrinkage/cracking; up to 40% shrinkage Will wash away if it rains within 48 hours of install

Solvent-based Sealants

Solvent-based sealants can offer more durability than water-based ones, though they will also encounter unwanted shrinkage and cracking due to evaporation while curing. Moreover, they are hard to work with, especially in cold weather. Each drop in degree makes the mix stiffen that much more, leading to cramps in your straining trigger fingers. Even harder is the clean-up, with sticky sealant ending up all over your hands and pants, and, often times, steering wheel and truck seat.

Polyurethane Sealants

These ultra-tough sealants certainly have their place, but it sure isn't on your metal roof. As with a solvent-based sealant, a polyurethane one is hard to work with and stiffens in cold weather. But worse yet, they do not adhere well to metal, and will pull away. So, they require a primer, which adds an extra step and an extra expense.

Modified Silicone Sealants

These can provide added flexibility, for less shrinkage. Plus, they are paintable. Indeed, there are many fine modified silicones on the market. We even offer one called NovaBond.

But, though commonly referred to as a silicone, just get down to the molecular level and you'll see the backbone of this category of sealant is actually urethane ... with silicone caps on each end of the molecular chains. So, all scientific mumbo-jumbo aside, it's really more of a siliconized urethane. It will still be susceptible to UV degradation and chalking.

None of the Above Can Handle the Sun Above

Apply a water-based, solvent-based, or modified-silicone to your metal roof and you'd better put down the caulk gun and pick up a paint brush. Because without a coat of paint, it will be like going without sunblock. These organic sealants are susceptible to UV light, which will break them down and cause cracking and chalking.

Want a maintenance-free metal roof? You want silicone. Nothing else offers you the longevity and appearance you need to see your warranty through to the end-and even beyond.

"But," you may be thinking, "silicone won't stick, right?" Wrong. Silicone will absolutely adhere properly to metal. You simply need to pick the right silicone with the right chemistry.

Don't Pick the Wrong Silicone

If you're looking at an acetoxy silicone, you're looking at a silicone made of a chemical that will lower PH levels. This creates an acetic acid while curing, which can lead to acid etching of paint, creating rust lines around beads ... and even deter from adhering to certain metals.

Unsure if the silicone in your gun is made of acetoxy? Just take a whiff. If the silicone stinks, so will its performance on your metal roof.

An Inorganic Oxime Silicone

This particular compound provides superior adhesion to metal. And the inorganic chemistry making up oxime silicone allows light rays to pass right through it, doing no damage. It simply won't degrade.

That's why we use oxime chemistry to produce our NovaFlex line of silicones. It can extrude down to -20 F and it remains permanently flexible. There is never any fading, chalking or cracking. There is one drawback: it's not paintable. So, we offer translucent and color-matching choices.

Brad Macoubrie is the building systems national sales manager at Novagard, Cleveland. To learn more, visit www.novagard.com or call (800) 380-0138.

Fellowship of the Parks, Northlake, Texas

To build a campus of connected buildings as a single building at Fellowship of the Parks' Northlake/Justin campus, a group of metal building systems and some conventionally framed elements were used.

Gaylen Laing, president at Gaylen Howard Laing Architect Inc. (GHLA), says, "We decided that we didn't want just one giant metal building, so we then thought of the campus as sort of a little village of small, interconnected metal buildings.

"By nature of turning the buildings in different directions, we could minimize the overall scale of the project to something that really felt very homey. We arranged all the clustering of buildings around a courtyard in the center."

Matt Lewis, director of engineering at Red Dot Buildings, which supplied the metal building systems, explains, "It's eight pre-engineered buildings attached to four conventionally framed structural components."

B&D Metal Building Erectors erected the metal building systems and built the conventionally framed elements. At the roof, the company installed 1,108 square feet of MBCI's 24-gauge steel SuperLok standing seam roof system in Ash Gray. For the walls, 1,158 square feet of MBCI's 26-gauge steel PBU wall panels in Ash Gray were installed.

Laing says, "We specifically picked [the PBU panels] out because of the shadow profile that we could get and the scale of the material. We decided to celebrate the fact that it was a metal building and not try to make a metal building look like it was something else. We let the structure be exposed in many areas. We just let it be what it was and worked a new design aesthetic around these metal buildings being just what they are."

The 19,055-square-foot campus building houses a worship center with seating for 300 people. The campus, which is located in the town of Northlake and near the City of Justin, adds another location to the church's multiple properties.

Owner: Fellowship of the Parks, Fort Worth, Texas Architect: Gaylen Howard Laing Architect Inc. (GHLA), Arlington, Texas, **www.ghla-inc.com** Installer: B&D Metal Building Erectors, Haltom City, Texas, (817) 386-9992 Metal roof/wall panels: MBCI, Houston, www.mbci.com, Circle #50 Metal building systems: Red Dot Buildings, Athens, Texas,

www.reddotbuildings.com, Circle #51





Photos courtesy of Red Dot Buildings

Religious Market Activity

In September, religious construction was \$2.9 billion, a 12.1% drop from 2020 and 0.4% less than August. Total nonresidential construction, \$791.2 billion, was also down for the year by 1.3% and 0.6% less than August.

Value of construction put in place in the U.S.

| | Percent change September 2021 from | | | |
|---|---------------------------------------|-------------|----------------|--|
| | September 2021 | August 2021 | September 2020 | |
| Religious construction | 2,893 | -0.4 | -12.1 | |
| Nonresidential construction | 791,151 | -0.6 | -1.3 | |
| Total construction | 1,573,610 | -0.5 | 7.8 | |
| Note: in millions of dollars, seasonally adjusted annual rate, as reported by the U.S. Census Bureau Nov. 1 | | | | |

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Risen Savior Lutheran Church, Chandler, Ariz.

Callahan Studios designed a contemporary expansion with curved walls for Risen Savior Lutheran Church. The expansion added functional space to the existing structure. Project goals for the worship center included a space that was accessible for all people, intimate, yet able to seat hundreds of people, and contemporary, yet sacred.

A one-story, 36,000-square-foot building has a contemporary worship venue that seats 728, and the congregation continues to use the sanctuary for a more traditional worship format. The project included a large commercial kitchen, classrooms, offices and an expansive front yard area for events.

Rev. Ronald Burcham, senior pastor at the church, says the congregation wanted a worship space that could be used for purposes other than worship, as well. "We were out of space in our current building, especially in the winter months when the winter residents are in town. There was no place for us to grow our contemporary worship services, and we had no dedicated space for junior high and senior high ministry. We are a multigenerational church, but we were looking to do a better job at ministering to younger families in our community."

Project challenges included building geometry. An elliptical worship center had to meet and blend seamlessly into a rectangular shape that houses classrooms and meeting rooms.

Josh Hansen, construction manager at Hansen Construction Management Group, says, "The footprint of the worship center is a true ellipse. On the exterior wall of the worship center, there are five rows of both interior and exterior shelves. The exterior shelves were designed to be light shelves, while the interior shelves were designed with acoustic panels running in between the shelves. The shelves followed the elliptical geometry of the building footprint. Flex-C Trac and Flex-C Arch were used in the framing to form the face of all radiused shelves."

Executive West Building LLC, framing and drywall contractor, installed 36 pieces of Flex-Ability Concepts LLC's 6-inch, 20-gauge Flex-C Arch and 114 pieces of 6-inch, 20-gauge Flex-C Trac.

For two weeks, six crew members installed the ellipse. Executive West Building's measurements and calculations had to precisely line up with the steel framers' work.

Allen Gravitt, director at Executive West Building, says, "This was a very ambitious design. Though we are very experienced with bending interior track, in this situation, we definitely thought it would be more beneficial to use Flex-C Trac. We have had good experience with the track in the past, and this install went very smooth."







circle #10 on reader service card





General contractor: Hansen Construction Management Group, Glendale, Ariz., www.hansencmgroup.com Architect: Callahan Studios, Scottsdale, Ariz., www.callahanstudios.com Distributor: L&W Supply Corp., Glendale, www.lwsupply.com Installer: Executive West Building LLC, Goodyear, Ariz., www.executivewest Building.com Curved metal framing: Flex-Ability Concepts LLC, Oklahoma City, www.flexabilityconcepts.com, Circle #52





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PROJECT FOCUS RELIGIOUS











Photos: Jason Lee, Shane Day, Paul Osterloh

St. Andrew's Catholic Church, Roanoke, Va.

At St. Andrew's Catholic Church, The Durable Restoration Co. removed the original slate roof on the church and replaced it with new slate from the same quarry using the same size and cut pattern as the original. This included the center spire's copper and slate cladding and all ornamental copper elements on the roof. Durable Restoration re-pointed the entire church using historically correct lime mortars. The lime motors were matched for similar compression strength and water permeability. Stone repairs were completed, as well.

Durable Restoration removed each piece of copper and cataloged them in relation to where they were removed from on the spire and roof. Each new piece was then replicated in the exact size and shape as the original by hand. Most pieces were hand soldered together for strength and watertightness. The pieces were hoisted up to be placed back on the spire in the exact locations as the original pieces. As a result, the restored spire and roof have the same quality of material and workmanship as the original that was installed in 1900.

To replicate copper detail work on the spire and throughout the roof, Chicago Metal Supply and Fabrication Inc. and Ornametals Manufacturing LLC fabricated, and Durable Restoration installed 1,000 pounds of 20-ounce copper. Chicago Metal Supply fabricated decorative parts of a copper center spire. Ornametals fabricated a crenelated copper ridge cap. Each piece was custom fabricated and hand soldered in place to ensure a watertight fit.

Additionally, Durable Restoration installed 1/4inch- to 3/8-inch-thick Buckingham slate. Each piece was hand cut to match the original size and shape.

Owner: Catholic Diocese of Richmond, Richmond, Va. General contractor/installer: The Durable Restoration Co., Columbus, Ohio, www.durablerestoration.com Architect: Cornett and Cundiff Inc., Roanoke, Va., www.cornettcundiff.com Copper: Aurubis Buffalo Inc., Buffalo, N.Y., www.aurubis.com, Circle #53, and Hussey Copper Ltd., Leetsdale, Pa., www.husseycopper.com, Circle #54 Fabricators: Chicago Metal Supply and Fabrication Inc., Chicago, www.chicagometalsupply.com, Circle #55, and Ornametals Manufacturing LLC, Cullman, Ala.,

www.ornametals.com, Circle #56





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PROJECT FOCUS RELIGIOUS

River of Life Church, Jacksonville, N.C.

To appeal to young members of River of Life Church and other residents, Dunn and Dalton Architects PA designed a modern church with an exterior that has a variety of materials. The church features a façade of precast concrete and three styles of metal wall panels in a minimalist palette of black, gray and mottled browns.

Flush panels were used as background for

tower-like signage at the church's entry. Two nonflush profiles were used along flat wall expanses. Matte black panels identify a large volume of the interior worship space. Corrugated panels, with a more monolithic appearance, were used on the exteriors of windowed gathering spaces.

Russ Woods, AIA, principal architect at Dunn and Dalton Architects, says, "It's a really long



element that cuts through the whole building and is punched with a lot of windows. My thought was, it doesn't need a lot of texture."

According to 2018 U.S. census data, with a median age of 22.7 years old, the residents of Jacksonville, N.C., many who are U.S. Marines and their families from nearby Camp Lejeune, are the youngest city population in the U.S. "This is the youngest city in the U.S., so they wanted something contemporary and striking on the exterior," Woods says. "The metal panels fit in with the aesthetic they were after."

Woods says the added work required to bring the varied materials and textures together paid off for the project. "I think the materials helped us achieve the look we were after."

Advanced Exterior Systems installed 16,000 square feet of Petersen Aluminum Corp.'s PAC-CLAD Highline B-2 panels with a Matte Black finish. The company installed 12,000 square feet of Petersen's 7/8-inch Corrugated panels with a gray Cityscape finish and 4,000 square feet of pencil-ribbed Flush panels in Cityscape. The Highline B-2 panels are 22-gauge steel, and the Corrugated and Flush products are fabricated from 0.04-inch-thick aluminum.

The design team, including installers at Advanced Exteriors and general contractor C.A. Lewis, determined a more rigid product was required in the locations where the Highline panels were installed

Matt Chance, company rep for Advanced Exterior Systems, says working with multiple profiles posed some challenges, especially in areas where differing panel styles intersected. "Alignment and trueness of the panels was key in completing the successful installation."

The 63,000-square-foot church is on an 18acre site, with space to expand. "They were a church that was growing significantly and were stuck in a small building," Woods says. "They wanted to make a big move to a larger site with flexibility for future expansion."

General contractor: C.A. Lewis Inc., Greenville, N.C., www.calewis.com Architect: Dunn and Dalton Architects PA, Kinston, N.C., www.dunndalton.com Installer: Advanced Exterior Systems, Raleigh, N.C., www.advancedexteriorsystems.com

Metal wall panels: Petersen Aluminum Corp., Elk Grove Village, III., www.pac-clad.com, Circle #57

Burke Community Church, Burke, Va.

To better serve the church's needs, a 40,000-square-foot addition was built on Burke Community Church's campus. The addition includes an 1,100-seat sanctuary, narthex, classrooms, offices and related ministry spaces.

The former worship center space was in a gymnasium/multipurpose area, which was overflowing with services spaces, and was inefficient with regard to limited site lines and entrance choke points. The new facility solves these problems and provides for current and future needs of the congregation.

To meet the church's budget, a pre-engineered metal building was selected for the superstructure of the addition including a partial second floor.

A standing seam roof system with Bay Insulation Systems Inc.'s Skyliner insulation system was used on the narthex and sanctuary. The wall system incorporated EIFS, brick and, at the rear and side elevations, metal wall panels.

MTD Erectors Inc. erected American Buildings Co.'s metal building system and installed American Buildings' 24-gauge Loc Seam 360 roof panels in Dark Bronze. MTD Erectors also installed American Buildings' 26-gauge Architectural III wall panels in Warm White.



Photos: Kody Cheyne



Manassas Va www.wj-inc.com Architect: Intec Group Inc., Washington, D.C., www.intecgroup.net Installer: MTD Erectors Inc., Thurmont, Md., (301) 698-0270 Insulation: Bay Insulation Systems Inc., Green Bay, Wis., www.bayinsulation.com, Circle #58 Metal building system: American Buildings Co., Eufaula, Ala., www.americanbuildings.com, Circle #59







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PROJECT FOCUS RELIGIOUS

Radiant Church,

Brandenburg, Ky.

An 18,681-square-foot metal building system was built for Radiant Church in Brandenburg, Ky. The building consists of a large sanctuary and stage for a place of worship, large lobby and coffee bar, and several classrooms.

It was designed with architectural features and functionality in mind. A pre-engineered building system was a cost-effective way to meet the design parameters of a modern worship facility. Additionally, a pre-engineered building was selected due to it being noncombustible and allowing for architectural design flexibility. Requirements included a large span for the worship area seating, 30-foot eave height and ability to carry suspended loads of AV equipment.

The project was a design-build project with Nett Construction Co. LLC, design-builder and erector, and Michael D. Hinton, LEED AP, an independent architect. Nett Construction erected Ceco Building Systems' rigid metal building system. At the roofs, Nett Construction installed Ceco's Double-Lok Roof



Photos courtesy of Nett Construction Co. LLC

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Panels in Galvalume and Metal Sales Manufacturing Corp.'s 24-gauge Magna-Loc 90 standing seam roof system in Copper Penny.

For the walls, Nett Construction installed Ceco's AVP metal wall panels in Tundram; Metal Sales' T2 metal wall panels in Copper Penny; and Metal Sales' T10D metal wall panels in Matte Black.

Design-builder/erector: Nett Construction Co. LLC, Elizabethtown, Ky.,

www.nettconstructionllc.com

Architect: Michael D. Hinton, LEED AP, Louisville, Ky.

Metal building system: Ceco Building Systems, Rocky Mount, N.C.,

www.cecobuildings.com, Circle #60

Metal roof/wall panels: Metal Sales Manufacturing Corp., Louisville,

www.metalsales.us.com, Circle #61



Mesh ceiling panels are large

Armstrong Ceiling and Wall Solutions offers large format, metal mesh, lay-in ceiling panels. Sizes include 24 inches by 48 inches, 24 inches by 72 inches and 24 inches by 96 inches. The large mesh ceiling panels are available in expanded metal, woven wire and welded wire MetalWorks mesh patterns, and in a variety of colors. Panels are installed with 15/16-inch suspension systems with borders or finished edges.

www.armstrongceilings.com Circle #62



Gutter sealant stays flexible

DAP Products Inc.'s AMP Gutter and Flashing High-Performance Sealant is used for metal gutter and flashing applications. The sealant has a combination of silicone and polyurethane. It stays flexible and crack-proof. AMP Gutter and Flashing High-Performance Sealant comes with a lifetime guarantee.

www.dap.com Circle #64



Doors are hurricane-rated Horton Automatics, a division of Overhead Door Corp., offers HD-Storm level E hurricane-rated sliding door systems. The door systems are Miami-Dade approved and meet wind-force ratings for coastal and inland areas. The systems are engineered to withstand pressures to +/- 80 pounds per square foot. The door systems meet small and large missile-impact requirements, and non-impact application requirements. The systems withstand the impact of a 9-pound, 2-inch by 4-inch projectile traveling at a speed of 80 feet per second.

www.hortondoors.com/product/hd-stormlevel-e-103 Circle #63



Wall assembly leverages spray foam insulation properties

Huntsman Building Solutions' D-Max Wall assembly is a continuous insulation solution that allows spray polyurethane foam insulation to be installed from the interior while managing thermal bridging of the studs and structure. The assembly uses HEATLOK HFO closed cell spray foam insulation. The designed wall assembly takes advantage of the spray foam insulation expanding. It acts as an air barrier and vapor barrier, and covers thermal bridges of structures when applied from interiors.

www.huntsmanbuildingsolutions.com
Circle #65



Gutters use hanger that allows thermal movement

Petersen Aluminum Corp.'s PAC-CLAD PAC-Tite water drainage systems include gutters, downspouts and scuppers. PAC-Tite Gold gutters include a 2-inch-wide external wind strap every 6 feet and gutter hangers every 24 inches on-center to comply with the ANSI/SPRI GT-1 Standard. Gutters have a heavy aluminum gutter hanger design that allows thermal movement of gutters and does not require drilling and riveting. An optional roof flange or slotted drain bars are offered for ballast retention.

www.pac-clad.com Circle #66



Accessory allows roof, ladder transitions Werner Co.'s extension ladder WalkThru is a ladder accessory that allows transitions from roofs to ladders. Users step directly from ladders onto roofs without stepping out to the side. The WalkThru can be used with Werner's GlideSafe extension ladder. Its connection secures the WalkThru to an extension ladder with a dual-clamping system with four points of contact to the ladder that locks onto side rails with no tools required. The WalkThru creates a 3-foot extension above the top support for access to an elevated surface.

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Roof Underlayments



CertainTeed Corp.

CertainTeed's WinterGuard roof underlayment for metal, shingle, slate and mechanically fastened tile roofs is self-adhering and slip-resistant. WinterGuard metal roof underlayment is unaffected by high temperatures caused by sun exposure during installation or when placed under metal roofing. WinterGuard roof underlayment protects roofs from clogged gutters, high winds and ice dams that cause water to accumulate on lower sloped roofs. The roof underlayment is waterproof, does not rip and seals around nails driven through it. www.certainteed.com Circle #68



Drexel Metals

Carlisle Construction Materials LLC's Drexel Metals' brand MetShield Synthetic with WIP GRIP technology is a high-strength, steep-slope roof underlayment for commercial and residential applications. It can withstand temperature ranges from 40 F to 260 F. When properly installed, it helps control water leakage during heavy rainstorms and from blown and melting snow. MetShield Synthetic with WIP GRIP is also an air and vapor barrier that passes ASTM D4869 and ASTM E96 at less than 0.05 perms. www.drexmet.com Circle #69



Ox Engineered Products' ToughSkin HT Ice and Water Guard is a roof

underlayment for metal roofs and tile roofs. It has a rubberized asphalt adhesive base layer for adhesion including in high-temperature climates. The

roof underlayment has woven and non-woven reinforcement layers that are

laminated together, a UV-shielded waterproof layer for protection from rain,

snow and ice, and a top layer with a SlipSafe walking surface.

www.oxengineeredproducts.com Circle #70

SlipSafe[®] Walking Surface

UV Shielded Wate Proof Laye oven & Non-Wo

rized Asphalt base laye

GCP Applied Technologies Inc.

Ox Engineered Products LLC

GCP Applied Technologies' GRACE Ice and Water Shield HT is a hightemperature, self-adhered roof underlayment. It is composed of two waterproofing materials: a rubberized asphalt adhesive and high-performance polymeric film with UV barrier properties. The rubberized asphalt surface is backed with a fold-less release paper that protects adhesive quality. During application, the release paper is easily removed, allowing the rubberized asphalt to bond tightly to roof decks. A RIPCORD embedded in the adhesive allows applicator to split release on demand, making it easy to apply in detail areas. gcpat.com/en/solutions/products/grace-ice-water-shieldroofing-underlayment Circle #71



Garland Industries Inc.

Garland's R-Mer Seal self-adhering, high-temp metal roofing underlayment forms a flexible, watertight seal under Garland metal roof systems including high-temperature roof conditions. Its flexible membrane is formulated with high-temperature rubberized asphalt. It has elongation capabilities and tensile strength to accommodate expansion and contraction of roof surfaces. R-Mer Seal has a peel-and-stick application and its cross-laminated polymer film provides a slip-resistant surface for installers.

www.garlandco.com/products/roll-goods/r-mer-seal Circle #72

Bitec Inc.

Bitec's MAT-40 durable metal and tile roof underlayment has a self-adhering membrane. It provides waterproofing protection for commercial and residential applications. It weighs 40 pounds per 100 square feet, and resists punctures and tears. MAT-40 roof underlayment has a top coat consisting of high-strength, dimensionally stable polyester combined with fiberglass scrim. On the bottom surface, the roll is coated with a styrene-buta-



diene (SBR) polymer modified adhesive. This allows for a silicone-treated split release film to easily attach to the membrane, which eases installation. www.bi-tec.com/underlayments.html Circle #73

MFM Building Products Corp.

MFM Building Products' Wind and Water Seal is a high-temperature, self-adhering roof underlayment for metal roofing systems where high heat is generated. The 40-mil-thick roof underlayment has an embossed polymer traction surface that self seals around roofing fasteners. Its styrene butadiene styrene (SBS) adhesive system is rated to 250 F. The



Wind and Water Seal is applied directly to roofing decks for whole roof coverage. It provides secondary water protection for roofing systems' failure or leakage. Additionally, Wind and Water Seal is a vapor barrier, so proper ventilation of the roof system is needed to ensure proper performance. The roof underlayment comes in 36-inch by 67-foot (2 square) rolls. It has a 10-year warranty. www.mfmbp.com/wind-water-seal Circle #74

Material Handling Equipment



Mitsubishi Logisnext Americas Group

Mitsubishi Logisnext Americas Group offers 22,000-pound to 40,000-pound capacity internal combustion pneumatic tire forklift trucks. There are seven different capacities, four different wheelbases and three load center options. The forklifts are customizable and equipped with features including onboard diagnostics to increase productivity, improve the operator experience and minimize downtime. They are powered by a Cummins B4.5 Tier 4 Final diesel engine.

www.logisnextamericas.com/en/mit Circle #75

Wood's Powr-Grip Wood's Powr-Grip's cladding lifter model MTCL6625DC3 is used to install metal roof and wall panels. The lifter has adjustable vacuum pads to grip on loads of various shapes and sizes by moving pad

mounts. For jobs that



require handling extra-long panels, pad frame extensions can be installed without tools. The MTCL6625DC3 panel lifter is capable of handling loads to 700 pounds (320 kilograms). To monitor power and vacuum systems, increase productivity and improve safety, the lifter uses Intelli-Grip technology. Additionally, the Intelli-Grip app for mobile devices can be used to monitor the lifter from a distance. www.wpg.com/catalog/imp-installation | Circle #76



JLG Industries Inc.

JLG's SkyTrak 12054 telehandler is a 12,000-pound class telehandler. It has a single joystick for multifunction capability and an integrated hitch and boom-mounted lifting lug for productivity. The telehandler has a tight turning radius. It is operated with a combination of Tier 4 Final Cummins engines (available in 74-, 85- and 110-horsepower), four-speed modulated transmission and high-performance axles.

www.jlg.com/en/equipment/telehandlers/skytrak-telehandlers/ 12054-skytrak-telehandler Circle #77



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Every other month, Metal Construction News publishes photos of people on the job who are doing the work every day. They often don't get enough recognition, and we want to draw attention to the great work done by these people in this country every day. Send your photos and information to Mark Robins, mrobins@ moderntrade.com. We also post photos on the Site Scene page of our website, www.metalconstructionnews.com/site-scene.

By Mark Robins, Senior Editor

Field Measurements Steve Perez

SITE SCENE

Foreman Steve Perez of DB2 Services Inc., Kansas City, Kan., is taking field measurements for cantilever airfoil sunshades on an office building in Overland Park, Kan. Dave Howe took the photo.





Reroof and Window **Replacement Romel Games-**Hernandez

Landis, N.C.-based LaFave's Construction Co. Inc. employee Romel Games-Hernandez is in a lift working on getting everything ready for a window replacement at the Santee-Wateree Regional Transportation Authority in Sumter, S.C. The photo was taken by Jeff Deason.

Metal Panel Installation **Tyler Openshaw**,

Alex Warner Tyler Openshaw and Alex Warner of J&M Steel Solutions Inc., Lehi, Utah, install metal siding over insulation at an American Eagle Batch Plant in Lindon, Utah. Rick Jackson, business development manager at J&M Steel Solutions. took the picture.





Safety Site-walk David Risucci, Luis **Guerra and Robert** Harding

Rancho Cordova, Calif.-based DesCor **Builders** employees David Risucci, Luis Guerra and Robert Harding perform a safety site-walk at The Mansion Apartments, Sacramento, Calif.



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