January / February 2021

Vol. 12 No.1

THE INDUSTRY'S VOICE

Grand Slam Katie Seashole Pressly Softball Stadium University of Florida

More Hospitality & Entertainment Projects

> BUSINESS SENSE Coping With the Labor Shortage

CONSTRUCTION LAW Updating Your Employee Manuals

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Check out the first episode of our podcast, *"Roofing*: The Industry's Voice," which profiles mission-critical roofs in Europe and the United States. For more information, visit RoofingMagazine.com.

RoofingMagazine.com

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ON THE COVER

The renovated Katie Seashole Pressly Softball Stadium on the campus of the University of Florida in Gainesville has a steeply pitched metal roof in a signature orange-red finish that frames an impressive gateway into the ballpark's friendly confines.



Photo: Matt Horton, hortonphotoinc.com

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RAISE THE ROOF

Solving the Puzzle

here's a special feeling that comes with solving an intricate puzzle. That flash of insight when you spot a solution can be very satisfying. It's even more satisfying if everyone else missed it.

Re-roofing applications can pose some of the toughest puzzles around. Everything has to fit together perfectly. Puzzles can have more than one solution, and sometimes an experienced contractor can come

up with an answer that no one else envisioned. When that solution is more durable, easier to install, and less expensive than the other alternatives, that's a true win-win-win scenario.

I talked to two contractors for this issue who recently hit that trifecta: Bill Devine of Coatings Application & Waterproofing Co. and Doug Claxton of The Solar Revolution.

When the standing seam metal roof on the Ritz-Carlton Coconut Grove in Miami had to be replaced, proposals for replacing the metal roof required large construction cranes to be mounted near the entrance of the property for months, causing disruptions for hotel guests.

Devine, area manager for Coatings Application & Waterproofing Co., proposed installing a PVC system that looked like a standing seam metal roof instead. He

asserted it would be more cost-effective and last longer than metal in the harsh oceanside environment. Construction would also be less intrusive for hotel guests because it would not require a crane – Devine knew he could bring everything up and down using the service elevator.

Claxton, principal and founder of The Solar Revolution, had been contacted by the Boulder Jewish Community Center to explore rooftop photovoltaics when the facility was built, but unfortunately, the budget didn't allow it at the time. Claxton notified board members when the city and county made grants available to help nonprofit organizations add solar power.

When the first phase of the solar project was put out for bid, all the other contractors

focused on sections of flat roofing for the PV system. Claxton had a better idea. He suggested installing the array on the standing seam metal roof of the gymnasium. Thanks to an innovative attachment system, mounting solar modules on the curved metal roof would be easier and less expensive than other alternatives. And, unlike the solar array on the flat roof, it would also be highly visible, helping the Jewish Community Center use solar power as an educational tool. Like a giant billboard, the solar array also helps spread the word about the grant process.

For more details, check out the case studies beginning on page 60 of this issue. You don't hit home runs like this in business every day. When you do, you should savor them.

– CHRIS KING





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Roofing welcomes letters to the editor. Letters must be signed and include a return address/email and telephone

number. *Roofing* reserves the right to edit letters for clarity and length. Send letters to <u>Chris@RoofingMagazine.com</u>.

If you enjoyed reading this issue, please consider submitting something for the next one. Let's talk about ideas! Call Chris King at (248) 376-5115; email him at <u>chris@roofingmagazine.com</u>; post a comment on our website; and/ or Facebook and tweet us. This magazine—and your peers—are counting on you!





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Christina Koch is editorial director of *retrofit* and the former editor of *Roofing*. In "Point of View," page 16, she offers a tribute to the late Dan Burke, sharing her memories of a one-of-a-kind man and dedicated co-worker.



Caroline Trautman is an attorney with Oak City Law, LLP, based in Durham, North Carolina. In "Business Sense," page 30, she explores the potential legal implications of manpower issues during the labor shortage, including the use of temporary labor.



Benjamin Briggs is a Partner at Cotney Construction Law who practices Labor & Employment Law. In "Construction Law," page 34, he provides advice to business owners about updating company employee manuals for the year ahead.



Keith A. Boyette is an attorney with Anderson Jones, PLLC in Raleigh, North Carolina. In "Business Sense," page 36, he examines how employers are facing increased scrutiny by OSHA for failing to strictly provide employees with coronavirus-related protections.



Louisa Hart is the director of communications for the Washington-based EPDM Roofing Association (ERA). In "Tech Point," page 40, she details the 40-year performance of an EPDM roof and its lessons for those looking to protect buildings from extreme weather events.

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David Ivey oversees the product development of fall protection and safety equipment at Malta Dynamics and sits on the ANSI Z359 board. In "Safety," page 42, he explains the proper uses of the numerous attachment points on modern full-body fall protection harnesses.



Marcin Pazera, Ph.D., is the Technical Director for Polyisocyanurate Insulation Manufacturers Association (PIMA). In "Environmental Trends," page 44, he explores the ways Environmental Product Declarations (EPDs) provide vital information for building project decision makers.



Thomas W. Hutchinson, AIA, CSI, Fellow-IIBEC, RRC, is a principal of Hutchinson Design Group Ltd. in Barrington, Illinois. In "The Hutchinson Files," page 46, he explains the effects of roof system design on HVAC performance in hot climates.



Tiffany Coppock, AIA, NCARB, CSI, CDT, LEED AP, ASTM, RCI, EDAC is the Commercial Building Systems Specialist at Owens Corning. In "Special Report," page 54, she points to a variety of case studies to examine the role of cellular glass insulation in mission-critical roof systems.



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POINT OF VIEW



ur hearts are broken. One of our own, our salesperson extraordinaire, Dan Burke, passed away unexpectedly in ear-

ly December. Those of you who read *retrofit* and *Roofing* may not have had the pleasure of knowing Dan, so I'd like to take a moment to reminisce about this one-of-a-kind man.

Dan joined our team in 2007. We weren't the *retrofit* and *Roofing* teams then; we were the *eco-structure* and *metalmag* team, magazines created by our publisher, John Riester, in the early 2000s. Dan's easygoing personality quickly established him within our small group and he became a valuable – and valued – member. Eventually, we all briefly went our separate ways until the entire band got back together. And that's when the real fun started.

Dan was a New Jersey native with a charming personality, a dapper style and a booming laugh. He had a big heart. Dan loved fiercely and shared his feelings openly. He also was a good listener and would remember things you told him years later. He adored music and played trumpet in a band for years. He was a New York Giants fan, and Monday morning conference calls in the fall typically began with a rundown of the Giants performance over the weekend. Dan enjoyed a good vodka at the end of a hard day and relaxing in front of a dramatic television series.

Nobody could work a trade show like Dan. Sometimes we'd crisscross the show as a team: other times we'd split up. When we'd regroup at the end of the day, my mind would be blown by the stack of cards Dan would have from people whose hands he'd shaken that day. Dan loved to bring in new business and was what John calls "a phone banger," making tons of phone calls (and sending umpteen emails) each day, seeking the ad dollars we need to keep the magazines thriving. Dan's work ethic was an integral part of our success. And with Dan's successes came certain catchphrases that will stick with me forever: "Oh, no way! Get out!" and "Thank you, sweet baby Jesus!" were often exclaimed in his Jersey accent along with his boisterous laugh.

Dan had a fear of cats. I have cats and it tickled my funny bone that a big man like Dan could be fearful of such sweet little creatures. Dan once stayed in my condo in Chicago during a trade show. Before he closed the guestroom door at the end of the night, he had to make sure I had both my cats. He was convinced a cat would smother him in his sleep!

One of my favorite Dan stories happened during A'18 in New York City. Dan and *retrofit*'s publisher John shared a hotel room and Dan woke up in the middle of the night roaring like a bear because of a wild dream. John, who is 6-foot, 4-inches tall, flew out of bed in fear and slammed into the wall of the tiny room. Dan and John had me crying with laughter when they shared the story the next morning.

Dan experienced a lot of challenges and tragedies. A lesser person would've folded, but not Dan. He always had a smile on his face. He always was eager to contribute to our team. He always wanted to make sure those around him were OK. His beautiful spirit helped him triumph over adversity.

Our retrofit and Roofing teams are small. I always have felt extremely fortunate to not only do a job I love, but to work with people who have become members of my family. However, that makes this loss particularly difficult. Our team will reminisce about Dan, especially when we are together, and there will be tears. But there also will be tons of laughter because Dan brought so much joy to us over the years. One of these days, when we can travel again - doing what Dan loved – there will be a vodka at the end of the day at the seat where Dan should be.

We love you, brother! 🖪

ABOUT THE AUTHOR: Christina Koch is editorial director of retrofit and the former editor of Roofing.

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→ NEW & NOTABLE



MFM Building Products to Celebrate 60th Anniversary

MFM BUILDING PRODUCTS, a manufacturer of a full envelope of waterproofing and weather barrier products for the building industry, will be celebrating the company's 60th Anniversary in 2021.

MFM Building Products was founded in 1961. Initially, the company manufactured products used for wrapping underground pipe to protect from water penetration and pipe contents becoming contaminated. Over the years, MFM expanded this technology to develop sealing and waterproofing products for use within the building envelope. In July 2017, MFM became an ESOP company and still holds true to its original core values.

Today, MFM manufactures a wide array of weather barrier products that include low-slope roofing membranes, roofing underlayments, window and door flashing tapes, multi-purpose waterproofing membranes, specialized waterproofing tapes, and HVAC duct and pipe wrap. These exterior, waterproofing membranes are self-adhering and self-sealing for ease of installation and complete waterproofing protection. MFM products are manufactured in the United States and sold through an extensive distributor network around the globe.

According to President Tony Reis, "MFM can offer our customers a complete envelope of waterproofing solutions – everything from the rooftop to the foundation. This single-source option gives our customers several competitive advantages."

For more information, visit <u>mfmbp.</u> <u>com</u>.

MetalForming Hires New President and COO

MetalForming Inc. (MFI) has chosen Dr. William Drury, an engineer and entrepreneur with an award-winning record of outstanding customer service, as the company's new president and chief operating officer. Company founder Geoff Stone will continue as MetalForming's CEO.

Dr. Drury, 57, has a significant history as an entrepreneur and brings to his new job a wealth of experience managing and leading a private company, Custom Molded Products, LLC, through all phases of growth and development. Dr. Drury sold most of his interest in CMP to private equity in 2013, but he continued as CEO until a couple of years ago. He largely retired then but still has a role as chairman.



According to Stone, Dr. Drury became a member of MetalForming's board of directors just under two years ago. After discussions with Stone and the board during the summer, he took on the role as president and COO on September 1, 2020.

"MFI is the acknowledged leader in

terms of technology and equipment for the metalforming equipment manufacturers they represent," said Dr. Drury. "My area is to take a company that is already successful and standardize the processes. Make it more consistent and efficient. As a company grows, you need to evolve. We want to install processes that are suitable not only for a company that is MFI's current scale but also for the scale we hope to achieve in the not too distant future."

"I'm absolutely thrilled to have a person of Bill's caliber on board, who also shares our cultural values," Stone said, "It's an amazing fit." For more information, visit metalforming-usa.com.

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NEW & NOTABLE



S-5! Expands Its State-of-the-Art Manufacturing Facility

S-5! ANNOUNCED a 20,000-plus square foot expansion of its state-of-the art manufacturing facility in Iowa Park, Texas, driven by global market growth in both solar and snow retention markets.

Wichita Falls-based Anthony Inman Construction is executing the work under a construction management contract with S-5! corporate. The project also involves local area subcontractors including GTO Engineering, Scales Concrete Construction, Parker Electric, James Lane Air Conditioning and Plumbing, and others.

"Steel erection has begun and the 'skeleton' will take shape over the next few days," said Harry Carner, S-5! Vice President of Manufacturing. "The expansion will house a raw material warehouse and manufacturing. It's designed to allow us to continue our growth and actually free up room for current production ... we're bulging at the seams now."

"The city of Iowa Park made us an offer on that building that couldn't be refused, and in return, we have created more than 80 new local jobs to date as our business continues to grow," said S-5! CEO and Founder Rob Haddock. "Iowa Park and the State of Texas understand economic development, and we are grateful and responsive to that. It just works."

For more information, visit <u>S-5.com</u>.

IIBEC Announces New Dates for 2021 International Convention and Trade Show

The International Institute of Building Enclosure Consultants (IIBEC) announced that its 2021 International Convention and Trade Show will now take place September 15-20, 2021, at the Sheraton Phoenix Downtown and the Phoenix Convention Center. It was previously scheduled for March 4-9, 2021.

"We are excited that we will be able to host an in-person meeting in 2021, even though it will be a little later than our usual event. I cannot wait to see our IIBEC members and industry partners next September for the best IIBEC convention yet. I applaud the IIBEC team for their resiliency and ability to improvise for the benefit of our members and the profession," said IIBEC President Scott Hinesley.

IIBEC's premier annual event will feature more than 25 hours of educational seminars, a two-day trade show with over 140 exhibitors and live product demonstrations, as well as an auction hosted by the RCI-IIBEC Foundation and RCI Foundation Canada.

For more information, visit iibec.org.

The IRE Launches a Virtual Event in Addition to the Physical Event

International Roofing Expo, with the full support of the NRCA, announced launch a virtual conference and expo in 2021, which will be held in addition to the physical event. The virtual event will be held on March 2-4, and the in-person event is rescheduled for August 10-12 at the Mandalay Bay Convention Center in Las Vegas, Nevada.

"We are thrilled about the addition of a complementary virtual event and being able to provide the industry with more of the education and content they look forward to every year," said Ray Giovine, Group Director for the International Roofing Expo and Informa Markets. "By transitioning our live event to August and launching our virtual event in March, we're able to create an opportunity to connect our audiences across multiple channels throughout the year."

For more information, visit theroofingexpo.com.

NEWSFROM**NRCA**

The Rosemont, Ill.-based National Roofing Contractors Association represents all segments of the roofing industry, including contractors; manufacturers; distributors; architects; consultants; engineers; building owners; and city, state and government agencies. NRCA's mission is to inform and assist the roofing industry, act as its principal advocate and help members in serving their customers. For information about NRCA and its services and offerings, visit <u>NRCA.net</u>.



NRCA Releases Updated Roof Coatings Guide

THE NRCA has released NRCA Guidelines for the Application of Roof Coatings. The new guide updates the 2015 guide and serves as a reference for roof coating designers and installers.

The guide provides technical information about the application of various types of roof coating systems, preparations necessary for their successful performance and quality control guidelines for on-site evaluation. Also included are best practice guidelines for the application of common roof coatings to various types of roof surfaces, such as membrane roof systems or existing coating systems.

The guide has been reorganized to more closely follow the chronological order of events surrounding the roof coating process, and terms and definitions have been modified, added or removed to better capture the wide range of applications currently available for roof coatings. Step-by-step guidance on some quality control and quality assurance procedures also have been added.

Hard copies of NRCA Guidelines for the Application of Roof Coatings are available at nrca.net/shop. NRCA members can download the guide for free in electronic format.



HATERIALS & GADGETS



Clamp Technology for Nail Strip Metal Roof Profiles

S-5! introduces the newest addition to its line of clamp product solutions for standing seam metal roofs: the NH 1.5. Part of the "N" line of clamps developed for nail strip profiles, it is designed specifically for 1-1/2 inch (38 mm) nail strip profiles with a wider horizontal dimension (> 0.475 inches and ≤ 0.800 inches), including VicWest Prestige, NewTech FF150 and similarly dimensioned profiles. The NH 1.5 features an innovative "hinge" and forms to the shape of the seam, preventing damage at the point of attachment, while offering optimal holding strength. The reversible insert allows for superior fit on both wide and medium-width profiles.

S-5.com





Premium Coverboard For FM Global's Very Severe Hail Standard

Georgia-Pacific launches DensDeck StormX Prime Roof Board, the first highperformance gypsum roof coverboard designed to help prepare commercial rooftops to hold tough under the dangers of impact and puncture caused by very severe hail conditions. The product, which is classified for use in approved assemblies meeting FM Global's Very Severe Hail Standard set in 2019, is available nationwide. Through the benefits integration of DensDeck Prime with EONIC Technology and innovative product development, the use of DensDeck StormX Prime Roof Board helps enable structures to meet the FM Global Very Severe Hail Standard while simultaneously enhancing assembly protection.

BuildGP.com



Extruded Polystyrene Insulation Reduces Embodied Carbon

Owens Corning offers FOAMULAR NGX (Next Generation Extruded) insulation, designed to meet or exceed stringent new environmental regulations in Canada and several U.S. states that went into effect on January 1, 2021. FOAMULAR NGX, the latest innovation in extruded polystyrene (XPS) insulation, contains a proprietary blowing agent that completely eliminates HFC 134a. The product delivers a 90 percent reduction in blowing agent Global Warming Potential (GWP) compared to legacy FOAMULAR insulation. The product is available in many compressive strengths, up to 100 psi, and is well suited to applications across the enclosure, from load-bearing vegetative roofs and foundational supports to wall assemblies.

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Polyglass U.S.A. Inc. offers Polystick XFR, a dual-purpose fire-resistant and self-adhered waterproofing underlayment designed to provide superior fire resistance for combustible decks with metal roof coverings and other high-temperature applications. According to the company, Polystick XFR combines ADESO and Burn-Shield technologies with the highest quality materials to yield a product that excels in providing robust fire protection and reliable waterproofing. This product achieves UL Class A fire ratings for combustible decks while also providing long-term superior weathering performance. Polystick XFR features an SBS (elastomeric) modified bitumen upper compound and an aggressive self-adhesive compound on the bottom.

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MATERIALS & GADGETS



New PVC Single-Ply Systems

Firestone Building Products, LLC (FSBP) announces the addition of a new category, Firestone PVC, to the Firestone brand. Firestone PVC single-ply systems provide durable, long-term commercial roofing solutions ideal for a variety of low-slope building types, including those often found on restaurants, airports and other commercial facilities. Highly resistant to impact, puncture, chemicals, grease and fire, Firestone's PVC systems produce exceptional performance in harsh environments. With highly reflective roofing membranes and UV inhibitors, it is a cool roof solution designed to help mitigate heat transfer, drive energy savings and support sustainability priorities.

FirestoneBPCO.com



Structural Thermal Break for Steel-to-Steel Connections

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Schock-NA.com



Stone Coated Steel Cool Roof System

The Boral Steel Cool Roof System, manufactured by Boral Roofing, is a highperformance roofing solution designed to keep the home warmer in winter and cooler in summer. The system consists of Boral Steel Stone Coated Steel roofing. a lightweight roofing material at just 1.5 pounds per square foot which boasts the structural strength of steel, along with three additional key components: Boral MetalSeal Underlayment, Boral Elevated Batten System (EBS), and a variety of hip and ridge ventilation products. Combined, these elements work in concert to greatly enhance the roof's energy efficiency performance, providing the homeowner with a lasting roof as well as meaningful return on investment.

BoralRoof.com

Polyiso Insulation With Different Colored Facers

Carlisle SynTec Systems introduces ReadyFlash Technology for SecurShield flat and SecurShield HD polyiso insulation products. ReadyFlash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board. ReadyFlash products feature a darkcolored coated-glass facer (CGF) on one side of the insulation board and a lightcolored CGF on the other. Utilizing the sun's energy, the dark facer accelerates adhesive flash-off, while the light facer slows it down. Applicators can choose which side of the board to use, helping to offset environmental variables affecting adhesive flash-off.

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- MATERIALS & GADGETS



Snow Retention System

Dynamic Fastener's Dyna-Guard snow retention system is designed to be used on virtually any style metal roof. Dyna-Guard is an 8-foot long extruded aluminum rail with a T-shape profile. It is installed by attaching non-ferrous clamps or mounts to a metal roof and bolting or screwing the system to clamps or mounts. Eight Dyna-Clamps with round-point stainless steel set screws and Sno-Dams are also offered. Sno-Dams attach to the back of Dyna-Guard and inhibit snow and ice from sliding underneath. A 2-inch-wide painted strip of metal from the same material as the roof is inserted in the Dyna-Guard for aesthetics.

DynamicFastener.com.



Elastomeric Acrylic Roof Coating

Nationwide Protective Coatings introduces PERMASIL PLUS, its newest addition to its lineup of elastomeric roof coatings. PERMASIL PLUS is a matte finish, bright white, elastomeric acrylic silicone, protective roof coating. It is a waterbased, high-build formula that possesses Silicone Technology for exceptional water resistance. Using silicone resin along with acrylic resin in a proprietary blend adds extra waterproofing protection to the already impressive performance of the company's acrylic coatings. The product also qualifies for a Class A Fire Rating Test as per ASTM E84-01, NFPA 101 Life Safety Code.

NationwideCoatings.com



New Safety Helmets

Malta Dynamics announces the release of its new safety helmets, which feature an innovative design that aims to maximize both safety and comfort on the jobsite. The new Malta Dynamics Safety Helmets meet ANSI Z89.1-2014 Type 1 Class C standards and can optionally come equipped with an attached clear or tinted visor. The helmet features sliding adjustable vents to help with air circulation, a six-point suspension system, and an adjustable chin strap. The low-profile design allows a more secure fit that sits lower on the crown of your head, which makes wearing the helmet more comfortable than a higher-profile sitting hard hat.

MaltaDynamics.com

Fluropon Color Palette for Architectural Metal

Sherwin-Williams announces its new Fluropon Metal Trends Color Collection featuring eight curated color families: Gold and Brass, Bronze, Silver and Nickel, Blackened Steel, Copper, Steel, Zinc and Anodized. All of the colors in this collection mimic the classic aesthetic of natural and anodized metals with the long-lasting performance of its flagship Fluropon architectural coating system for architectural metal products. For projects seeking a pre-weathered, pre-patina appearance without waiting for the metal to naturally age, the Fluropon Metal Trends Color Collection includes such unique options as Antique Copper Print, Weathered Steel Print and Weathered Zinc Print.

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"We are always working to develop new solutions that help our customers work faster and smarter," said David Spaulding, Director of Sales, Low Slope Roofing Products at ICP Building Solutions Group. "With the new Polyset PVC Spray Contact Adhesive, we're confident we've done just that, with a quick setup process and a simplified application that helps professionals complete quality jobs more efficiently."

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BUSINESS SENSE



Coping With the Labor Shortage

MANPOWER ISSUES AND USING TEMPORARY LABOR HAVE POTENTIAL LEGAL IMPLICATIONS

WRITTEN BY | CAROLINE TRAUTMAN

2020 HAS BEEN a year like no other for the United States. COVID-19 and its resulting recession have touched nearly every aspect of the economy. While the construction industry has been deemed an "essential" business in many states and jurisdictions, COVID-19 has still impacted the industry. According to a September 2, 2020 report by the Associated General Contractors of America (AGC), COVID-19 has contributed to construction project delays, disruptions, and even layoffs and furloughs, with 60 percent of respondents to a recent AGC survey reporting cancellations or delays. AGC partnered with Autodesk to conduct the survey in August; it polled respondents about the preceding twelve months.

The finding that COVID-19 has

prompted delays and cancellations likely won't surprise many in the construction industry. But also significant is that whatever impact the industry has felt, it hasn't been enough to counteract the industry's shortage of skilled craft labor. The labor shortage existed before the recession; on March 16, 2020, the trade group Associated Builders and Contractors (ABC) reported that the construction industry needed to hire an additional 550.000 workers compared with 2019 (up from a 440,000 increase from 2018 to 2019). The September AGC report indicates that, as recently as August, firms in the United States were still struggling to fill skilled labor positions; about 52 percent (down from 80 percent in 2019) reported difficulty filling hourly craft positions and 28 percent (down from 47 percent) reported difficulty filling salaried positions. The survey results revealed some employers cited COVID-related issues, like workers' health risks and childcare concerns, as contributing to the struggle.

The labor shortage impacts many aspects of the industry; however, this article will attempt to identify potential legal implications and issues for firms to consider as they contract in these unique economic conditions.

MANPOWER ISSUES AND "DEFAULT" NOTICES

Labor shortages might impact the number and scope of projects contractors choose to take, but unexpected shortages on pending projects present unique legal issues. Most standard agreements entitle owners and general contractors to fast recourse if a contractor or subcontractor fails to perform its obligations due to inadequate manpower. For example, the American Institute of Architects (AIA) A201-2017 General Conditions of the Contract for Construction, in § 2.5, entitles the owner to recourse if the contractor fails to "commence and continue correction" of its failure to "carry out the Work." A201-2017 § 2.5 affords the contractor ten days to do so following the owner's notice of default. The AIA's corresponding subcontract provision (A401-2017 § 3.5) establishes a five-day notice to cure period for subcontractors. Many contractors and subcontractors know. however, that shorter notice periods commonly, 48 hours - are increasingly routine on commercial projects, with some contracts requiring that defaults be cured or corrected within this period in order to avoid assessment of back charges for supplemental labor. Upon the contractor or subcontractor's failure to commence or correct the default in question, the owner or upper-tier contractor typically is entitled to proceed with self-correction measures including hiring its own workers or subcontractors to make corrections, or to supplement the labor force of the party in default. The default might



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also entitle the owner or contractor to terminate the party in default.

In addition to contractual rights to cure defaults, contractors in some states also enjoy a statutory right to an opportunity to cure. Contractors in the many states that have no such statutes may wonder to what extent contractual notice-to-cure provisions are enforceable. Generally, parties on commercial projects are entitled to contract for such provisions, and they are enforceable in court. Courts' strict enforcement of such provisions can set a high standard of compliance for both the defaulting party and the owner or upper-tier contract. For instance, in a New York case, the upper-tier contractor's notice to its subcontractor that it "may declare [subcontractor] in default" if the subcontractor



failed to correct deficiencies within 48 hours did not necessarily constitute a sufficient notice to later support termination for cause because it only implied that it *might* default the subcontractor. [See RKI Construction, LLC v. WFF, Inc., No. 14-CV-1803 (E.D.N.Y, Nov. 6, 2020).] In a delay-related case, the Ninth Circuit Court of Appeals has also found that, because the default (a severe delay) could not be cured within 48 hours, a general contractor was entitled to terminate its subcontractor without providing 48 hours to cure per the subcontract terms. [See L.K. Comstock & Co. v. United Engineers & Constructors, Inc., 880 F.2d 219 (1989).] Contractors facing a short default notice window likely should assume that the contract terms will be strictly enforced; if the contract requires them to "commence" a cure within a specific time period, they might take the position that they need not completely cure within 48 hours but merely present a plan to do so.

If owners and general contractors successfully enforce contractual default provisions, what damages can they legally recover? AIA A401-2017 entitles a general contractor to withhold the "reasonable cost" of remedying the subcontractor's default or neglect. The "reasonable" language is consistent with the common-law duty to mitigate damages that is incumbent upon most litigants in breach of contract actions. This means that the non-breaching party is responsible for taking reasonable measures - such as shopping around to find a competitive price for replacement labor - to minimize its damages arising from the breach. Parties may agree by contract that additional damages, such as liquidated damages where delay is an issue, are recoverable.

TEMPORARY LABOR AND RELATED LIABILITY CONSIDERATIONS

Contractors and subcontractors struggling to adequately staff jobs, or perhaps facing a default notice, might have to look to temporary labor to fulfill contractual obligations. Staffing firms can be a lifesaver for contractors in this position, although working with Leading up to 2020, federal courts were split on the issue of whether and when contractors could be considered joint employers of temporary laborers, or even a subcontractor's employees.

temporary labor poses potentially complex legal issues. Leading up to 2020, federal courts were split on the issue of whether and when contractors could be considered joint employers of temporary laborers, or even a subcontractor's employees. Effective March 16, 2020, the U.S. Department of Labor (DOL) has published a final rule in an effort to provide clarity on this issue. Under the rule, a contractor will be found to be a joint employer of a worker when the worker performs work that simultaneously benefits another person who is "acting directly or indirectly in the interest of the employer in relation to the employee." (See 29 C.F.R. § 791.2.) The DOL rule provides that a worker is acting in the contractor's interest such that employer becomes a joint employer when the contractor:

- Hires or fires the employee;
- Supervises and controls the employee's work schedule or conditions of employment to a substantial degree;
- Determines the employee's rate and method of payment; and
- Maintains the employee's employment records.

Being considered a "joint employer" can obligate a contractor to comply with wage and hour laws, workers' compensation rules, and other employment laws. It is therefore crucial for any contractor considering using temporary labor to consult with an attorney to consider the legal implications of doing so. A written contract establishing terms such as who is entitled to fire, who sets the terms of the employment, and who maintains personnel records is likely important, as well as making clear who is responsible for maintaining workers compensation insurance on the workers in question.

Author's note: This article does not constitute, and should not be construed as, legal advice on any particular scenario. For specific advice, consult with an attorney licensed in your state.

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Updating Your Employee Manual for 2021

WRITTEN BY | BENJAMIN BRIGGS

MOST EVERYONE can agree that 2020 has been challenging. However, the year has also been an opportunity, a time for roofing contractors and other businesses to take a step back, study what works and what does not, and implement necessary revisions to standard operating procedures.

As you get ready for the new year, take a moment to evaluate your company. See what has changed and consider what new demands you expect for 2021. Then update your employee handbook to reflect those changes.

I-9 REQUIREMENTS

Your human resources office is likely well-versed in having workers complete I-9 forms when they onboard. During the COVID-19 pandemic, the U.S. Immigration and Customs Enforcement (ICE) and the Department of Homeland Security (DHS) relaxed the I-9 requirements for remote workers, but that flexibility expired on December 31. Also, as Presidentelect Biden takes office, immigration regulations may change. Ensure your employee handbook adequately explains the current requirements, and be ready to make changes throughout 2021 as needed. Additionally, as states continue to pass new laws regarding e-verification of employees, make sure that your employee handbook is properly updated to address any e-verify changes that affect your company.

MINIMUM WAGE AND OVERTIME

In November, Florida voted to raise the state minimum wage to \$15 per hour, to incrementally take effect by 2026. Seven other states had already agreed to the increase, and with the new administration, increased minimum wage rates may become a national trend. Take a look at your hourly employees and determine if you need to start raising their pay to meet your state's standards. Also, be sure that your handbook clearly explains rules around working overtime and receiving overtime pay.

DISCRIMINATION AND HARASSMENT PREVENTION

In recent years, courts and lawmakers have issued rulings and legislation to prohibit discrimination and harassment in the workplace. For instance, in 2020, the United States Supreme Court ruled that federal law prohibiting discrimination on the basis of an employee or job applicant's sex also extended to sexual orientation and gender identification, so that it is illegal for covered employers to discriminate on the basis of an employee or job applicant's sexual orientation or gender identity. It is important to update your manual to reflect those directives and to ensure your human resources and management team understand the newly-clarified scope of federal anti-discrimination laws.

SAFETY GUIDANCE

Over the last several months, everyone has become accustomed to wearing masks, social distancing, and regular handwashing. The promise of a COVID-19 vaccine looms. However, it may be several months before the vaccine is available to the entire population, and then it will still be sometime before the country sees the collective effects of the vaccine. Everyone may be growing tired of the pandemic precautions, but it is important to keep the necessary safety guidelines in place and clearly explain them in the employee manual. Further, as COVID-19 safety guidance continues to evolve on a weekly basis, it is important to remain vigilant and up-to-date on the evolving safety standards.

DRUG USE AND TESTING

In the recent election, many states voted on laws related to personal drug use. In Arizona, Montana, New Jersey, and South Dakota, voters cast their ballots to decriminalize recreational marijuana, making it legal in 15 states. Oregon made it legal to possess small amounts of cocaine, heroin, and methamphetamines (but selling the drugs is still illegal) and also voted to create a program for distributors of psilocybin, the active ingredient in psychedelic mushrooms. Washington, D.C., also decriminalized psilocybin. Meanwhile, Mississippi and South Dakota voted to legalize medical marijuana, joining 33 other states that had already done so.

Review the laws in your region and make sure your handbook explains (or related drug policy adequately addresses) the possession and use of controlled substances in light of these changing laws. Bear in mind that while you cannot dictate what employees do on their own time, you are generally still able to implement certain drug-free policies as it relates to your workplace. If drug testing is among your company's policies, review your policies to ensure they comply with your state laws regarding medical marijuana use and other controlled substances.

EMPLOYEE TRAINING

In addition to updating your manual, consider updating your employee training. As the new year approaches, everyone could likely benefit from a refresher on discrimination and harassment prevention, safety, and compliance.

Also, your company may want to offer additional training for managers so they can identify signs of impairment. If workers have any drugs in their system, they can be a danger to themselves, their coworkers, and/ or your customers and the community, and this is especially true in the roofing and construction environment. Any lack of focus can result in accidents, injuries, and lost time, which puts your people and your projects in jeopardy.

As you prepare for 2021, do not shy away from challenging issues. Instead, determine how they will affect your company and create the proper policies. It is up to you to set expectations for your workers and keep communications current and accurate.

Authors' note: The information contained in this article is for general educational information only. This information does not constitute legal advice, is not intended to constitute legal advice, nor should it be relied upon as legal advice for your specific factual pattern or situation.

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A Contractor's Guide for OSHA Compliance in the Coronavirus Era



WRITTEN BY | KEITH A. BOYETTE

AS COVID-19, or the "coronavirus," continues to dramatically impact the United States, employers across various industries continue to face new state-mandated rules and regulations aimed at protecting both employees and the general public. In addition, employers are facing increased scrutiny by the Occupational Safety and Health Administration (OSHA) for failing to strictly provide employees with coronavirus-related protections.

OSHA inspections are generally prompted for various reasons, including, but not limited to, fatalities or "catastrophes"; referrals of hazards from other government agencies, individuals, organizations, or the media; employee complaints; or for routine inspection. Since the start of the coronavirus pandemic through November 26, 2020, OSHA has received more than 12,750 complaints and referrals, and has opened nearly 1,400 coronavirus-related workplace inspections. In that same time frame, state agencies have received nearly 42,000 complaints and referrals, and have opened approximately 4,200 coronavirus-related inspections. In response to those complaints, referrals, and inspections, OSHA has cited nearly 250 businesses for violations relating to the coronavirus, resulting in proposed penalties of at least \$3,403,139.

Specifically, OSHA inspections have resulted in coronavirus-related citations to employers for failing to:

- Implement a written respiratory protection program.
- Provide a medical evaluation, respirator fit test, training on the proper use of a respirator and other personal protective equipment (PPE).
- Report an injury, illness, or fatality.
- Record an injury or illness on OSHA recordkeeping forms.
- Comply with the General Duty Clause of the Occupational Safety and Health Act of 1970.

In addition to those more specific OSHA violations above, the General Duty Clause can generally serve as a basis for any citation. The General Duty Clause requires employers to furnish "a place of employment which [is] free from recognized hazards that are causing or are likely to cause death or serious physical harm" to employees, and to comply with all standards, rules, regulations, and orders promulgated under the Occupational Safety and Health Act of 1970. Accordingly, an employer could be in violation of the General Duty Clause when the hazard is COVID-19. Although the most common violations are linked to the PPE standards, recording requirements, and the General Duty Clause, employers should be aware that OSHA has the power to issue citations for any violation observed during an inspection, even if those violations are unrelated to COVID-19.

Violations for workplace safety could result in costly penalties. Specifically, as of January 15, 2020, the agency's maximum per-violation monetary penalties are \$134,937 for willful or repeated violations, \$13,494 for serious, other-than-serious, or posting requirements violations, and \$13,494 for failure to abate existing violations. These are maximum fines, so the actual fine levied by OSHA could be, and in most coronavirus-related cases has been, less.

AVOIDING CORONAVIRUS-RELATED OSHA VIOLATIONS

Notably, the highest number of complaints have originated from the healthcare, retail, restaurant, and construction industries, in that order. As of the date of this article, however, there are no OSHA regulations or standards specific to the coronavirus.

So, how can contractors avoid coronavirus-related OSHA violations?

In an effort to assist employers, OSHA points to its general standards and directives that may be most applicable to reduce worker exposure to the coronavirus. In addition to those general standards and directives, on April 22, 2020, OSHA issued safety guidance aimed at reducing construction workers' risk of exposure to the coronavirus. The substance of the guidance presents no new regulations but provides contractors with a clear and concise list of practical advice regarding areas such as enhanced workplace cleaning, social distancing in the workplace or at the construction site, and face coverings and other protective equipment.

More specifically, when working in the construction industry, OSHA recommends that the following actions be taken to reduce the risk of exposure to the coronavirus:

- Encourage workers to stay home if they are sick.
- Allow workers to wear masks over their nose and mouth to prevent
them from spreading the virus.

- Continue to use other normal control measures, including PPE, necessary to protect workers from other job hazards associated with construction activities.
- Advise workers to avoid physical contact with others and direct employees/contractors/visitors to increase personal space to at least six feet where possible. Where work trailers are used, all workers should maintain social distancing while in the trailers;
- Train workers how to properly put on, use/wear, and take off protective clothing and equipment.
- Encourage respiratory etiquette, including covering coughs and sneezes.
- Promote personal hygiene. If workers do not have immediate access to soap and water for handwashing, provide alcohol-based hand rubs containing at least 60 percent alcohol.
- Use Environmental Protection Agency-approved cleaning chemicals from List N or that have label claims against the coronavirus.
- To the extent tools or equipment must be shared, provide and instruct workers to use alcohol-based wipes to clean tools before and after use. When cleaning tools and equipment, workers should consult manufacturer recommendations.
- Keep in-person meetings (including toolbox talks and safety meetings) as short as possible, limit the number of workers in attendance, and use social distancing practices.
- Clean and disinfect portable jobsite toilets regularly. Hand sanitizer dispensers should be filled regularly. Frequently-touched items should be disinfected.
- Encourage workers to report and safety and health concerns.

While many of these recommendations are standard operating guidelines with respect to jobsites, it is increasingly important to ensure that these guidelines are closely followed to prevent any unanticipated effects of the



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coronavirus, complaints or referrals, and to be better prepared in the event of an OSHA inspection.

STEPS TO FOLLOW AFTER A CITATION

Should OSHA determine that a contractor is in violation of OSHA standards warranting a citation and notification of penalty, there are several steps that contractors should take.

First, contractors must keep track of the 15 business days in which to contest the citation and penalties and the few exceptions which apply to that time frame. Occasionally, contractors lose track of the deadline during informal settlement negotiations in hopes of reaching an agreement. However, if that settlement cannot be finalized within those first 15 business days, then the contractor must file a formal contest even if its only reason for doing so is to preserve its rights.

During those first 15 business days, contractors should also determine whether they are seeking a complete reversal of the citation and fine, a reclassification of the citation to a lesser penalty or a change in the description of the offense, or if they are better suited to simply pay the fine. Contractors are encouraged to consult with an attorney when making these determinations, particularly in the event of a death or serious injury, whether coronavirus-related or otherwise.

A contractor has three grounds for contesting an OSHA citation: the citation itself, the proposed penalty, and/or the abatement date. Once a contractor has filed a notice of intent to contest the citations, including the proposed penalties and abatement dates, are put on hold pending a final resolution, either through settlement or trial. In most cases, the dispute will end in settlement. However, barring a settlement, the area office forwards the notice of contest to the OSHA Review Commission, which assigns the case to an administrative law judge, who schedules a hearing. During the review, contractors are given an opportunity to serve discovery, conduct depositions and cross examination of witnesses, and may also appeal the decision of the administrative law judge for a review by the full commission.

Because the contractor will be defending itself in a court-like setting, it is important that the contractor maintain detailed records about the company's safety procedures, including how the company has addressed and corrected any issues identified by the initial inspection and, if the contractor does decide to contest a citation, contractors are strongly encouraged to consult on attorney.

Authors' note: This article is intended or ly for informational purposes and should not be construed as legal advice.

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TECH POINT



Forty-Year Roof

EPDM SYSTEM'S LONG-TERM PERFORMANCE REVEALS IMPORTANT LESSONS

WRITTEN BY | LOUISA HART

FOR MOST OF US, turning 40 is something of a milestone. Maybe a time for a party, some soul-searching and usually a lot of brave talk about how 40 is the new 30. Regardless, we have crossed into undeniable middle age.

When a roof turns 40, still healthy and well-functioning, that's an accomplishment of a different sort, putting that roof out front in a league of its own. In October, 1980 - yes, 40 years ago – in West Bend, Wisconsin, a team of installers put the finishing touches on the first Firestone RubberGard EPDM roof. That 45-millimeter, 7,900 square feet of membrane is still protecting the headquarters of Albo Manufacturing today, and has continuously done so for the last 40 years. Kurt Mueller, now the president of Albo, was 22 when his dad decided to try out the new type of roofing membrane.

Why would someone agree to be the first in line to try out a new product, especially one that represented a major investment for a small independent job shop? "He was good buddies with the contractor," Mueller says as he explains his dad's decision. The contractor "gave my father his word that the roof would perform, and that, I believe, is what swayed my father." For the contractor and his employees, the lure of installing the roof without having to use hot asphalt was also a plus.

The roof at the Albo job shop is a testament to the durability of EPDM. While results may vary, this 40-year old has withstood the extremes of the harsh Northern Wisconsin: tornadoes, thunderstorms with winds up to 60 miles per hour, almost two feet of snow, and temperatures that plunged to 20 degrees below zero in the winter and rose to a scorching 100 degrees plus in the summer.

Other than congratulating the owner for his savvy decision-making, why should we be talking about this durable roof? Is it a "one-off" or a sample of what might be expected from an EPDM membrane? Here's why the 40year performance of an EPDM roof is increasingly relevant today: we are facing new challenges now as we look for ways to protect our buildings from extreme weather events. While there may be debate about the cause, indisputable global statistics confirm the increasing frequency of more extreme weather: intense tornado outbreaks, record-setting heat, catastrophic wildfires, heavy downpours, longer droughts, and more frequent and more powerful hurricanes. This roof teaches us important lessons from its 40-year performance, and helps to inform decision-making moving forward.

In a highly competitive marketplace, the manufacturers of EPDM – Firestone Building Products as well as Carlisle SynTec Systems, and Johns Manville – have joined to create the EPDM Roofing Association (ERA), and invest in the science that delivers the data behind record-setting roofs like the facility in West Bend. This effort, in turn, has led to a generation of improvements that deliver a product based on 21st century science.

For instance, while ERA has numerous

examples of the durability of EPDM from case studies, it was important to the association to investigate the science behind the longevity of their product. To that end, in a landmark aging study, ERA examined five roof systems with 28 to 32 years of in-field service, and concluded that all of the systems examined were still performing as intended. In fact, the study found that all of the samples were essentially performing "like new" with physical characteristic properties above or just below the minimum characteristics of newly manufactured 45-millimeter EPDM membrane. The roofs were first inspected in the field to get a good sense of their condition, and then samples were sent to a testing facility for the roofing industry. The laboratory testing examined five critical performance characteristics of the EPDM membrane.

The Elongation Test Results showed that four of the five roof samples exceeded the minimum characteristics for aged EPDM, and one exceeded the minimum for new EPDM. For Tensile Strength, all five samples exceeded the minimum standard. For Thickness XD (Cross Direction), three samples exceeded the manufacturer minimum, while the other two missed by one-thousandth of an inch. For Thickness MD (Machine Direction), three achieved or exceeded the minimum, while one missed by one one-thousandth of an inch and another by four one-thousandths of an inch. For Factory Seam Strength, it was only possible to test two of the samples, but both easily surpassed manufacturers' minimums.

Overall, ERA has conducted four studies on EPDM that validate the long-term performance of the EPDM membrane. "The first field studies of EPDM were done in the late 1980s, and we are finding a pattern," says Thomas W. Hutchinson AIA, FRCI, RRC and Principal, Hutchinson Design Group, Ltd., Barrington, Illinois. "The pattern is that these roofs can really last a long time.



By using today's advanced design techniques and proper roof maintenance, it is reasonable to expect that an EPDM roof will approach or exceed 40 years of service."

Given the recent challenges of increasingly cataclysmic weather events, this durability and longevity is one important aspect of the contribution that EPDM can make to a resilient roofing system. Additionally, EPDM has excellent hail resistance, remaining flexible and pliable so that it can absorb the impact from hail without fracturing. The membrane is also very dimensionally stable when exposed to significant changes in temperature and EPDM is the only commercially available membrane that performs in an unreinforced state, making it very forgiving to large amounts of movement without damage and potentially more cycles before fatiguing. Seaming technology has constantly improved over the last 40 years, and has brought about innovations such as double-sided tape and factory applied tape. Sixty millimeter and 90-millimeter membrane has been introduced, offering enhanced puncture resistance.

These improvements to EPDM over the last four decades add up to increasingly sustainable and resilient construction. During a time when resilient structures are essential to a recovering economy, the value of updated EPDM is more evident than ever to the building owner. Kurt Mueller up in West Bend is grateful that his father's roof continues to provide shelter for his small business. For anyone making a decision about a roofing membrane today, it's important to know that the 21st century product, with increased strength and multiple improvements, is not your father's EPDM.

For more information about EPDM as part of a resilient roofing system, consult ERA's 2020 Resilience Report (epdmtheresilientroof.org.)

ABOUT THE AUTHOR: Louisa Hart is the director of communications for the Washington-based EPDM Roofing Association (ERA). For more information, visit <u>epdmroofs.org</u>.

SAFETY

A Field Guide to Fall Protection Harness D-Rings

WRITTEN BY | DAVID IVEY

MODERN FULL-BODY harnesses for fall protection often come with many attachment points for lanyards of different varieties, and it can be tempting to think that any available D-ring is as good as the next for fall-arrest tieoff. Unfortunately, this is not the case, and using the wrong D-ring can have life-threatening consequences in the event of a fall.

Getting to know the various D-rings on your harness can help you avoid putting yourself and others in danger when working at heights.

DORSAL D-RING

D-rings get their name because they are shaped like a capital "D." The dorsal D-ring – the attachment point on the back of the harness – is the main connection point for fall protection and fall arrest lanyards. Its position high on the back ensures that, in the event of a fall, the worker is oriented in an upright position and the force of arresting the fall is safely distributed evenly throughout the body. Once a fall is arrested, the dorsal D-ring allows the suspended worker to remain upright with their weight centered while awaiting rescue.

When a worker wears the harness, the dorsal D-ring should sit between the shoulder blades in the center of the back. An improperly fitting harness can present a serious hazard because the position of the dorsal D-ring when the harness is in use is key to its effectiveness. If it's too high, it could strike the back of the worker's head during a fall; if it sits too low, a fallen worker can end up suspended face-down rather than falling in an upright position, increasing the risk of suspension trauma and secondary injury.

Always ensure your harness fits properly, with the dorsal D-ring falling in the center of your back between your shoulder blades and the harness fitting snugly enough to allow you to put your fingers – but not a fist – between your body and the straps.

SIDE D-RINGS

Many harnesses have D-rings on the sides, located at the hips. Side D-rings are mainly used for work positioning. Work positioning systems allow a worker to be held in suspension, enabling them to work with both hands free. This has common applications in tower work and rebar construction, for example. Positioning devices such as a belly chain or a rebar chain assembly can connect to the harness's side D-rings for hands-free work positioning.

Note that these positioning systems do not replace the need for fall protection, which should be attached from a suitable anchor point to the harness's dorsal D-ring at the same time. Side D-rings are not suitable for fall-arrest attachments; attaching a fall arrest system to a side D-ring is extremely dangerous. With a fall protection system attached to a side D-ring, in the event of a fall, the worker won't descend in an upright position, and the force of the sudden stop when the fall arrest system engages would not be distributed evenly throughout the body, likely causing serious injury.

Side D-rings are, however, ideal options for attaching tool lanyards. Elastic tool lanyards, sometimes called tool tethers or bungees, prevent dropped tools from falling onto workers below. Simply attach one end of a tool lanyard to the tool and the other onto a side D-ring on your harness. This configuration keeps the tool



The sternal D-ring, located in the center of the chest, is primarily used for fixed-ladder climbing fall protection systems.

tethered to your harness in case you lose your grip on it, while keeping the length of the lanyard conveniently off to the side when you're working with the tool.

STERNAL D-RING

Probably the most noticeable D-rina to the harness wearer is the one on the center of the chest. Called the sternal D-ring, this attachment point is primarily used for fixed-ladder climbing fall protection systems. New OSHA regulations that began to phase into effect in November 2018 require a ladder safety or personal fall protection system on all new fixed ladders of 24 feet or taller. Starting in 2020, all new fixed ladders and replacement ladder/ladder sections must have a ladder safety or personal fall protection system and all existing ladders must be equipped with a cage, well, ladder safety system, or personal fall arrest system on fixed ladders that do not have any fall protection, according to OSHA.

Headlining the changes in OSHA's latest update is a purposeful shift away from ladder cages in favor of ladder safety or personal fall protection systems. These ladder-based fall protection systems typically attach to the sternal D-ring, allowing the workers to comfortably scale the ladder while remaining protected from a fall.



Like the dorsal D-ring, the sternal D-ring should fall squarely in the center of the chest, at the sternum or breastbone. This positioning ensures the harness is able to distribute the worker's weight evenly and safely in the event of a fall. Wearing an ill-fitting harness that sits too high or too low can lead to secondary injuries if the fall-arrest system is engaged.

SHOULDER D-RINGS

Many harnesses have shoulder D-rings at the top of the harness. These may be webbed or metal D-rings and can be used as attachment points for confined-space rescue, entry, and retrieval or for work positioning when used as a pair.

Because of their location off-center to the worker's body, shoulder D-rings are not suitable as fall arrest connection points. Furthermore, these D-rings are not rated for fall arrest and are not designed to withstand the tremendous, sudden force at play when a fall arrest system is engaged. Instead, these D-rings are meant to allow workers to descend or ascend a confined space in a steady, controlled motion.

Although each type of D-ring may look superficially alike, their intended uses should not be confused. Most importantly, it is critical not to rely on the wrong D-rings as attachment points for your fall protection system. As a rule of thumb, fall protection attachment points should be high up in the center of your body. Always check with the manufacturer of your fall protection equipment for their recommendations if you're unsure which D-rings can be used as fall protection attachment points.

ABOUT THE AUTHOR: David Ivey oversees the product development of fall protection and safety equipment at Malta Dynamics. He also sits on the ANSI Z359 board and participates in many subcommittee meetings for safety products. For more information or with questions about how to properly use your safety harness D-rings, contact <u>divey@maltadynamics.com</u>.

+ ENVIRONMENTAL TRENDS



Making Sense of EPDs Harnessing Data for Better Product Selection

WRITTEN BY | MARCIN PAZERA, PH.D.

GLOBAL INTEREST in the relationship between climate change and the built environment has incentivized design professionals to give a closer examination to the environmental impacts associated with the manufacture of building materials. Building owners, developers, architects, designers, and builders are increasingly including carbon footprint and other specification criteria as major considerations in deciding between alternative products and construction methods. Access to verified information about different materials makes it possible for stakeholders to base decisions on measurable data and metrics.

In the same way that food labels provide consumers with consistent information on nutrition facts for different products, Environmental Product Declarations (EPDs) are independently verified documents that present transparent information about the life cycle impacts of building products. EPDs provide stakeholders with uniformly developed information on building materials that are classified under the same product category. As an internationally recognized and standardized tool, the EPD has become a trusted source of vital information for building project decision makers. EPDs are now being used by all major green building rating systems globally and in North America, including LEED, BREEAM, and the Living Building Challenge.

As part of its advocacy for manufacturers and industry suppliers of rigid polyiso products in the United States and Canada, the Polyisocyanurate Insulation Manufacturers Association (PIMA) publishes EPDs for polyiso products on its website: www.polyiso.org. These third-party verified and ISO-compliant declarations are regularly updated and describe the cradleto-grave impacts resulting from the supply and transport of raw materials as well as the manufacture, transport, installation, replacement, and endof-life disposal for polyiso products. Recent updates to the polyiso roof and wall insulation EPDs are now available for review along with an entirely new industry-wide EPD for high density (HD) polyiso cover boards.

The EPD report for polyiso roof

insulation offers substantiated information about the energy savings benefits of using polyiso insulation throughout an assumed 75-year building service life, including accounting for the typical roof replacement project. The EPDs help to tell polyiso's story of superior performance and highlight the product's contributions to building energy efficiency. The polyiso EPDs also include documentation that confirms the low global warming potential (GWP) of the raw materials used to manufacture polyiso products, which makes polyiso insulation an ideal solution for projects specifying low-GWP products.

The positive environmental attributes of polyiso products include:

- High Return on Embodied Energy– the energy savings potential of polyiso roof and wall insulation over their typical life span is many times greater than the impacts associated with the initial energy required to produce, transport, install, maintain, and eventually remove and dispose of the products.
- Outstanding Thermal Efficiency– requires less total thickness and weight to deliver a specified R-value, reducing overall construction and installation costs, increasing usable building space and lowering loads on roof systems.
- Zero ODP, Low GWP-manufacturing members of PIMA use pentane, a zero-ozone depletion potential and low-global warming potential substance, as the blowing agent for polyiso products.
- Recycled Content-polyiso products are manufactured with raw materials that utilize recycled content (percentage of recycled content varies by product).
- Opportunity for Reuse-polyiso roof products can be reused throughout a building's roof service life; to increase the transparency of the reports and to align with industry practice, the EPDs for polyiso roof insulation and HD cover boards assume the products will be replaced once during a building's 75-year service life.

The U.S. Department of Energy estimates that the built environment accounts for 41 percent of our national energy consumption and nearly as much of our greenhouse gas emissions. With an eye toward conserving resources and mitigating the effects of climate change, the building industry has a responsibility to lead on the achievement of economy-wide sustainability goals by undertaking projects that reduce the environmental footprint of today's buildings. Since every decision is only as good as the information it is based upon, EPDs play a critical role in reaching environmental goals and sustainability targets.

The polyiso industry has long been recognized as a leader in the development of innovative product solutions and an advocate for sustainable and energy-efficient construction. The publication of the recently completed EPD reports for polyiso roof and wall insulation as well as HD cover boards. is only the latest chapter. The polyiso industry together with the roofing industry is uniquely positioned to bring about positive change through the replacement and upgrade of energy-efficient roof systems. Together with the performance advantages of selecting polyiso wall products as the continuous insulation solution for new construction projects, polyiso products deliver performance to any project not matter its scope or the size of its sustainability aspirations.

PIMA's latest EPDs can be found at polyiso.org/page/EPDs.

ABOUT PIMA

For more than 30 years, the Polyisocyanurate Insulation Manufacturers Association (PIMA) has served as the voice of the rigid polyiso industry, proactively advocating for safe, cost-effective, sustainable, and energy-efficient construction. Organized in 1987, PIMA is an association of polyiso manufacturers and industry suppliers. Polyiso is one of North America's most widely-used and cost-effective insulation products. To learn more, visit <u>polyiso.org</u>. **R**

ABOUT THE AUTHOR: Marcin Pazera, Ph.D., is the Technical Director for Polyisocyanurate Insulation Manufacturers Association (PIMA). Dr. Pazera coordinates all technical-related activities at PIMA and serves as the primary technical liaison to organizations involved in the development of building standards. He holds a doctoral degree in mechanical engineering from Syracuse University and, over the course of his career, has worked in building science with a focus on evaluating energy and moisture performance of building materials and building enclosure systems.

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WRITTEN BY | THOMAS W. HUTCHINSON, AIA, CSI, FELLOW-IIBEC, RRC

The Importance of SHADE

THE GROWING POPULARITY of increased thermal insulation, in association with code and standard mandates, assists in mitigating exterior ambient temperatures and heat flow migration influences on building interior environments. Some have tried to mitigate these exterior influences on the interior by roof surface color alone – an incorrect precept. Roof color alone, an attribute of a single roof system component, cannot mitigate exterior influence in and by itself. Insulation, roof system design, roof deck, etc., all have a role to play.

To make matters worse, HVAC designers have not been informed as to how roof system design can detrimentally affect HVAC performance. Increased air temperatures above the roof surface, high-temperature heating of rooftop piping, and the heating of rooftop units by reflection of the roof surface have all resulted in HVAC performance well below that for which it was designed.

The roof system is made up of various components, which can include some or all of the following: roof deck; substrate board; vapor and/or air barrier; thermal insulation layers; the insulation adhesive or mechanical fasteners; spray foam insulation sealer; cover board; cover board adhesive or mechanical fasteners; roof membrane; membrane adhesive or mechanical fasteners; and roof cover of ballast or coating. Thus, the function of the roof is not a single component effect, but the sum of the whole – all components working together in association Designing Resilient Single-Ply Membrane Roof Systems for Hot Climates

with building type, interior use, and location.

Appropriate roof system design is the result of the architect, engineer and building owner working together, taking into consideration the function of the building and the effects of the climatic and environmental conditions expected to be experienced.

This article explains the effects of roof system design on HVAC design in hot climates from the perspective of a roof system designer. It is based on a paper I delivered at the 2014 ASHRAE International Conference on Energy & Indoor Environment for Hot Climates in Doha, Qatar. Its lessons are even more relevant today, with the increase in ambient temperatures worldwide. Concerns such as heat flow, reflected ultraviolet light effects, rooftop temperatures and their potential detrimental effects on HVAC performance will be reviewed. Design recommendations and detailing suggestions for achieving long-term roof service life performance in hot climates with single-ply membranes will be explored. Proactive design recommendations for HVAC designers on how to deal with roof-borne effects will also be provided.

ENVIRONMENTAL CONCERNS LEAD TO CHANGES

Societal concerns for the environment, which led to the development of the Leadership in Energy and Environmental Design (LEED) program under the auspices of the United States Green Building Council (USGBC) promoted the use of "cool roofs" - now referred to as "reflective roofs" - as both a potential energy conservation and urban heat island reduction methodology. This movement led to legislative and code mandates that became drivers for massive changes in the roofing industry. Consequently, the use of reflecive roof membranes, which are defined by the U.S. Environmental Protection Agency's Energy Star program as roof covers with an initial solar reflectance of 0.65 or greater, have become the code-mandated choice that architects have when designing low-slope roof systems. The specifying of reflective roof membranes - albeit with little forethought in their use and implementation into a roof system resulted in unintended consequences, such as the formation of moisture below the membrane, excessive heat production to rooftop equipment and building components, and premature

Photo 1: The Temple of Karnak, Luxor, Egypt: The ancients learned by experience that shade in association with ventilation provided comfort.

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failure of some roof systems.

The goal of cool roofing has moved over the past years from a potential energy-saving roof cover to an urban heat island mitigator. The challenge for the building design community is to realize that if energy savings is the goal, ballasted roofs are the best choice, as research shows that cool roofs actually raise the ambient temperature above the roof surface. Additionally, reflected UV rays are heating rooftop piping. Clearly in hot and sunny climates, reflective roofs are not in the best interest of the HVAC system performance.

As with any roof-cover material, the appropriate design and use of the material is required to achieve long-term success and a truly sustainable roof system. Roof-system design is equal in importance to structural, mechanical, plumbing and electrical design. Therefore, it is imperative that designers who utilize single-ply cool roof systems, especially those which fall within American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Climate Zones 4 through 7 (approximately from the state of Tennessee north), take extra care to achieve a properly functioning and sustainable low-slope roof system. Efforts have recently been made to raise the mandate for reflective roof surfaces to include ASHRAE Climate Zone 4. While this author firmly believes that the selection of a roof system (no matter the climate zone) should be the decision of the architect and owner, raising the mandate to Climate Zone 4 would be imprudent and result in little if any energy savings, with increased potential for roof system failures.

OPTIMAL HVAC PERFORMANCE IN HOT CLIMATES

HVAC cooling equipment design in hot climates often utilizes over-design to compensate for the building's thermal gain and heat on the roof. Another often overlooked aspect of rooftop equipment is the drop-off in efficiency due to cooling loss in the ductwork and piping; as a result of solar gain,



heat and exacerbation from cool roof surfaces that reflect rays back up at the piping can "superheat" the pipe/ duct contents.

If the roof cover temperature can be reduced, and the roof's effects on ducts and pipes can be reduced, the efficiency of roof op equipment will rise, units can be reduced in size, and operating costs will be reduced.

ROOF SYSTEM REQUIREMENTS

Roof system design should take into consideration the climate and micro-climates in which the roofs are to be located. This is often not the case, with architects simply selecting a roof system by its warranty length and how many LEED credits it can procure. This lack of design methodology has kept many a forensic roof consultant busy, owners frustrated, and manufacturers unsettled, as failures are frequent and mitigation costly.

The need for climatic considerations is exacerbated when the roof system will be located in geographical areas of extreme weather: high winds, extreme cold, and extreme heat. For the purposes of this paper the climatic parameters to be considered are:

- Extreme heat
- Intense ultraviolet radiation

Sand erosion

Thus, to be successful, the roof cover (membrane) must resist these forces for the term of the desired service life. This author believes in designing with long-term service life in mind. Longterm service life is the essence of sustainability, and in this author's opinion is a minimum of 30 years.

Heat aging and deterioration of roof membranes from ultraviolet radiation has been the bane of roof covers for decades. Premature end of service life as a result of these effects has been well documented by professionals, studied by researchers, and experienced by building owners.

The effects of windblown sand across, or accumulation upon, roof membrane is less understood, but as a rough-surfaced material moving across a pliable membrane it is intuitive that this action could be egregious to the long-term performance of the roof membrane.

Consequently, to achieve long-term performance in hot climates, the roof membrane, in addition to meeting all the needs of the building and roof system, must have a history of resisting long periods of high ambient temperatures, and high surface temperatures, and be resistant to the effects of ultraviolet radiation.

LESSONS FROM HISTORY

Learning from historical examples from indigenous peoples who had to deal with the climate with fewer tools than are available today is both prudent and wise. Cultures in the Middle East have dealt with extreme heat is several ways. The first is through shade. While exposed to the sun, hot and arid ambient climates are almost unbearable. Indigenous people first protected their skin with "galabeyas," a traditional garment. For structures, shade became a key design element. This can be observed in many of the ancient Egyptian structures that have been uncovered and are viewable today. The Temple of Karnak along the Nile in Luxor is one fine example. (See Photo 1.)

The Temple of Karnak also provides us with a second example of a method used as protection from the heat and sun, which is to cool via ventilation. The tall columns of the various halls provided needed structure, but also induced air movement. This concept was integral in the design of the Jeddah Airport in Saudi Arabia.

Wall and roof construction across the Mediterranean, not only in the European cultures, but also in the Asia Minor, Middle Eastern, and Northern African cultures, utilized thick, massive walls that could absorb the heat of the day and prevent it from moving to the interior – a cave above ground, if you will.

Thus, we learn from history that the following were important design features in providing comfort in extremely hot and arid climates:

- 1. Shade
- 2. Ventilation
- 3. Mass

In translating the historical precedents in regard to roofing to today's building needs and roof systems, the issue of shading needs to be given more consideration. In the United States, the current roof systems that offer shading are ballasted assemblies with river-washed gravel of approximately 1.5 inches in diameter (3.8 cm) (See Photo 2.) Spread at a minimum of 10 pounds

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(4 kg) per square foot (30.5 cm2), the stone creates a shading layer over the roof membrane below. The stone ballast also creates a mass element that can absorb the sun's energy. While the stones lying next to each other create voids and spaces, the ventilation element is small, but present. In order to achieve the ventilation element, a drainage mat (used in garden roof systems) is placed above the roof membrane and below the stone.

To complete the roof system, a roof membrane with a historical in situ

record of exposure performance and resistance to UV is needed. EPDM satisfies this requirement with its carbon black component, as well as its proven performance, given this author's experience with EPDM roofs designed 30 years ago which are still in service today. Thermal insulation layers should be multiple, and in the range of 3 inches (7. 5 cm) each.

This roof assembly can be seen in Photo 3 and is detailed in Figures 1A and 1B. It typically includes the following:

- Ballast to shade the membrane from solar heat gain and prevent reflection back at the walls and mechanical equipment. The aim is to provide a mass to gather the solar energy and not allow it to dissipate to the building interior, rooftop equipment, and/or the atmosphere.
- Drainage mat to provide a ventilation layer.
- PDM to provide resistance to heat and UV radiation, and to provide a break in potential heat flow.
- Thermal insulation to "keep the hot out, and keep the cold in."

There are several goals to this system, including:

- 1. Shade the roof membrane and thus provide a cooling layer.
- 2. Provide protection from the deleterious effects of heat and UV radiation.
- Provide a ventilation plan to dissipate heat.
- 4. Eliminate the reflection on rooftop equipment.
- 5. Reduce cooling loads.
- Provide a rooftop environment that will allow for the downsizing of rooftop equipment, and thus increase efficiency and lower energy usage.
- 7. Achieve a sustainable long-term roof system.

A roof system of similar concept was recently installed at the Queen Alia International Airport in Amman, Jordan, in which metal roof panels were elevated off the roof deck to form a cavity to vent any possible heat build-up. (See Photo 4.)

DESIGN RECOMMENDATIONS

The goal of architects/designers should be to design roof systems to achieve sustainable and resilient long-term service lives. Today's society is asking that roof systems provide more than just protection from the exterior environment. For extreme climatic areas of the world, the standard of care required to be exercised by the design professional has increased. For dry and hot climates interior comfort is paramount, and the roof system can be designed to assist rooftop HVAC systems in regard to performance, energy conservation, and efficiency, as well as extending the roof system service life.

Many of the required roof system design parameters apply, but for hot climates there are several key design elements that should be given consideration. Following are the design considerations that will provide a greater opportunity for successful roof systems in hot and dry climates:

- Ensure collaboration and coordination with the HVAC system designer. The association between potential heat flow, resultant interior heat gain and cooling demand is so closely related that it would appear obvious that the coordination of the two building system designers should be a given. Unfortunately, this is far from reality.
- 2. Gain an understanding that heat energy is first and foremost transmitted by solar energy, and protecting the roof membrane's surface from the "sun's rays" will result in diminished heat gains. Use indigenous concepts to your benefit.
- 3. Use thermal insulation to provide a formidable barrier between the interior and exterior environments. It is not only about the cost of cooling that should be dictating the amount of insulation, but the loss of cool air and preventing heating. This author feels that the insulation amounts used on roofs of hot climates should be equal to those in cold climates.
- Shading 1: Protecting the roof surface from direct contact by the solar radiation will provide enormous benefits.
- 5. Shading 2: The shading element typically will absorb (to the extent the solar radiation is not deflected), thus minimizing and/or absolving the effects of heat flow to the interior.
- Specify roof membranes (roof covers) that have a history of in situ long-term performance in hot climates.

- 7. Specify roof membranes (roof covers) that have high resistance to ultraviolet radiation.
- Specify roof membranes (roof covers) that have high resistance to heat aging.
- 9. Understand that the high base flashings are part of the roof

system and will need to be designed appropriately. The should be protected with double layers of flashings.

10. Specify robust and durable materials: Increase the thickness of roof membranes and covers. If the membrane is reinforced, the



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thickness of material protection above the scrim is the critical dimension.

- 11. Design roof system components with the same care for the effects of the sun, solar radiation, and heat as you would the roof. For example, the use of no-hub couplings on roof drains will see the sun for several hours each day and will deteriorate over time, and will become attributable to one of those "hidden, mystery" leaks.
- 12. Use the historically proven method of heat disbursement: Provide

a ventilation layer above the roof membrane (roof cover).

- 13. Design to protect rooftop HVAC equipment and walls from deflected solar radiation. Remember how you started a fire as a kid with a magnifying glass? This is the same concept.
- 14. When using metal components such as roof edge copings, realize that the temperature of the metal during daylight periods will work to heat age and deteriorate the roofing below. Try to incorporate a ventilation layer below the metal.

THE IMPORTANCE OF THE ROOF

The design of roof systems has historically been given little forethought, and was often regulated to junior designers with little or no empirical experience, and armed with little more than a "canned" master specification that provided little more than a market-driven minimum of a roof system. Today's buildings are much too expensive and sophisticated to allow poorly conceived and designed roof systems to prevail. With an increase in detrimental "climactic events," roof systems demand the same level of consideration and design as do all other building systems: structural, mechanical, plumbing, communications, and building envelopes.

Hot climates are special and unique climatic environments, and as such, have special environmental conditions that need to be designed for. Using empirical and historical information, proven materials, and designing to particular in situ environmental conditions can produce roof systems that will reach sustainable levels of performance. With proper coordination with HVAC designers, the roof can rise above just a protection layer, and provide both raised interior comfort and greater HVAC cooling efficiencies. Greater emphasis on education on proper, innovative, and sustainable roof system desian can be achieved if all stakeholders (manufacturers, contractors, architects, engineers and consultants) work together.

It is well past the time to move roofing system design to the forefront of building design and have it become a system that is appreciated for its crucial role in energy conservation and resilient construction.

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museum built atop ancient artifacts reflecting human activities from the Greek Bronze Age to Roman and Byzantine Greece. A crescent-shaped design center sheathed in a copper/aluminum alloy. A paper mill that is home to the world's largest newsprint press, producing enough paper to cover 120 km of three-lane motorway every hour.

Each of these buildings presented a common dilemma for designers and contractors: How best to protect what's inside? The high-value products and processes these structures house span centuries – from ancient scrolls to high-speed presses. But despite the buildings' varied purposes, one material protects them all – cellular glass insulation.

Long trusted in Europe for its endurance and performance, cellular glass insulation is valued for a spectrum of performance criteria. These attributes include outstanding compressive strength, a moisture-impervious profile, redundancy, dimensional stability, fire resistance and sustainable composition. Collectively, these qualities provide a roofing insulation designed to weather the stressors of time, toil and the elements.

Below, we take a virtual journey "across the pond" to understand how cellular glass insulation is protecting timeless treasures with modern-day processes. Returning to America, we consider how this material has found a home in the New World and consider how cellular glass can help ever-industrious America protect mission-critical buildings.

NEW ACROPOLIS MUSEUM, ATHENS

Standing as a model of "living history," the New Acropolis Museum's collections allow visitors to experientially move through human civilization from prehistoric times through late antiquity. A window onto an archeological excavation area below the floor connects modern-day discovery with ancient artifacts preserved beneath the museum.

Comprised of a base, middle and top level, the museum takes the form of a cube. Viewed from the Acropolis perched above, the flat FOAMGLAS roof complements the geometric ethos of the design. Above a base level that allows viewers to watch excavation activity in real time, the middle level is a double-height trapezoidal plate accommodating galleries from the Archaic period to the Roman era. The top level is made up of a rectangular Parthenon Gallery. The gallery features a glass enclosure allowing



New Acropolis Museum in Athens houses priceless art and historical artifacts. The building's highly transparent glass façades are designed to showcase its exhibits and provide panoramic views of the historic surroundings.



This detail shows the roof system installed on the concrete deck on Level 2 of the New Acropolis Museum including (1) the concrete deck; (2) bitumen-based primer; (3) FOAMGLAS slabs, fully adhered; (4) two layer waterproofing membranes, with polyester reinforcement; (5) adjustable BUZON pedestals; (6) marble slabs, roof finish.





natural light to show off sculpture while providing breathtaking views.

The cellular glass insulation in the main roofing system is placed atop a metal roof deck that includes a bitumen-based primer under FOAMGLAS tapered and fully adhered insulation. The insulation is placed below a layer of hot bitumen and two layers of waterproofing membrane which are reinforced with polyester material and covered with an embedded protection course. This surface is connected with a FOAMGLAS serrated plate, screw and rubber air- and water-sealing gasket ring to a support structure underneath non-transparent glass.

Marc Clynhens, Technical Director for FOAMGLAS and based in Belgium, was on the jobsite during the installation of the roof system. Installed during Greece's scorching summer weather, the material was easy for workers to handle on the jobsite, according to Clynhens. "FOAMGLAS is a very rigid material, but it is easy to cut into shapes to complement a building's unique design," he says. For example, a dome sitting atop the roof of the Qatar National Museum required cellular glass insulation to be precisely cut to create the specific domed shape.

Of course, every project has a few unexpected challenges. While lightning protection was being installed in the New Acropolis Museum, drilling through the cellular glass insulation punctured the waterproofing layer and was sealed with silicone instead of the sealant specified by the roof membrane manufacturer. Clynhens notes this turned into a "teachable moment" for the crews. Quick troubleshooting and a revised detail resolved this issue. A conduit was installed to attach the lightning protection system.

A few other "aha" moments that had to be managed on the jobsite were slight deviations between drawings and the actual roof measurements.

- SPECIAL REPORT /// MISSION CRITITCAL ROOFS





This is a quite common occurrence on jobsites, and as cellular glass insulation is easy to cut, adjustments can be easily made to address these deviations. The tapered roof system is well known in Europe. The FOAMGLAS team often recommends tapered insulation to reduce the weight of the roof and ensure drainage, just as we would in the United States. Since the substructure was flat, the team had to slope the insulation to meet the design of the museum's top glass layer.

Even low-profile materials support the assembly's performance. Bitumen - a sealing and adhesive membrane material of choice since the 1960s attaches the cellular glass insulation to the rest of the membrane. This material also complements reuse of FOAMGLAS in the future - for example, if building codes require modification to materials or if waterproofing membranes are replaced. Clynhens notes it is relatively easy to peel off the membrane from the FOAMGLAS, pour a new level of bitumen, and reattach the original insulation to the new membrane.

Europe has long been a leader in sustainable building, and the 60 percent recycled glass in FOAMGLAS supports this performance quality. Processes on the jobsite also support sustainability, with the goal always being to generate as little waste as possible. For example, Clynhens notes that FOAMGLAS production waste materials that cannot be recycled in the production process are remixed into clay for bricks.

FIRSTSITE DESIGN CENTRE, COLCHESTER, UNITED KINGDOM

Located in Essex, about 90 minutes from London, the Firstsite Design Centre presents experiential contemporary art while paying homage to the rich artistic legacy of the local landscape. While studio and gallery spaces host workshops, lectures and events,



the centerpiece of Firstsite is the Berryfield mosaic, an ancient artifact discovered in 1923 on the site where Firstsite stands. The mosaic – installed in a glass case built into the floor – was originally part of a Roman townhouse, circa 200 A.D. To protect the ancient artifacts underneath, Firstsite was erected on a concrete raft foundation, requiring no deep excavation.

While much of the site's intrigue is underground, above-ground design elements – especially the roof – are pretty remarkable. FOAMGLAS insulation was laid onto beads of a cold adhesive on the metal roof deck with no through fasteners. Square plates for mechanical attachment were pushed into the insulation and a torch-on membrane was applied. Additional metal grips were screwed through the bitumen membrane into the metal plates below, providing the structure onto which the standing seams of Tecu Gold Sheets (a copper and aluminum alloy) could be folded and mechanically attached.

While cellular glass insulation provides a completely waterproof roof, it is also part of the intriguing façade. A FOAMGLAS slab of 100 mm was applied and adhered to the center's plywood substrate, enhancing the façade's resilience, while the Tecu Gold Sheets were seamed and fixed into position help achieve the aura of a golden glow.

STORA ENSO'S LANGERBRUGGE MILL, BELGIUM

One of Europe's largest paper mills, Stora Enso's Langerbrugge Mill in northwestern Belgium produces 540,000 tons of recycled paper annually and houses the world's largest newsprint machine. The company is also a leader in renewable materials that replace fossil-based resources. In 2019, the company announced a pilot facility for enabling the production of bio-based plastics and, in 2020, the facility found a way to recycle used paper cups that will cut the carbon footprint of disposable paper cups by a compelling 50 percent.

The FOAMGLAS cellular glass roof topping the 22,000 m² (236,806 ft²) area of flat roofs at the Langerbrugge

- SPECIAL REPORT /// MISSION CRITITCAL ROOFS



Mill aligns with the company's investment in ecologically responsible activities. From a sustainability perspective, cellular glass insulation is manufactured using more than 60 percent recycled glass. Totally inorganic, FOAMGLAS contains no ozone-depleting propellants, flame retardants or binders, and is free of volatile organic compounds. Sand is the primary ingredient used in the manufacture of cellular glass, along with some other ingredients, including limestone and soda ash.

Compressive strength is another consideration in the industrial environment. The Langerbrugge Mill's rooftop supports mechanical and electrical equipment that demand extreme

loadbearing capacity. The lowest compressive strength of this type of cellular glass insulation is in the range of 50-70 PSI and can go much higher. High compressive strength complements its dimensional stability. The pure glass composition provides a low coefficient of thermal movement, comparable to concrete and steel. Such stability means there is no warping, dishing or shrinking of the insulation, even as the temperature fluctuates over seasons. Cellular glass provides a stable foundation for the roofing membrane, minimizing the stress arising from constant stretching that can allow a membrane to deteriorate over time.

Industrial operations present considerations when it comes to fire and moisture resistance as well. Noncombustible, cellular glass does not burn, spread fire, produce flames or present a fire risk in the building structure. Printing and biomass processes create a high vapor pressure, which cellular glass is well-suited to manage, given its ability to manage moisture.

The "layered" roof assembly consists of a prefab concrete slab, concrete topping, adhesive primer, cellular glass insulation fully adhered and sealed at the joints with hot bitumen, and two layers of bituminous waterproofing to complete the roof.

STATESIDE PROVEN PERFORMANCE

In Europe, where space is limited and humans have been building for millennia, cellular glass insulation has earned a reputation for its endurance. But its qualities are not without precedent in North America. Cellular glass's



performance attributes captured attention in the mid-20th century, but fell out of the spotlight as less-expensive foam products were introduced. However, when considering the longevity of FOAMGLAS insulation across a building's life and its ability to maintain performance in harsh conditions, FOAMGLAS could potentially be a more economical choice than less-expensive insulating options.

Still, for mission-critical projects, cellular glass insulation has been a trusted material for projects ranging from the roof of a Chicago water treatment plant processing one billion gallons of water daily, to the rotunda in New York City's iconic Guggenheim Museum.

The longevity of cellular glass was exposed, literally, during a re-roofing of the Jardine Water Purification Plant next to Chicago's Navy Pier. Each day, the plant processes almost a billion gallons of water (that's about a million gallons per minute) from Lake Michigan. Considered critical to the city's infrastructure, it falls under the protection of the Department of Homeland Security.

The building's roof was designed with cellular glass insulation to withstand the harsh conditions of Chicago's climate, as well as the corrosive conditions that accompany water treatment processes. The insulation's effectiveness in meeting performance expectations came to light in 2012 when the plant's original concrete and coal-tar pitch roof, spanning 10.3 acres, began to show signs of moisture infiltration after nearly a half-century in use. As the roof was disassembled, the cellular glass insulation was found to be completely intact, installed in place and performing without flaw - even in extreme conditions for nearly 50 years.

WHEN PERFORMANCE IS PARAMOUNT

In Europe, America and around the globe, designers have many choices today when it comes to roofing options. Quality is non-negotiable and performance levels are high in today's roofing materials. But when a project is mission-critical, and performance is paramount – such as buildings that house timeless treasures or cover one-of-a-kind equipment or processes - cellular glass insulation provides a level of performance that stands up to the tests of time, climate and designers' trust.

ABOUT THE AUTHOR: Tiffany Coppock, AIA, NCARB, CSI, CDT, LEED AP, ASTM, RCI, EDAC is the Commercial Building Systems Specialist at Owens Corning where she provides leadership in building science, system development, testing, and documentation.



For even more information on these unique roofs, check out the first episode of our podcast, *"Roofing*: The Industry's Voice." For more information and links, visit <u>RoofingMagazine.com</u>.

HOSPITALITY

Nay Innovative Approach Solves Re-Roofing Puzzle at Oceanside Resort

Better

WRITTEN BY | CHRIS KING

ometimes re-roofing projects are pretty straightforward. Others can present a complex puzzle. Sometimes looking at things in a different light can lead to an

unexpected solution that proves more cost-effective and less intrusive for the building and its occupants.

The Ritz-Carlton Coconut Grove in Miami, Florida, serves as an excellent example. The hotel consists of two 26-story towers, and each was topped with a standing-seam metal roof, with steep sections transitioning to sloped roof sections at their base.

When the original standing seam roof reached the end of its service life, the owners solicited bids to replace it with a new standing-seam metal roof. The installation would require large construction cranes to be mounted near the entrance of the property.

Bill Devine, area manager for Coatings Application & Waterproofing Co., was convinced a new metal roof was not the answer. He proposed installing the Sarnafil Décor PVC system as an alternative, asserting it would be more cost-effective, more durable and less invasive to the hotel owners and guests.

Devine's intimate knowledge of the jobsite helped him craft his plan. "We had an existing relationship at the Ritz," he explains. "We went in about nine years before that to repair the metal roof that was up there. We patched it after some storms and painted it for them. We've helped them out with some other stuff over the years, and the consultants came in to talk to them about taking the metal roof off and putting a new metal roof back on it. That's when I got involved to try to convince them otherwise."

There were several key factors influencing Devine's recommendation, including the harsh, corrosive oceanside environment, which is tough on metal. "I convinced them to use the Sarnafil PVC Decor Rib System, which has the appearance of a standing seam metal roof," Devine says. "The average person who looks at it doesn't know it's not



HOSPITALITY

a metal roof, but it's all PVC. The way I designed it, there is not one piece of exposed metal that can rust anymore."

With the PVC system, all the roofing materials could be brought up using the service elevators, eliminating the need for a crane. To top it off, it would be less expensive than a new metal roof.

"What got us the job was when I gave him my price for the Sarnafil and told him I wouldn't have to have a 200-300 foot crane sitting in front of the Ritz Carlton for eight months," notes Devine. "I took the entire roof off and put the whole new roof on using the service elevator." attached to the building's heavy-duty steel framing at the top of the towers. "We drilled through that and put anchors through those big beams and ran our safety lines and swing stages through that," says Devine.

The plan was to take everything up through the roof hatches, including the swing stages, which were engineered to fold up for transport. Debris was taken out the same way.

"We pulled all of the metal off a section at a time and dropped it down through the roof hatch," explains Devine. "Each side had a roof hatch and we dropped it through there to



CHALLENGING INSTALLATION

Coatings Application & Waterproofing (CAW) installed approximately 30,000 square feet of the PVC system. The steepness of the roof sections would pose obvious challenges, and CAW developed special swing stages to remove the existing metal roofing and install the Decor system. "That's 250 feet in the air with a 23/12 pitch," notes Devine. "It's almost a wall."

A detailed safety plan was paramount. Crew members had to be tied off 100 percent of the time, and all tools were tethered. Anchor points were the floor. We had guys inside who separated the trash from the metal and stacked it. We recycled all of the metal."

Logistics at the jobsite were very tight. "The property doesn't really have a parking lot area – it has a parking garage – so we had no place to put dumpsters. We just had a few spots down in the parking lot to stack insulation and rolls, and we took material up the freight elevator whenever we were ready for it."

Recycled metal and debris were also taken out via the freight elevator. "We brought it down on a Friday, and we had a guy with a truck who would meet us at the loading dock. We'd load all of the trash in his truck and he'd take it to the dump," Devine says. "There was nothing easy about it."

As the metal roof was torn off in sections, roof areas were covered with 1.5-inch isocyanurate insulation with guarter-inch DensDeck bonded to it with adhesive. The pre-assembled 4-foot-by-4-foot boards caused some difficulties. "We had to make modifications to the swing stage so they could stack insulation on it," notes Devine. "We dropped all of the trash down through the roof hatch, but when we went to pull our insulation up, it wouldn't fit through the roof hatch. We cut a 5-foot-by-1-foot hole in the roof deck on each side of the building and had the guys hand the insulation up through the slot in the roof deck. They'd stack it on the stage, take it up and start installing it."

The insulation panels were fastened to the 20-gauge steel decking with 3-inch #15 screws and insulation plates, and a Sarnafil vapor barrier membrane was installed. The slots cut in the deck were repaired using flatstock steel.

The Patina Green PVC membrane was adhered using Sarnacol 2170 adhesive. Crews on the swing stages worked from top to bottom, adhering about 2 feet at a time. "When they got to the bottom, then they would go back up to the top with welders and weld the laps," Devine explains.

Applying the Decor ribs with a hotair welder was the last part of the process. The swing stages had to be modified for this step as well. "We had to be held off far enough that we could run our welder and still keep it in a straight line," Devine recalls. "It was a fun one."

Work on the project included the internal gutter systems and mechanical areas. "Each corner has an internal gutter that extends 15 feet down one side and 15 feet down the other. Those were completely shot," says Devine. "The only thing that saved them was the concrete underneath. Everything above was shot. We had to put tapered insulation and the Sarnafil membrane in those and put new drains in."



Coatings Application & Waterproofing used special swing stages to remove the existing roof and install the PVC system.



There was no exposed metal on the project, according to Devine. The hips and ridges were made from SarnaClad Patina Green metal, which is wrapped in PVC, and the metal framing was also wrapped with PVC membrane.

AWARD-WINNING WORK

Work on the project began in February 2019 and was completed in November 2019, ahead of schedule. The project received the Sarnafil Project of the Year award for 2019. "Winning that award is a pretty good feeling," says Devine. "We went through a lot, and Sarnafil was there to help us out."

Detailed planning was crucial to the project's success. "I had the luxury of plenty of time to think about all of the different things we were going to have to do," Devine notes. "We had to make some changes out in the field, like cutting a hole in the deck, but most of it went pretty smoothly."

Devine credits CAW's experienced team for the success of the project. "I had a good crew," he says, "Our foreman, Bob Hinojosa, he's been with me for 30 years, and he is just good."

According to Devine, this project demonstrates CAW's ability to execute difficult projects. "We find the best way to do it," Devine says.

RITZ-CARLTON COCONUT GROVE MIAMI, FLORIDA

TEAM

ROOFING CONTRACTOR: Coatings Application & Waterproofing Co., Saint Louis, Missouri, <u>cawco.com</u>

MATERIALS

PVC ROOF SYSTEM: Sarnafil Decor Roof System, Sika Sarnafil, <u>usa.</u> <u>sika.com/sarnafil/</u>

COVER BOARD: DensDeck, Georgia-Pacific, <u>buildgp.com</u>

ENTERTAINMENT

Authentic Look

New Synthetic Cedar Roof Now Tops Arboretum

RoofingMagazine.com | Roofing 65

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S. S. Lake

+ ENTERTAINMENT



nyone from Dayton, Ohio, will tell you that the 174-acre Cox Arboretum is one of the premier places to visit in the city, thanks to the daily free

admission and neighboring Gardens MetroPark, which offers more beautiful gardens and green space for visitors to enjoy. For more than 50 years, the Arboretum has wowed residents and tourists alike. With its numerous trees, shrubs, specialty gardens, mature forests, and even prairies, it isn't difficult to understand why.

Just the building itself can grab a visitor's attention, with its beautifully curved design and cedar shake roof. These two features have become synonymous with the arboretum and the roof, in particular, is something the board at the arboretum hoped to preserve. Therefore, naturally, when it came time to replace the aging cedar shakes everyone loved so dearly, the board members wanted to do it right. They decided to go to Dayton-based architect Greg L. Lauterbach and contractor E. Lee Construction, a company that has been in business since 1955.

CHOOSING SYNTHETIC

The board was soon faced with another decision: should they keep the real cedar shakes, which can be costly and difficult to maintain, or should they go a more modern route? While they wanted to preserve the roof's look, they also wanted to ensure it was durable and long-lasting, and, for that reason, they decided to switch to synthetic shakes.

They chose to go with synthetic cedar roofing for many different reasons. For one, while appearances are naturally important for Cox Arboretum, more important was the roof's ability to handle the various types of weather conditions seen in Western Ohio. This area sees everything from seasonal rains, hailstorms, and high winds to heavy snow loads and extreme temperature fluctuations. As a result, it was critical to choose a roofing material that wouldn't easily break or damage under such conditions. A synthetic cedar roof was chosen for its durability. The next step was making sure it captured the look of authentic cedar shake.

Lauterbach wasted no time in collecting samples of synthetic cedar shakes from various manufacturers for review. In the end, he chose to go with Brava Roof Tile for "the aesthetics of the tile and long lifespan." Unlike some other brands, Brava Shakes truly mimic real cedar, offering lengths of 5 inches, 7 inches, and 12 inches, and varied thickness to recreate that classic split texture of natural wood.

These aren't the only reasons Brava was chosen, however. When it comes to durable roofing products with a long lifespan, Brava Roof Tile is among the industry's toughest. Their synthetic shingles offer up to a Class A fire rating, a Class 4 impact rating, and can withstand wind speeds over 110 mph. Moreover, an installed Brava roof weighs a mere 350 pounds per roofing square, much less than some competitors and less than real cedar roofing shakes.

Brava Shake comes in a wide range of colors meant to mimic real wood. Lauterbach took his time before deciding on the Sierra Shake, a lighter woodtoned option with some darker highlights. He went with the Sierra Shake because it "best mimics the look of real wood shingles while having the benefits of composite."

ENSURING AN AUTHENTIC APPEARANCE

As an arboretum, a place dedicated to trees and nature, having a natural-looking roof was critical. So, one of the board's primary concerns was ensuring the most authentic appearance possible. Another major concern was how the Brava shingles would look on the property's large turret. The decision was made was to purchase "solids" rather than Brava's standard cavity-back roofing shingles for the turret.

Unlike traditional cedar roofs, a Brava roof is easy to install, with no breakage and no special tools required. While it is easier to install than other roofing options, neither E. Lee Construction nor Lauterbach had previously worked with Brava. The company representatives took a day to train them before they went to work on the Cox Arboretum project, ensuring crews

COX ARBORETUM DAYTON, OHIO

TEAM

ARCHITECT: Greg L. Lauterbach Architect, LLC, Dayton, Ohio, <u>gllarchitect.com</u>

ROOFING CONTRACTOR: E. Lee Construction, Delphos, Ohio, <u>eleeconstruction.com</u>

MATERIALS

SYNTHETIC SHAKE: Brava Cedar Shake in Sierra, Brava Roof Tile, <u>bravarooftile.com</u>



knew what to do each step of the way. With that training, E. Lee Construction headed the project and completed it seamlessly. In the end, they installed the Sierra Brava Shakes on three different buildings on the Cox Arboretum's property.

Cox Arboretum has a beautiful, realistic synthetic cedar roof thanks to Brava Roof Tile. Visitors continue to admire the exterior, and many are not aware that it isn't a real cedar roof. Now, the Arboretum no longer has to worry about extensive roof repairs or maintenance, or even about what will happen to the roof in certain types of weather.

After this project, E. Lee Construction has gone on to use Brava Roof Tile on other projects throughout Ohio, proving it is a realistic, durable choice that will stand the test of time. ENTERTAINMENT

Grand Slam

Florida Stadium's Metal Roof Intimidates, Alludes to Campus Architecture

1 Han 1

KATIE SEASHOLE PRESSLY STADIUM



he renovated Katie Seashole Pressly Softball Stadium on the campus of the University of Florida in Gainesville might have all the latest amenities, but its design pays homage to the school's earlier days.

The facility's steeply pitched metal roof in a signature orange-red finish is a clear reference to the buildings surrounding the stadium, and it also frames an impressive gateway into the ballpark's friendly confines.

"The university is known for its collegiate gothic architecture and highpitch, orange-red gable roofs," says Joe Walker, AIA, president of Walker Architects, the local firm that designed the stadium. "This project ran with the roof as the character-defining element of the exterior, and the final design is a direct nod to the collegiate gothic style."

The collegiate gothic roots most clearly are seen in the stadium's signature entryway. In addition to tying the stadium to the surrounding campus, this two-story structure elevated on brick columns makes a statement all on its own for fans – as well as Gator opponents.

"From a fan's perspective, the geometry of the roof signals the entryway and frames the impressive – and, for a visiting team, intimidating – first glimpse of the field," Walker says. "For a player, when you look at the elevation of the facility from the field, the central gable is a centerpiece positioned directly over home plate."

While officially a "renovation," because the original 1996 field wasn't altered, the upgraded facility has been largely rebuilt to include a new locker room, lounge training room and press box. According to Walker, the \$15 million project is a tribute to the work head coach Tim Walton has done building the team into a national presence since joining the team in 2006. Since 2008, the Gators have made it to the Women's College World Series eight times and have earned national titles twice.

Walker says metal roof panels were

an obvious choice to create a visual link to the classic clay tiles that top many of the university's older structures. "It was the product with the best look for the project price point and, aesthetically, it fit in well in this area of campus," he says. "Plus, it has the benefit of being low maintenance and importantly, it does a great job of keeping water out."

The architect specified 10,300 square feet of PAC-CLAD Tite-Loc Plus from Petersen in a Terra Cotta finish for the project. He says the choice of this particular profile was aided by advice from the company's technical staff. "It was Petersen that suggested we use the Tite-Loc Plus product with striations, knowing it would be a better product for our project with respect to minimizing oil canning and damage from potential impacts."

Jacksonville, Florida-based Thorne Metal Systems handled the roof installation, which posed a few challenges, according to the company's office manager Cody Thorne. "It was a particularly tight site – we could only work around the perimeter because they were working on the field," he says, adding that the roof's steep pitch also called for some extra attention. "It was 10:12, so a little more caution and safety were involved."

KATIE SEASHOLE PRESSLY SOFTBALL STADIUM UNIVERSITY OF FLORIDA GAINESVILLE, FLORIDA

TEAM

ARCHITECT: Walker Architects, Gainesville, Florida, <u>walker-arch.</u> <u>com</u>

ROOFING CONTRACTOR: Thorne Metal Systems, Middleburg, Florida

MATERIALS

METAL PANELS: PAC-CLAD Tite-Loc Plus in a Terra Cotta, Petersen, pac-clad.com

HOSPITALITY

Lake Views

Bay Harbor Yacht Club's Patio Plaza Gets an Upgrade



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ocated along the shore of northern Lake Michigan, the Bay Harbor Yacht Club (BHYC) is a stately building surrounded by natural beauty. In addition to a deep-water marina and sandy beach, members of this luxurious private club have access to a pool, tennis courts, a fitness center, and a variety of restaurants, from upscale to casual.

One of the most popular spots in the BHYC is the large, tiled patio deck that extends off the second-floor ballroom. The patio deck, which also serves as the roof of the spa's outdoor relaxation area, provides a laid-back atmosphere for people to eat, drink, spend time with friends, and listen to live music while taking in spectacular views of Lake Michigan.

In 2020, the patio needed repairs. The old tile pavers were damaged, resulting in leaks in the outdoor spa area below. A new system was designed that used a fully adhered 135-mil VersiFleece TPO membrane beneath Hanover Porcelain Pavers, which would provide much better waterproofing protection than the previous coating/ tile paver system.

Doyle Roofing, Inc., was selected for the BHYC project based on the company's 40-year track record of high-quality work all over northern Michigan. The Doyle Roofing team is trained and experienced in the installation of a wide variety of roofing systems on both new construction and re-roofing projects.

REMOVAL AND REPLACEMENT

The project started with removing the old tile pavers and coating system down to the concrete deck. Then the Doyle Roofing crew primed the concrete deck with Versico's CAV-GRIP 3V Low-VOC Adhesive/Primer. CAV-GRIP 3V can be used in a wide range of temperatures, is low-odor and low-VOC, sets up quickly, and is easy to apply.

After priming, Doyle Roofing applied Versico's Flexible DASH, a two-part urethane adhesive, to the deck. Flexible DASH is VOC-free, energy-absorbing, and impact-resistant, and it allows for a quick and totally non-penetrating system. Once the Flexible DASH set up, the crew then installed a 135-mil VersiFleece TPO membrane. VersiFleece TPO offers exceptional waterproofing protection, as well as durability, flexibility, and toughness due to its thickness, reinforcing scrim, and polyester fleece backing.

After the membrane installation was complete, it was time to install the paver system. The crew loose-laid a drainage/protection mat over the VersiFleece membrane, then installed the pedestal paver system. Versico's Hanover Porcelain Pavers were selected because they are ideal for use as outdoor flooring. Porcelain Pavers are hard-wearing, anti-slip, weather-resistant, and capable of withstanding heavy loads without compromising aesthetics. These pavers are quick and easy to install and are resistant to acid, chemicals, mold, and salt.

The project was completed in May 2020. Work was completed in approximately one month. The Doyle Roofing crew reported that the job was made much simpler by the use of Flexible DASH Adhesive, which sets up much more quickly than standard bonding adhesives and allowed them to compete more work in less time.

BHYC's new and improved patio plaza will provide a welcoming place for members to gather and socialize for years to come, while Versico's VersiFleece membrane will keep the fitness center below dry and protected against leaks.

BAY HARBOR YACHT CLUB PATIO PLAZA BAY HARBOR, MICHIGAN

TEAM

ROOFING CONTRACTOR: Doyle Inc. Roofing Contractors, Cheboygan and Petoskey, Michigan, <u>doyleroofing.com</u>

MATERIALS

MEMBRANE: 135-mil VersiFleece TPO, Versico, <u>versico.com</u>

PEDESTAL SYSTEM: Hanover Porcelain Tile Pedestal Pavers, <u>hanoverpavers.com</u>

BERT

*SUN

Ouality Workmanship Ensures Top Performance of Stadium's Roof

IC LANUARY/FEBRUARY 2021

• ENTERTAINMEN
hen Liberty University wanted errorless work on the roof of its new softball stadium, the college turned to Roanoke, Virginia-based

Mountain Roofing.

Mountain Roofing has served the Southwest Virginia market since 1998, focusing primarily on commercial projects. According to Adam Gheen, the company's vice president, Mountain Roofing's skilled crews are experienced in all types of roof systems including EPDM, TPO, standing seam metal, copper, slate, and asphalt shingles. The company also excels in historic restoration applications.

Gheen estimates that 40 percent of the company's work involves metal roofing. When the roofing portion of Kamphuis Field at Liberty Softball Stadium was put out for big by Branch Builds, the general contractor, Gheen was confident his crews could execute the job. "I bid the project and coordinated it until the day the punch list was done," he says.

The roof panel specified for the project was Fabral Power Seam 16-inch, 24 gauge Dark Bronze with shadow lines – a product often specified by the school to ensure campus-wide consistency on all metal roofing projects.

Kamphuis Field at Liberty Softball Stadium was designed to provide fans a great venue to watch softball action. The field is named after Dwayne Kamphuis, a legendary fast-pitch softball pitcher who played with Eddie "The King" Feigner as part of the renowned "King and His Court" traveling softball team.

The stadium includes 1,000 chairback seats, home, visitor and umpires' locker rooms, as well as a team room, situation room, training room, coaches' offices, indoor batting tunnels, two full bullpens, and a state-of-the-art press box.

Approximately 19,000 square feet of metal roofing was installed on the grandstand and buildings making up the complex. "We were left with the exposed metal deck," Gheen recalls. "We installed two layers of insulation, which were mechanically attached, with an air and vapor barrier over top of that – Henry Blueskin RF200. After it was dried in and watertight, then we started installing the metal panels."

The material distributor on the project was NB Handy. The prefabricated panels were brought in by tractor trailers and lifted to the roof by a crane. The panels are held in place with clips and mechanically seamed. The safety plan called for workers to be tied off at all times.

The project went smoothly, notes Gheen, with one exception. "This one was fairly straightforward. The one thing I remember is mud," he says. "There was a lot of mud. That was a fairly big issue, not only for installation but safety."



Workers had to take care to make sure mud did not cause any safety hazards, especially while climbing ladders. At times, crew members were forced to change out their boots before going up to the roof. "We had to keep the ladders as clean as possible, and of course, the roof surface had to be kept clean."

Mountain Roofing has handled other projects at the university, so it was well prepared for the stadium installation. "The majority of the roofs are the Fabral Power-seam panel," says Gheen. "They've been running that metal for years, and it's a lifetime product. It's the industry standard at LU."

According to Gheen, the workmanship on the project shows what sets Mountain Roofing apart. "We're known for our quality," he says. "We really don't press the 'quantity' button. Quality, all the way around – that's what we base our company on. That shows through all of the products that we run."

KAMPHUIS FIELD AT LIBERTY SOFTBALL STADIUM LIBERTY UNIVERSITY LYNCHBURG, VIRGINIA

TEAM

GENERAL CONTRACTOR: Branch Builds, Roanoke, Virginia, <u>branchbuilds.</u> <u>com</u>

ROOFING CONTRACTOR: Mountain Roofing, Roanoke, Virginia, <u>mtnroof.com</u>

DISTRIBUTOR: NB Handy, Lynchburg, Virginia, <u>nbhandy.com</u>

MATERIALS

METAL PANELS: Fabral Power Seam 16 inch, 24 gauge Dark Bronze with shadow lines, Fabral, <u>fabral.com</u>

UNDERLAYMENT: Blueskin RF200, Henry Company, <u>henry.com</u>

+ ENTERTAINMENT

The green roof on the meerkat habitat features native plants including Pennsylvania Sedge, Prairie Dropseed, and Lance-leaved Tickweed.

John Ball Zoo's Green Legacy Extends to Rooftops

ince 1884, John Ball Zoo's 40-acre stretch of land has continued to flourish in the heart of Grand Rapids, Michigan. At the

turn of the 20th century, the zoo population consisted of local favorites such as raccoons and deer. By 1927, Charles Lindbergh deemed the park a popular enough site to address crowds of onlookers after his trans-Atlantic flight. Throughout the 1950s and 1960s, the zoo expanded exponentially, adding a number of new exhibits including Monkey Island, an aviary, and an aquarium. In 1983, John Ball Zoo was the first zoo in Michigan to receive accreditation from American Zoo and Aquarium Association. Moving through the 21st century, the zoo continues to thrive with its innovative tiger exhibit, and a growing list of additions such as its most recent meerkat habitat.

John Ball Zoo has been a proponent

of sustainability in all facets of its design — from the conservation of animals to creation of green spaces that make up the foundations to many of its exhibits. Living walls and living roofs are already a part of that architectural landscape, thanks to local experts such as LiveRoof, LLC. For more than a decade, John Ball Zoo and LiveRoof have turned many of its habitat roofs into viable and beautiful green spaces.

In keeping with this partnership, a new milestone was recently reached. John Ball Zoo has built a first in the nation meerkat habitat that is SITEScentered. A new green certification that considers all aspects of a building's sustainability, SITES is a set of comprehensive, voluntary guidelines together with a rating system that assesses the sustainable design, construction, and maintenance of landscapes. Unlike other green certifications, SITES is a voluntary assessment that is used from the earliest drafting phases, to the outlook of upkeep and maintenance for the foreseeable future. The zoo's goal is to be certified with SITES Gold

Certification, which would make John Ball Zoo the first zoo in the country to receive this rating and the first SITES v2.0 project in Michigan.

The meerkat habitat building is topped with the LiveRoof Deep system pre-grown with native plants in locally sourced growing medium. "While John Ball Zoo's other green roofs are populated with sedum and allium selections, this one is different because it contains native grasses and herbaceous perennials," says Allmon Forrester, the zoo's horticultural director. According to Forrester, the existing relationship with LiveRoof was most important in selecting a green roof system because of the work their team has done with the zoo on multiple buildings and habitat enclosures. Forrester's team worked closely with LiveRoof and J&L Roofing, the contractor that installed the green roof system, to secure the necessary documentation on the sustainability of the system, its growing and production methods, and plants.

The roof system beneath the living roof consisted of two layers of 3-inch



zoo's horticultural director.

polyiso insulation, DensDeck Prime



cover board set in foam adhesive, adhered 60-mil FPDM membrane and a 60-mil EPDM slip sheet.

In 2008, John Ball Zoo's first LiveRoof was installed atop the building in the lion habitat. Since then, additional green roof systems from

LiveRoof have been planted atop buildings in habitats for monkeys, chimpanzees, bobcats, bears, and meerkats. Not only have the roofs been sustainable and met requirements for a number of green certifications, but they also have proved an aesthetic asset to the makeup of the zoo. **R**



JOHN BALL ZOO MEERKAT HABITAT **GRAND RAPIDS, MICHIGAN**

TEAM

ARCHITECT/BUILDER: Wolverine Building Group, Grand Rapids, Michigan, wolvgroup.com/

ROOFING CONTRACTOR: J&L Roofing, Grand Rapids, Michigan, ilroofing. <u>com</u>

GREEN ROOF DESIGNER/SUPPLIER: LiveRoof, LLC, Nunica, Michigan, liveroof.com

MATERIALS

GREEN ROOF: LiveRoof Deep System, LiveRoof, <u>liveroof.com</u>

SOLAR



At the Boulder JCC, Rooftop Solar Fulfills Several Key Priorities

> he 52,444-square-foot Boulder Jewish Community Center (Boulder JCC) was conceived as a contemporary interpretation of sustainable de-

sign. The campus was designed and built by Colorado-based RB+B Architects and Calcon Constructors, who desired to create something beautiful, functional and unique. Construction included a wing for daycare and education, a gymnasium and fitness center, a full commercial kitchen, a community hall with a state-of-the-art stage, a library, administrative offices and a large outdoor gathering area, complete with a fireplace.

The Boulder JCC is a 501c3, nonprofit

organization. Sustainability, energy efficiency and education are priorities for its members. The goal was to incorporate rooftop solar during the initial construction, but the budget wouldn't allow it. After the complex was built, the challenge was to find a cost-effective photovoltaic (PV) solution that presented a solid return on investment, which would make the project a no-brainer from a financial standpoint.

THE PROPERTY AND

The Solar Revolution, a PV system designer and installer located in Boulder, was there to help. Doug Claxton, principal and founder of The Solar Revolution, advised the Boulder JCC that grants from the City of Boulder and Boulder County were available for helping nonprofits go solar. The high visibility of the PV system and the educational opportunities afforded by solar power were important to both the Boulder JCC and the grant committees, and the project was approved.

J BoulderJCC

The Boulder JCC now has a 74.4kW PV array located on multiple rooftops, including the highly visible and gently curved standing seam metal roof and a low-slope TPO roof. In addition to solar on the main facility, a 7.2kW array is installed on the adjacent barn at the "Milk and Honey Farm." The farm is 100 percent powered by solar and serves as a valuable tool for the Boulder JCC's educational and preschool programs.

ADDING SOLAR POWER

Work on the project was done in phases, beginning with the Firestone UC-3 double lock standing seam metal roof over the gymnasium. "We did the solar on the metal roof first because that's the most cost-effective place to do it, using S-5!'s clamps and PVKIT," notes Claxton. "So, we did that, and then a year later, another round of grant money was available, so we were able to do even more solar up there on the flat roof."

Installing solar panels on the roof would provide excellent visibility and have a lower initial cost than the



low-slope roof sections. "That's one reason we actually won the job, along with the grants," Claxton recalls. "We quoted it and when they saw the number, they said, 'That's much less expensive than we had anticipated."

The key to the metal roof installation was the S-5-PVKIT 2.0, which provides a simple, secure, economical method for attaching solar modules with no penetrations. The PVKIT's pre-assembled components enable installers to directly attach PV modules to the roof's standing seams using S-5! clamps and brackets, which is faster and more economical than a traditional rail mounting system.

"I think a standing seam metal roof is hands down the best roof for solar just because of the fact that we don't penetrate, and it installs so quickly," Claxton says. "What's unique about the S-5! system with their PVKIT is that we don't use a traditional support rail underneath the panels. With the S-5! kit, the panels rest right on the kit. You eliminate the rail, so you cut your material costs down quite a bit. You also cut the labor cost quite a bit."

The safety plan called for traditional fall protection equipment, which was also easy to implement on the metal roof. "There are a couple of companies that make really good fall protection equipment for standing seam metal, so again that's the beauty of a standing seam roof – there are no penetrations for the solar mounting, and we use fall protection that doesn't damage the roof," Claxton notes.

The installation method eliminates concerns about violating the manufacturer's warranty. "In order to route the power from the roof down, we just did a conduit detail around the eave," says Claxton. "In this case we didn't penetrate the roof and the steel deck at all. And we got all those solar panels on in two days with a four-man crew. It's really pretty darn simple."

THE SECOND PHASE

When solar was added to the flat roof, The Solar Revolution developed a hybrid system using both ballast and mechanical attachment. "We installed the Ecolibrium system, which is a ballasted solution that uses concrete pavers to essentially weigh the system down," Claxton explains. "In this case, though, with our windspeeds being as high as they are, we introduced about a dozen mechanical attachments interspersed throughout, and that allowed us to get the designed windspeed without making the system too heavy."

Attachments were made using the U Anchor 2400 from Anchor Products, which is fastened to the deck and features TPO flap that's bonded to it. "What we do is zip it in and have a roofer come in right after us and weld the TPO down," Claxton says. "For every attachment we do, it eliminates the need for 420 pounds of concrete block, so it helps us keep our ballast weight in check on these systems. It gives us a lot of peace of mind that the system is not going anywhere."

The solar installations went smoothly, according to Claxton, and The Solar Revolution is preparing another grant application for the third phase of the project.

"The only challenge was working around a facility that has events going practically 24-7," he says. "We had to make sure we were being safe, especially working in areas above people. There were no real challenges other than coordinating the work in an operational facility."

According to Claxton, the project illustrates the company's strengths, which include finding the optimal way to design and install the PV system. "We were the only company to propose utilizing the standing seam metal roof," he says. "We are very good at analyzing the site and finding the best solution, which isn't always the most obvious solution. That standing seam is like a barrel vault – it has a gentle curve to it – and a lot of companies don't think to use that because of the curve, but the S-5! system allows us to contour that curve perfectly."

The aesthetics of the solar system were an important consideration as well as ROI. "Again, the JCC is doing solar because they also want it to be a learning tool, and the city's grant wants it to be visible, so by using the metal roof we achieved the goal of visibility," says Claxton. "They are putting solar all over their campus so they can reduce their energy costs and have more money to put into these early childhood programs. They also help educate kids on renewable energy and sustainability. It's all part of their mission. As a nonprofit, anything they can do to reduce their energy costs is beneficial." R

BOULDER JEWISH COMMUNITY CENTER BOULDER, COLORADO

TEAM

Architect: RB+B Architects, Fort Collins, Colorado, <u>rbbarchitects.</u> <u>com</u>

GENERAL CONTRACTOR: Calcon Constructors, Englewood, Colorado, <u>calconci.com</u>

ROOFING CONTRACTOR: Douglass Colony, Commerce City, Colorado, <u>douglasscolony.com</u>

SOLAR INSTALLER: The Solar Revolution, Boulder, Colorado, <u>thesolarrevolution.com</u>

MATERIALS

SOLAR MODULE AND INVERTER: LG Solar, www.lg.com/us/solar, SolarEdge. <u>solaredge.com</u>

METAL ROOF ATTACHMENT: S-5-PVKIT 2.0, S-5!, <u>s-5.com</u>

LOW-SLOPE ATTACHMENT: Ecolibrium, https://ecolibriumsolar.com, and U2400, Anchor Products LLC, anchorp.com

COMMERCIAL



Addiction Treatment Center's Roof Offers — Great Aesthetics, Low Maintenance—

ake exit 69 off the Long Island Expressway, and that's where you'll immediately find the impressive new Wellbridge Addiction Treatment and Research Center. The 96-acre campus in Calverton, New York, consists of six buildings, all of which have composite shake roofing overhead.

Opened in April 2020, the 80-bed facility includes a two-story main building. This structure houses the primary treatment facility, labs, care sections and auditorium. It also has a dining room, chapel and a variety of offices. The massive main building connects to other buildings via paved garden paths. The campus, which has 134,000 square feet of space, includes a short-term care building, wellness center, creative expression center, and maintenance building.

"We designed this complex with



No matter how many roofs we do in the future, this project will stand out for many years to come.

- Robert Foreman, Premier **Building & Renovations**

low maintenance in mind," says Ron Whelan, senior project manager for Engel Burman. "The DaVinci Roofscapes composite shake product fits our needs. We want the exteriors of the buildings as easy-care as possible."

"Our company has used DaVinci's synthetic roofing products in the past," Whelan notes. "The Bristal Assisted Living project in Garden City, New York, also features DaVinci's low maintenance roofing tiles. The product looks great at both facilities. I believe it's a beautiful composite roofing product that seems to hold up well to the

environment with no fading or other problems."

LARGEST PROJECT TO DATE

Soon after the project started, the team at Premier Building & Renovations Corp. was brought in. Their task was to install DaVinci Bellaforté Shake roofing on the structures as they were built. Their work started in February of 2019, and completed 10 months later in October.

"This is the largest DaVinci project we've ever tackled," says Robert Foreman, owner of Premier Building & Renovations Corp. "We had ten people working on this project continually. The Bellaforté Shake product is great to work with. It's lightweight and installs easily."

Premier Building & Renovations is proud to point to this project as an example of the company's outstanding workmanship. "In the five years we've been installing DaVinci composite roofing tiles, we average about three or four major projects a year," says Foreman. "No matter how many

roofs we do in the future, this project will stand out for many years to come. The Weathered Gray shake tiles give both a unified and unique look to this complex of buildings. The composite shake tiles look great and provide the owners with the low-maintenance roof they wanted." **R**

WELLBRIDGE ADDICTION TREATMENT AND RESEARCH CENTER

CALVERTON, NEW YORK

TEAM

DESIGNER: Engel Burman, Jericho, New York, engelburman.com

ROOFING CONTRACTOR: Premier Building & Renovations Corp., Farmingdale, New York, premierbuildingny.com

MATERIALS

SYNTHETIC SHAKE: Bellaforté Shake, DaVinci Roofscapes, davinciroofscapes.com

RESIDENTIAL

Expert Craftsmanship

he Preston Hollow neighborhood in North Dallas is renowned for its high-end homes, but after a tornado tore through it in November 2019, many of them were

left with substantial roof damage. Precision Construction & Roofing, headquartered in North Richland Hills, Texas, was tapped to replace almost 27,000 square feet of slate and copper roofing on one residence.

According to CEO Eric Hunter, Precision Construction was perfect for the job. The company specializes in complex projects and storm restoration work. "Our focus when we started the company 12 years ago was high-end residential, mainly historic," he says, "We do all types of roofing but focus on slate, tile and copper. We're doing more and more commercial work as the years go by, and we're planning to launch a commercial division, so we'll be doing a lot more commercial work in the future."

The company is well-known for

its work on historic homes featuring Ludowici tile. "We're the Ludowici Contractor of the Year for four years running, and we've won Ludowici Roof of the Year for five years in a row," notes Hunter.

This slate and copper roof was one of the biggest residential projects the company has ever tackled. "It's a monster," says Hunter,

The existing roof was comprised of copper panels and Chinese slate, which was installed by the home builder. "We tore that off – or I should say the tornado tore a lot of it off for us," Hunter recalls. "It had extensive tornado damage. All that copper standing seam you see on the roof at the top was completely gone."

One of the company's salesman found a section of the copper roof draped over a power line two blocks away.

Precision dried in the damaged roof and completed the roof replacement as part of an insurance claim. After the claim was approved and slate arrived, High-End Residence Gets New Slate and Copper Roof After a Tornado

WRITTEN BY CHRIS KING

the actual installation took about six weeks from start to finish.

One crew worked on the slate sections while another handled the copper work. "It was kind of a combined effort," Hunter explains, "Naturally, we started with the slate, but there were parts of the standing seam we had to do before we could continue with the slate. I would say the slate was about 85 percent done, and then we did all the copper. We had to go back and actually put on the remaining 15 percent of the slate after the copper was done. There was a lot of coordination involved in that."

SLATE AND COPPER

For the slate sections, crews installed ice and water shield from PABCO along the eaves, valleys, hips and ridges, as well as Precision's private labeled synthetic underlayment.

The slate roof combined products from of two different suppliers. North County Black Slate was blended with a Vermont Slate Unfading Green. "I think that North County Black is the nicest slate in the world," Hunter notes. "It's amazing stuff. We took that and blended it in with the Vermont S1 Grade Unfading Green."

Slate can have natural color variation, and proper blending is essential. Hunter estimates that the blending process took 60 man-hours to complete. "The blending is all done on the ground," he says, "We took one piece of slate from every single palette of the North Country Black and blended that together. We did the same with the Unfading Green. That was all blended, and then we blended the two colors together to come up with the percentages on the roof. When that slate was brought up on the roof and put on the toe boards, it was brought up there to be put on in that order."

The slates had been hand punched at the quarry with two nail holes. Approximately 22,700 square feet of slate was installed using copper nails

Copper was the only option considered for the low-slope roof sections and details. "Copper should be used, in my professional opinion — if not lead — on every single slate roof in the country, no matter where it is," Hunter says. "Copper is the only metal that can withstand freeze-thaw, the elements, and the heat for hundreds of years. In Texas, lead isn't popular because, believe it or not, squirrels love lead. It's like a snack to them."

Flashing, gutters, downspouts and other details were fabricated from scratch. "Any slate or tile project we install, no matter what, has copper everything on it – drip edge, valley metal, step flashing, counterflashing," Hunter says. "Every one of the pipe jacks you see on that roof was hand made from copper. All of the gable vents, dormer vents and any other vents were fabricated by us either on site or in our warehouse."

Approximately 3,700 square feet of double-lock copper panels were



fabricated on the site. "Those panels were taken up, and if any modifications needed to be made, we had our bender, our breaker and our cutter up there at the very top," Hunter notes. "We hand crimped and hand bent every one of those panels up there on the roof. We made sure those double locks were nice and tight. It probably took about two weeks to do all of the copper."

Hunter credits his experienced crews for their expert workmanship. "Where there would be a hip or a valley, everything was soldered," he says, "Soldering is very time consuming. You've got to really know what you're doing."

Challenges included notorious Texas weather and steep terrain at the back of the house that made access difficult. The slate could only be delivered in the front and had to be carried to the back. "This house was hard because in the back the scaffolding went up three stories," Hunter says. "There's a patio area in the back that actually drops down a story."

Crews were tied off 100 percent of the time for fall protection. "That roof is so steep that you have to be very careful and use every safety measure you can," Hunter says. "Those standing seam roofs are 45 or 50 feet up in the air." The completed project shows off the craftsmanship that is the hallmark of the company, according to Hunter. "It was a very, very time-consuming job, but it was not rushed," he says. "Our slogan at Precision is 'We Build Pretty Roofs.' It's kind of spread. People will say, 'You're the guys who build the pretty roofs!' That's been our hashtag and our motto for years. We just really take pride in our work."

PRESTON HOLLOW RESIDENCE DALLAS, TEXAS

TEAM

ROOFING CONTRACTOR: Precision Construction & Roofing, North Richland Hills, Texas, <u>precisionconstructionandroofing.</u> <u>com</u>

MATERIALS

SLATE: North Country Black, North Country Slate, <u>ncslate.com</u>, and Vermont Unfading Green, Vermont Slate Company, <u>vermontslateco.</u> <u>com</u>

COPPER: Double-lock standing seam copper panels

AD DIRECTORY

COMPANY	PHONE NUMBER	WEB ADDRESS	PAGE
Ace Clamp	(860) 479-0876	www.PMCInd.com	14
Advanced Architectural Sheet Metal	(231) 861-0050	www.AdvArchSM.com	33
Aztec Washer	(800) 388-6134	www.AztecWasher.com	35
Bison Innovative Products	(800) 333-4234	www.BisonIP.com	37
BloBlades HVLS Fans	(833) Blo-Fans	www.BloBlades.com	53
Building Products Development	(866) 766-3254	www.BPDusa.com	49
Dryer Jack	(561) 743-8696	www.DryerJack.com	45
Dynamic Fastener	(800) 821-5448	www.DynamicFastener.com	19/84
Equipter	(717) 661-3591	www.Equipter.com	9
Flex Roofing Systems	(800) 969-0108	www.FlexRoofingSystems	15
GAF	(973) 628-3000	www.GAF.com	13
GSSI	(800) 288-9489	www.GSSISealants.com	6
IMETCO	(800) 646-3826	www.IMETCO.com	35
International Roofing Expo	(972) 536-6300	www.TheRoofingExpo.com	39
K & M Sheet Metal	(919) 544-8887	www.KMSheetMetal.com	31
LiveRoof	(800) 875-1392	www.LiveRoof.com	25
LMCurbs	(800) 284-1412	www.LMCurbs.com	49
Malarkey Roofing	(503) 283-1191	www.MalarkeyRoofing.com	4
Marathon Drains	(800) 824-8424	www.MarathonDrains.com	21
Metal Plus LLC	(860) 379-1327	www.MetalPlusLLC.com	38
MetalForming	(770) 631-0002	www.Metalforming-USA.com	2-3
MFM Building Products	(740) 622-2645	www.MFMBP.com	23
Mule-Hide Products Co. Inc.	(800) 786-1492	www.MuleHide.com	51
NB Handy	(434) 847-2498	www.NBHandy.com	27
Polyglass USA, Inc.	(954) 233-1239	www.Polyglass.us	5
RK Hydrovac	(800) 762-8361	www.RKHydrovac.com	83
Roofing Alliance	(847) 299-9070	www.RoofingAlliance.net	29
Roof Hugger	(800) 771-1711	www.RoofHugger.com	37
Shredded Tire	(844) 480-8473	www.ShreddedTire.com	17
Swenson Shear	(877) 588-8748	www.SwensonShear.com	11
Triad Corrugated Metal	(866) 625-9727	www.TriadMetalRoof.com	12
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