September / October 2020

Vol. 11 No.5

line

THE INDUSTRY'S VOICE

Roofing FOR Green Future

Georgia Tech's Kendeda Building

More Education Projects

> **BUSINESS SENSE** Changes in PPP Loan Requirements

CONSTRUCTION LAW
COVID-19 Liability Waivers

TECH POINT Zinc Roofing in Coastal Applications

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ROOFS WALLS FOUNDATIONS PARKING DECKS BRIDGES ADDITIONAL EXPERTISE



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TITE-LOC PLUS METAL ROOFING SYSTEM Custom color: Marguis Orange

Bright Future

Petersen's Tite-Loc Plus metal roofing system in a distinctive Marquis Orange finish brightens the vision of the new Latrobe Elementary School. The 22-gauge panels complement the classic terra cotta-toned brick that clads the upper two-thirds of the school's façade.



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ON THE COVER

With a combination of great insulation, energyefficient systems, and a rooftop solar array, the 46,800-square-foot Kendeda Building is engineered to actually produce more energy than it consumes.



Photo: Jonathan Hillyer



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RAISE THE ROOF

WRITTEN BY CHRIS KING

A Green Future

he cover story of this issue is titled "Roofing for the Green Future." The article documents the design and construction of The Kendeda Building for Innovative Sustainable Design on the campus of Georgia Tech. The design team decided to meet the rigorous performance requirements of the Living Building Challenge – the world's most ambitious green building program.

A TPO roof system with optimal polyiso insulation, energy-efficient mechanical systems, and a rooftop solar array are designed to help the 46,800-square-foot Kendeda Building produce more energy than it uses. The roof is also designed to capture rainwater for collection into an underground cistern. It is also home to a 1,000-square-foot accessible roof deck and a 4,300-square-foot rooftop garden, complete with a honeybee apiary.

The Kendeda Building is an amazing example of sustainability, resilience, and energy efficiency in action, but the headline "Roofing for the Green Future" would have worked on every project profiled in this issue. The designers, installers, and manufacturers of the roof systems detailed here all focused on bringing energy

efficiency, durability, and resilience to life.

Examples include the metal and modified systems installed on the new Latrobe Elementary School; the synthetic slate, built-up, and green roof systems on the University of Minnesota's renovated Pioneer Hall; the new EPDM system installed on the 66,300-square-foot hyperbolic paraboloid roof of the athletic complex at Clarkson University; and the energy-efficient wall systems on the new gymnasium at Pacific Christian.

On a massive Texas project, 195,000 square feet of a high school's campus was re-roofed with a highly reflective modified system to alleviate concerns about the urban heat island effect. At an elementary school re-roofing project in Michigan, an

energy-efficient PVC roof system was installed and 8,700 pounds of the old PVC membrane was recycled, keeping it out of the landfill and resulting in a lower cost for the school district.

It's rewarding to cover projects that embody a true win-win-win scenario. Installing a truly resilient roof system can provide optimal protection for building occupants, ease the burden on the environment, and offer a lower life-cycle cost to the owner. You don't hit that trifecta in business very often.

In a year in which "back to school" has a radically new meaning for many, it's uplifting to see these educational facilities being constructed for the long haul. For many, the first day of school this year found students at home, in front of their computers. Let's hope everyone will soon be exploring a brighter future together, in buildings designed to bring out the best in us.





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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!



Don't Let Your Metal **Send** You Over the Edge

The importance of a properly designed roof edge system should not be underestimated. On average, the roof edge typically represents only 1% of a building's overall cost. However, improper design and installation of the roof edge can have catastrophic consequences. As one of the most vital parts of a roofing system, it's imperative that coping and fascia are included in your roof system warranty – that is why Carlisle created the new "Edge-to-Edge" Golden Seal Total System Warranty.



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Keith A. Boyette is an attorney with Anderson Jones, PLLC in Raleigh, North Carolina, a law firm with attorneys licensed in North Carolina, South Carolina, and Georgia. In "Business Sense," page 34, he examines how changes in guidelines for the **Paycheck Protection** Program might make the program more attractive to contractors.



John A. D'Annunzio is president of Paragon Roofing Technology Inc., a Construction Engineering Firm he founded in 1989 in Troy, MIchigan. In "Details," page 40, he outlines key principles of business management that are crucial in uncertain times.



Brian Oblow is a Partner at Cotney Construction Law who represents clients in all aspects of construction law and arbitration. In "Construction Law," page 48, he explores the concept of liability waivers and examines whether COVID-19 liability waivers are enforceable.



Charles "Chip" McGowan is president of Rheinzink America. Inc., a company providing architecturalgrade zinc materials for roofing and wall cladding systems throughout North America. In "Tech Point," page 50, he details five key elements to consider when working with zinc in coastal roofing applications.



Thomas W. Hutchinson, AIA, CSI, Fellow-IIBEC, RRC, is a principal of Hutchinson Design Group Ltd. in Barrington, Illinois. In "The Hutchinson Files," page 54, he continues his series on resiliency in roof details by exploring the design and construction of durable parapet walls.



Justin Koscher is the president of the Polyisocyanurate Insulation Manufacturers Association (PIMA). In "Education," page 60, he reveals how the new Kendeda Building for Innovative Sustainable Design at Georgia Tech lives up to its name.



Louisa Hart is the director of communications for the Washingtonbased EPDM Roofing Association (ERA). In "Education," page 68. she documents Clarkson University's project to rehab the roof of its Indoor Athletic Facility, noting how the roof system met key standards relating to energy efficiency, durability and resiliency.



Thomas Renner writes on building, construction, and other trade industry topics for publications in the United States. In "Education," page 80, he analyzes the renovation of the theater at Middlesex School to illustrate the crucial benefits of acoustical smoke vents.



Rick Hackett is product manager with Boral Roofing, a provider of durable and energy-efficient new and retrofit roofing solutions. In "Residential," page 84, he recounts how two designers conceived and rebuilt their home after a fire to exemplify energy efficiency, sustainability, and safety.

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NEW&NOTABLE



New England Metal Systems and Drexel Metals Win Top Honors in MRA Best Residential Metal Roofing Project Competition

THE METAL ROOFING ALLIANCE (MRA) selected New England Metal Systems and Drexel Metals as the winners of its Best Residential Metal Roofing Project competition for the second quarter of 2020. The winning project features the installation of a new metal roof on a 1992 contemporary craftsman home located in New Hampshire. Installed over the home's original asphalt roof, the 24-gage galvalume snap lock standing seam metal roof was manufactured by MRA member Drexel Metals. Even with the home's round roof areas, curved facia and custom pie shaped panels, it took the installer New England Metal Systems just under a week to complete the job.

"Our family business has specialized in standing seam metal roofing for over 20 years, and on my initial consultation with this homeowner, I knew this was a project I wanted to do," said Chris Leighton, owner operator of New England Metal Systems. "I was excited and inspired by the complexity and challenge. I love the end result and am proud to have this project recognized by the Metal Roofing Alliance."

For more information about how to enter MRA's "Best Metal Roofing" competition for the trades, visit <u>www.metalroofing.com</u>.

Roper Whitney Announces Partnership With EvoBend

Roper Whitney announced a partnership with EvoBend GmbH to bring the next generation of sheet metal folding equipment to the metal fabrication marketplace in North America. As of August 2020, Roper Whitney is the exclusive sales, distribution, and service centers for EvoBend up/down folders (models D300, D600, D800) in the North American market. The product line features patented technologyfor the folding system as well as patented features for operator safety. For more information, visit www.roperwhitney.com/evobend.



A.C.T. Metal Deck Supply Celebrates 50 Years in Construction Industry

A.C.T. Metal Deck Supply, headquartered in Aurora, Illinois, announced that the company is celebrating 50 years in the construction industry. Nick A. Polizzi, working out of his basement as a metal deck broker, originally founded Area Construction Trades (A.C.T.) Inc., in 1970. Nick A. Polizzi is still involved as an advisor for the company.

A.C.T. Inc. worked for the next 35 years as a metal deck subcontractor, furnishing and installing metal deck packages, including drawings and all coordination along with seven field crews. The company no longer works as a subcontractor, phasing out the erection services in October 2007.

A.C.T. Metal Deck Supply began out of a direct need in the marketplace for a metal deck stocking dealer. One truckload of B22 Prime Painted Roof Deck was brought into a warehouse in Schaumburg, Illinois. Today the company's network has grown to 15 locations around the country, which gives A.C.T. Metal Deck Supply national/international exposure. The family-owned and operated company prides itself on fulfilling the needs of the metal deck users in the building community.

For more information, visit <u>www.</u> <u>metaldecksupply.com</u>.

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NEW&NOTABLE



Rutter Roofing Awards New Roof to Local Army Veteran

RUTTER ROOFING, a full-service, family-owned-and-operated exterior remodeling company located in Malvern, Pennsylvania, awarded Lower Pottsgrove resident retired Army Sgt. Joe Oberholtzer with a brand-new roof as part of its annual Memorial Day Giveaway. As the winner of the veteran-aimed promotion, Oberholtzer received a free CertainTeed roof system, which was installed the first week of July courtesy of Rutter Roofing.

Oberholtzer, who served in the U.S. Army from 2001-2009 where he received several honors for bravery and humanitarian work, was unknowingly entered into the giveaway by his father-in-law.

As a retired sergeant, Oberholtzer continues to give back to the community as a lifelong member of the Sanatoga Fire Company, where he is a former deputy chief. Today, he and his wife, Shannon Oberholtzer, both serve as first-responders in Montgomery County, Pennsylvania.

Oberholtzer said he's touched by Rutter Roofing's generosity. "For us to be helped and be recognized is like all the pieces of our lives falling perfectly into place," said Oberholtzer.

For more information about Rutter Roofing, visit <u>www.rutterroofing.com</u>.

GAF Energy and Sunnova Team Up to Expand Roof-Integrated Solar Options

GAF ENERGY and Sunnova Energy International Inc. announced a strategic partnership to provide homeowners with GAF Energy's DecoTech 2.0 solar roofing system together with Sunnova's solar service offerings. The partnership is designed to leverage both companies' reach in the new home and re-roof markets and exemplifies the growing convergence between roofing and solar.

"I'm excited to be working with Sunnova to expand solar roofing choices for homeowners across the country," said Martin DeBono, President of GAF Energy "This partnership represents a coming together of two complementary powerhouse companies. As our industry continues to grow, this partnership will enable us to optimally monetize opportunities with solar roof products and financing."

"This partnership is a strategic win-win-win for Sunnova, GAF Energy and homeowners looking for ways to power their homes with clean energy and a new roof," said John Santo Salvo, Executive Vice President of Channel Operations and Chief Procurement Officer at Sunnova.

GAF Energy introduced the updated DecoTech 2.0 earlier this year. For more information, visit <u>www.gaf.energy</u>.

Mule-Hide Products Names New Regional Directors

Mule-Hide Products Co. Inc. has promoted Ken Schultz to regional direc-

tor for the West and Midwest regions and Rob Keating to regional director for the Northeast region.

A 19-year veteran of the roofing industry, Schultz has led Mule-Hide Products' West region since 2017, first as regional manager and then regional director. He now adds oversite of the Midwest region to his responsibilities. He joined Mule-Hide Products in 2016 as a technical representative. He began his career as a general manager at Owens Corning and then served as a warranty investigator for Firestone Building Products. He studied at the University of Indianapolis.

Keating had served as territory manager for Mule-Hide Products' South Jersey territory since 2014. He came to Mule-Hide Products from TRUFAST, where he had been Northeast regional manager for six years. He has a Bachelor of Science degree in marketing from Penn State University.



Ken Schultz



"Ken and Rob are both outstanding leaders,"

said Mule-Hide Products Managing Director Dan Williams. "They have been major contributors to Mule-Hide's success, and I have no doubt that they will continue to accomplish great things."

For more information, visit <u>www.mulehide.com</u>.

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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>www.NRCA.net</u>.



The Roofing Alliance Announces 2020-2021 Melvin Kruger Endowed Scholarship Recipients

THE ROOFING ALLIANCE, the foundation of the National Roofing Contractors Association (NRCA), announced the 2020-21 Melvin Kruger Endowed Scholarship Award recipients. For more than 30 years, the Roofing Alliance has invested time and funds to help educate the roofing industry and the industry's youth. This has been made possible through the Melvin Kruger Endowed Scholarship Program, which was named for Melvin Kruger, a former president of NRCA, a former president of the Roofing Alliance and CEO of L.E. Schwartz & Son Inc.. Macon, Georgia. NRCA contractor and supplier members, their families and their employees are all eligible to partake in this program as long as they intend to pursue a career in the roofing or construction industries.

The Roofing Alliance awarded one new \$5,000 Melvin Kruger Endowed Scholarship to:

Jacob James, stepson of Raymond Orman, quality assurance and field trainer, Schwickerts Tecta America, Mankato, Minnesota.

In addition, the Roofing Alliance renewed eight Melvin Kruger Endowed Scholarships to:

Davis Edwards

Dan Cohen Scholarship, attending Huntingdon College.

Salvador Flores Garcia

Beacon Roofing Supply Scholarship, attending University of California: Berkeley.

Matthew Killgore

OMG Scholarship, attending Arkansas State University.

Elaina Krumholz

Fred Good Scholarship, attending the University of Minnesota.

Morgan Patterson

OMG 2nd scholarship, attending DePaul University.

John Paynter

Melvin Kruger Scholarship, attending East Carolina University.

Calvin Raymore

William Good Scholarship, attending the University of Delaware.

Cameron Tickerhoff

Firestone Scholarship, attending Penn State University.

"A total of \$40,000 was awarded for scholarship renewals," stated Kyle Thomas, current president of the Roofing Alliance. "We also awarded \$5,000 for one new scholarship for a total of \$45,000 for the 2020-21 school year. To date, the Melvin Kruger Endowed Scholarship program has awarded 131 students a total of \$890,000 in scholarship awards. We are very honored to give back to the next generation of roofing professionals in this way."

Each scholarship recipient is awarded \$5,000 and eligible for renewal for up to three years of undergraduate study. This is a merit-based scholarship.

For details on the 2021-22 Melvin Kruger Endowed Scholarship program, visit <u>www.roofingalliance.net</u>.

NRCA Reschedules 134th Annual Convention to Coincide With 2021 IRE

The NRCA has rescheduled its 134th annual convention to coincide with Irving, Texas-based Informa's 2021 International Roofing Expo, which was rescheduled from February to April amid the COVID-19 crisis. NRCA's convention will be held April 12-16, 2021, in conjunction with the 2021 IRE at the Mandalay Bay Convention Center in Las Vegas.

NRCA expressed its full support as Informa decided to reschedule the 2021 IRE. Informa and NRCA believe rescheduling the dates was the right choice to ensure a safe, productive and relaxed environment for attendees. For more information, visit <u>nrca.net/convention</u>.

NRCA Offers New Website Focused on Careers in Roofing

The NRCA announced it has launched a new website, www. careersinroofing.com, that offers resources that highlight the career opportunities available in the roofing industry and provides a recruitment tool for roofing companies. According to NRCA, the resources emphasize opportunities for success can be found on the roof, in the shop, in the office and in manufacturing facilities, underscoring the stability and income a roofing industry career can provide. The website also features training and education resources.

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TECHTOOLS



Roof Hugger Unveils New Website

Roof Hugger announced the launch of the company's new website. New features of the site include dedicated sections for Design Professionals, Building Owners, and Contractors, where they will find all the information they need to determine which Hugger will be best suited for their project, as well as informational videos of "Huggers in Action" and a 3D Animated Installation video. An allinclusive Download page provides access to all of the company's part drawing details, specifications, design manual, the latest brochure, and testing data. A new comprehensive Products Page and Get A Quote button are available. For more information, visit <u>www.roofhugger.com</u>.



Stormseal Launches New U.S. Website

Stormseal introduced a website that addresses the needs of contractors based in the United States. Stormseal is a polyethylene film that heat-shrinks to securely wrap a damaged roof or structure. Visitors to the site will be able to access the latest company news and information, as well as easily view dates and locations for the U.S. training centers. Following training, contractors are issued a user name and password, allowing access to the online ordering portal on the Stormseal website. Contractors order what they need and the product is delivered to their door. For more information, visit <u>https://stormseal.com/us/</u>.



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WHITE



Expanded Shingle Line Offers Enhanced Products

GAF announces the latest expansion of its residential product line with the newly enhanced Timberline American Harvest shingles (Timberline AH), now featuring proprietary GAF StainGuard Plus and LayerLock technologies across its range of distinct color blends. According to the company, StainGuard Plus time-release technology delivers long-lasting algae fighting power and a 25-year limited warranty against blue-green algae discoloration. GAF Timberline AH shingles are engineered for fast and accurate installation, and new Timberline AH shingles offer up to 99.9 percent nailing accuracy and up to 30 percent faster nail fastening during installation vs. Timberline HD shingles.

www.GAF.com Circle No. 17



Full-Body Harnesses Available in Extra Small Sizes

Malta Dynamics offers Extra Small sizes for six of the company's full-body fall protection harness models. Proper sizing is critical in fall protection harnesses, and the Extra Small (XS) harnesses are designed to better fit workers for whom small and medium harnesses may be too big and fit too loosely. The XS harnesses are designed to fit comfortably for heights ranging from 4'10"–5'8" and weights of 130–180 pounds. The belt sizing on the XS harness is optimized for waists measuring 26"–36" (66–91 cm).

www.MaltaDynamics.com

Circle No. 18

Granulated Cap Sheet Features Fire Retardant Additives

Polyglass announces Modibond G FR, an APP (plastomeric) granulated cap sheet for low-slope roofs. Featuring fire retardant additives, Modibond G FR is specially designed for heat welded applications. Modibond G FR can be applied directly over an acceptable substrate or as part of a multi-ply system. It is classified as an acceptable option in UL Class A assemblies for a fully adhered cap sheet on a combustible deck. Modibond G FR incorporates a high-quality polyester mat, providing superior tear strength and puncture resistance. The quality APP compound and durable construction ensures long-term weathering performance. The top surface is granulated while the bottom surface has a factory applied burn-off film.

www.Polyglass.us Circle No. 19



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MATERIALS & GADGETS



Custom Single-Ply Accessories

Mule-Hide Products Co. Inc. offers new custom single-ply accessories for contractors to deliver TPO and PVC roofing systems. The new program is an extension of the company's existing collection of prefabricated accessories. Designed for use on unusually sized or shaped roof protrusions that will not accommodate standard accessories, the custom accessories provide a neater, more polished appearance than is possible with field wrapping. Accessories available include round boots (split and closed), square tube wraps (split and closed), conical boots (split and closed), scuppers (through-wall and overflow), curbs, breather vents (one-way and two-way), and sub base and boot assemblies.

www.MuleHide.com Circle No. 21



Rooftop Attachment Anchor

OMG Roofing Products introduces PowerGrip Universal 7 (PGU-7), a rooftop attachment anchor for mounting solar racking systems and other products to virtually any commercial roof. PGU-7 units are designed to reduce or eliminate the need for ballast in solar racking systems, so there's less weight, material handling and labor on the roof. Made of heavy-duty cast aluminum, PGU-7 units include a base ring that is secured through the roofing assembly and into the structural roof deck, as well as a waterproof cover plate to prevent water from infiltrating the system.

www.OMGroofing.com Circle No. 22



Roof Ventilation Intake and Exhaust Systems

Atlas Roofing Corporation introduces its new TruRidge and HighPoint Roof Ventilation intake and exhaust systems. These ventilation products complement the current line of Atlas residential roofing products and are the company's first ventilation products, designed to improve home energy efficiency and maintain optimal roof performance as part of the Atlas Signature Select Roofing System. The TruRidge and HighPoint systems are manufactured with a proprietary polymer that is formulated to withstand the rigors of severe weather conditions. When properly installed, TruRidge and HighPoint exceed U.S. Department of Energy recommendations and all nationally recognized ventilation building codes.

www.AtlasRoofing.com Circle No. 23

New House-Branded Synthetic Roof Underlayment

Gulfeagle Supply launches its house-branded synthetic roof underlayment: Gulfeagle SecureGrip25, manufactured by Continental Materials, Inc. (CMI). This synthetic underlayment is proprietary to Gulfeagle. The Gulfeagle SecureGrip25 is 48 feet wide and 250 feet long, and boasts a 90-day exposure rating and a 25-year material warranty. The Gulfeagle underlayment is made with ultraviolet inhibitors in all four layers of construction and each roll carries a tracking number for total traceability and quality assurance.

www.Gulfeagle.com Circle No. 24



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MATERIALS & GADGETS



New Line of Rooftop Fall Arrest Anchors

Kee Safety introduces its comprehensive line of Kee Rigid Anchors fall arrest systems to provide personal fall protection. Available in stock for shipment within 24 hours, they are designed to withstand a pull-out force of 5,000 pounds applied in any direction and meet applicable OSHA, ANSI, and Cal/ OSHA standards. New Kee Rigid Anchors are galvanized for corrosion resistance and durability, easy to install, and have insulated posts to stop conductivity and provide for temperature consistency on the building, according to the company. The product line includes five standard options to meet a wide range of building and roof types.

www.KeeSafety.com Circle No. 26



Cleaning and Disinfecting Products

The Garland Company, Inc. launches its innovative Defense Force line of highperformance products designed to either clean, disinfect and/or protect commercial facilities. The flagship Defense Force product is D7, a safe and effective EPAregistered antimicrobial disinfectant that kills bacteria, fungi, germs and viruses in minutes and has demonstrated effectiveness against viruses similar to the coronavirus/COVID-19. The Defense Force product line also includes Clear-Shield, a patented, clear acrylic water-based solution designed to protect a roof's existing surface, and Clean-Shield, a biodegradable, nontoxic cleaning solution formulated to safely and effectively clean, brighten and restore a variety of masonry substrates.

www.GarlandCo.com Circle No. 27



High-Performance House Wrap

Benjamin Obdyke offers a new and improved Flatwrap HP house wrap. Flatwrap HP is a high-performance house wrap designed for use in non-absorptive cladding applications or in conjunction with a rainscreen for other applications. According to the manufacturer, the product offers superior durability via a trilaminate polypropylene substrate. The trilaminate design protects the water hold out laver from damage during install. Flatwrap HP can be installed as an air barrier and is also breathable with an ideal perm rating between 10 and 20 perms per building science research. The product can be exposed for 120 days before cladding install and offers a gray, low-glare surface for easy install.

www.BenjaminObdyke.com Circle No. 28

Hybrid Snow Guard System

Alpine SnowGuards unveils the Fusion-Guard, a hybrid snow guard system that offers the option of adding pipe-style snow guards to the new pad-style snow guard. According to the manufacturer, Fusion-Guard is a "best of both worlds" solution to managing snow on most new and existing roof types because it pairs the company's newly designed pad-style snow guard with an optional pipe-style approach to managing snow. The system's two optional 3/8-inch rods are accepted by the Fusion-Guard Rod Bracket, which fastens onto the back of the snow guard face, allowing the installer to add rods if desired during, or any time after, the initial installation.

www.AlpineSnowGuards.com Circle No. 29





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MATERIALS & GADGETS



PVC Spray Contact Adhesive

ICP Building Solutions Group launches Polyset PVC Spray Contact Adhesive, designed as a portable, self-containing, single component solution with speed and simplicity in mind. Engineered to adhere most PVC membranes to most vertical walls and substrates for commercial low slope roofing applications, Polyset PVC Spray Contact Adhesive delivers high adhesive output with a fast setup time, helping commercial roofing professionals reduce labor time and complete jobs faster. According to the company, the adhesive can be applied in temperatures as low as 25°Fahrenheit and higher.

www.ICPgroup.com Circle No. 31



Balcony Roof Window Available in Smaller Size

VELUX introduces the Cabrio Balcony Roof Window MK19, which is designed to provide a cost-effective alternative for homeowners looking to open up attics with low, angled ceilings. According to the company, the new size is 20 percent smaller in width than the standard Cabrio Balcony and costs 35 percent less. The Cabrio Balcony MK19's rough opening size is 32 inches by 101 inches, compared to the Cabrio Balcony PK19, which has a rough opening of 39.5 inches by 101 inches. Both have a clear lacquer wooden interior frame and grav aluminum exterior cover. When closed, the product is flush with the roof, making it a seamless addition to the roofline.

www.VeluxUSA.com Circle No. 32



New Line of ANSI-Rated Safety Helmets

The new line of Ridgeline XR7 Safety Helmets from **Pyramex Safety** is the company's latest addition to its trusted Ridgeline series, incorporating expertly designed features like a comfortable breakaway chin strap that secures the hat and offers protection from strangulation should a major fall occur, as well as the ability to attach earmuff and face shield accessories to adapt to the needs of any work environment. The new Ridgeline XR7 Safety Helmet is constructed of ABS/PC material that's not only ultra-lightweight, it offers superior strength and increased heat resistance.

www.PyramexSafety.com Circle No. 33

New Line of Evaporative Coolers

Big Ass Fans offers new line of evaporative coolers. Cold Front by Big Ass Fans brings a full range of customer options for use in spaces of all sizes and applications, delivering a dramatic temperature reduction up to 33 degrees Fahrenheit. Capable of covering anywhere from 600 to 6,500 square feet, the Cold Front lineup allows owners to cool at a fraction of the cost of air conditioning, plus take comfort outside and on the go with ease. Designed for convenience, all models feature locking swivel casters, automatic low-water shutoff, and an easily accessible drain plug, while the largest model adds a backlit LCD display, premium remote, occupancy sensor for hands-free operation, and an auto-dry function.

www.BigAssFans.com Circle No. 34





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ROOFERS'CHOICE

Metal Roofing and Siding Panels Recreate the Look of Reclaimed Metal

eclaimed Metal Rust is a pre-painted metal roofing and siding panel from Western States Metal Roofing that rec-

reates the look of reclaimed metal. The panel is made of new steel that looks like an old barn. The panel features white and silver coloring with orange and reddish rust streaks throughout its design to mimic the look of old, faded galvanized that is rusting. The panel is available in Kynar 500 paint system and comes in ten different profile finishes. Reclaimed Metal Rust is a proprietary color of Western States Metal Roofing and offers a solution for architects and designers that want the look of reclaimed metal without the problems of reclaimed metal.

"Our customers wanted something that looks like faded galvanized and a rusted roof at the same time. Previously, the only way to get something like that would be to locate an old building that had reclaimed sheet metal on the roof," said Paul Rubio, Vice President of Western States Metal Roofing. "That's expensive and hard to find. We thought there has to be a better way. That led us to create the Reclaimed Metal Rust panels, which are new steel panels that look like they were taken from an old barn that's 100 years old."

According to the company, this specialty paint print is available in coil, flats, metal roofing, siding, and wall panels. Reclaimed Metal Rust panels come in a PVDF/Kynar 500 paint finish. These panels are designed for interior and exterior applications.

LEARN MORE

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The "Roofers' Choice" selection is determined by the product that receives the most reader inquiries from the "Materials & Gadgets" section in a previous issue. This product received the most inquiries from our May/June 2020 issue.





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BUSINESS SENSE

WRITTEN BY KEITH A. BOYETTE



SBA Relaxes PPP Loan Requirements for Coronavirus Relief

ON MARCH 27, 2020, Congress enacted an unprecedented \$2 trillion stimulus package, called the Coronavirus Aid, Relief and Economic Security Act (CARES Act), aimed at assisting people, states, and businesses nationwide that have been devastated by the coronavirus pandemic.

As part of the CARES Act, the U.S. Small Business Administration (SBA) was authorized to issue special loans to employers in need of financial assistance. Through two rounds of funding, approximately \$659 billion has been allocated to the Paycheck Protection Program (PPP), intended to provide short-term financing to small businesses that would otherwise be forced to lay off employees, and in some cases close the doors, as workers continue to stay home as a result of the outbreak. As of the date of this article, approximately \$100 billion is still available in the fund.

Under the PPP, eligible businesses include all businesses — including 501(c)(3) nonprofits, 501(c)(19) Veterans organizations, Tribal concerns, sole proprietorships, self-employed individuals, and independent contractors - with 500 or fewer employees, or no greater than the number of employees set by the SBA as the size standard for certain industries. As for the construction industry, now more than ever, cash flow is essential to short-term and long-term sustainability. However, in addition to the size requirements, construction companies seeking a PPP loan were also required to ensure that their annual revenue would stay within SBA-set limits that the agency typically uses to determine eligibility for other SBA loans.

Understandably, with unanticipated delays and ever-changing plans to "reopen" varying from state to state, construction companies have been faced with the difficult task of providing thorough and accurate information regarding anticipated annual revenue numbers when applying for PPP loans. On April 4, 2016, the Associated General Contractors of America (AGC) recognized the difficulty construction companies faced to obtain much needed financial assistance and urged federal officials to revise the rules in order to encourage construction companies to seek assistance.

As discussed below, in response to the AGC, the U.S. Treasury Department issued new guidance that cleared the way for construction companies to apply for loans through the PPP, and in recognition of the growing need for additional funding and further expansion, Congress revised a number of PPP qualifiers and loan requirements.

THE NEW "EITHER/OR" STANDARD

Initially, construction companies were required to meet both the workforce-size and annual revenue limits, which caused many construction companies to balk at PPP assistance. However, on April 6, 2020, the Treasury Department issued formal guidance stating that in order to be eligible for a PPP loan, construction companies must now meet either the 500-employee threshold or the annual revenue ceiling, but would no longer be required to meet both criteria.

THE PAYROLL PERCENTAGE REDUCED

When the PPP was first introduced, it required all borrowers to use 75 percent of the loan for payroll purposes and further required companies to retain and bring back furloughed or terminated employees in order to qualify for loan forgiveness. In many states around the country, however, construction crews were not permitted to work, making it difficult for companies to spend the required amount on payroll expenses.

Now, with revisions and expansions from Congress, the payroll percentage threshold to qualify for forgiveness is lower, at 60 percent, which allows construction companies to spend more of their PPP loan on other much needed business necessities. Additionally, under the new terms of the PPP, companies are only accountable for the percentage under 60 percent that is not used for payroll purposes at a 1 percent interest rate.



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Both Durapon 70° for coil and extrusion coating can be formulated using "cool" pigments to comply with industry energy conservation initiatives such as LEED, Title 24, Energy Star®, and ASHARE.











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THE TIME FRAME FOR SPENDING

Under the initial PPP requirements, construction companies had eight weeks to spend their PPP funding on qualifying payroll expenses. However, for construction companies and materials suppliers, it was difficult to spend

75 percent of their loan on payroll expenses in the face of uncontrollable and unavoidable delays in such a short time frame. Under the relaxed PPP requirements, companies are now given 24 weeks for such spending, which provides much needed relief for smallto mid-sized construction companies.

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Construction companies who have already obtained PPP funding should contact their lender to request an extension under the new rules.

THE HIRE-BACK DEADLINE

With the exception of employees that were unwilling to return to the jobsite, the PPP originally required businesses to re-hire furloughed or terminated employees by June 31, 2020. Under the new rules, the period to re-hire employees has been extended to December 31, 2020, and still allows a company to gualify for forgiveness even if it is unable to fill a vacated position due to specialization, such as licensed architects and engineers, or employee refusal.

The U.S. Treasury **Department issued new** guidance that cleared the way for construction companies to apply for loans through the PPP, and in recognition of the growing need for additional funding and further expansion. **Congress revised a** number of PPP gualifiers and loan requirements.

THE PPP APPLICATION AND REPAYMENT DEADLINES

The original application deadline for the PPP was June 31, 2020. From the time the PPP was introduced, up until the recent revisions and expansions. nearly 5 million companies applied for relief. Such high demand, coupled with rumors that funding was severely limited, caused many construction companies to pass on applying for a loan. Today, however, approximately \$100 billion is still available to gualifying companies and the application
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deadline has been extended to December 31, 2020.

In situations where a company could not qualify for loan forgiveness, the previous version of the PPP required loan repayment within two years of receipt. That repayment period has now been extended to five years, allowing greater relief to companies who may not be able to qualify for full forgiveness in the future. Construction companies in need of financial assistance should contact a local lender to learn about the application process and to ensure that all proper forms and agreements are in place to qualify for forgiveness or an extended payback period.



PAYROLL TAX DEFERRAL OR PPP LOAN?

Under the original PPP requirements, construction businesses were faced with deciding whether to defer payroll taxes or apply for a PPP loan. The new rules, however, allow companies to apply for a PPP loan and file for a payroll tax deferral, providing significant relief for large construction companies and suppliers.

WHAT REMAINS THE SAME?

The maximum amount available to each borrower is equal to the lesser of (a) \$10 million or (b) 2.5 times its average total monthly payroll costs, as defined in the CARES Act. Unlike most typical SBA loans, these loans are unsecured loans requiring no collateral, no personal guarantee, and no showing that credit is unavailable elsewhere. To the extent not forgiven, the loan has a maximum 10-year term and the interest rate may not exceed 4 percent. The current interest rate, as stated above, is 1 percent if repayment is necessary.

Under the revised and expanded PPP rules, construction companies, contractors, and suppliers have been provided additional opportunities to obtain much needed financial support for essential business functions. Construction companies that have already obtained a loan through the PPP, or those that intend to seek assistance through the PPP in the future, are encouraged to contact an attorney and a local lender to take advantage of the relief offered under the CARES Act and to ensure that all PPP requirements are satisfied.

ABOUT THE AUTHOR: Keith A. Boyette is an attorney with Anderson Jones, PLLC in Raleigh, North Carolina, a law firm with attorneys licensed in North Carolina, South Carolina, and Georgia. For more information or questions about this article, please email him at kboyette@andersonandjones.com.

AUTHOR'S NOTE

This article is intended only for informational purposes and should not be construed as legal advice.





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DETAILS

WRITTEN BY JOHN A. D'ANNUNZIO

Principles of Management for Uncertain Times

WE ARE IN THE midst of economic uncertainty, and no one can accurately predict how long this crisis will last and what the long-term ramifications from this crisis will be. The only certainty is that the business practices that we have relied on for decades will require change. That means that business management philosophies must be altered to meet the forthcoming challenges.

The current business environment

will require managers at every level to provide the leadership necessary to navigate the organization through the impending economic turmoil. A competent manger must always possess certain key traits to be an effective leader, such as accountability, confidence, and integrity. In these challenging times, a manager must also be organized and maintain the skills necessary to supervise and direct employees in an effort to advance the implemented goals and

strategies of the organization by communicating effectively and engaging in conflicts productively.

Managers must provide the leadership required to facilitate the required organizational change. There are six leadership traits that are essential to managing through change in uncertain times:

- 1. Ethics
- 2. Communication
- 3. Involvement

- 4. Spirit
- 5. Flexibility
- 6. Vision of the future

ETHICS

Business ethics is by definition "the moral standards by which a company conducts itself." The company's leaders and managers have a personal obligation to conduct themselves and the organization's business practices in an ethical manner. Companies with unethical business practices have lined the front page of the nation's newspapers in the last decade, perhaps none bigger than Enron and Arthur Anderson, whose demise can be directly attributed to unethical practices of top management. In some respects, the current global economic crisis has been propagated by unethical business schemes.

Business ethics is divided into three equally important categories: non-discretionary, organization specific, and discretionary.

Non-discretionary ethics includes

universal items that allow for zero tolerance if they are violated. These include laws and regulations, public and employee safety, and truthfulness in financial statements.

Organization-specific ethics involves policies and procedures that the organization adopts as the ethical standards that cannot be compromised. The organization's ethical standards should be clearly defined in the employee manual and referenced in its mission statement. It is the responsibility of all personnel to be familiar with these standards. It is management's responsibility to ensure that these standards are upheld throughout the organization. Furthermore, management should enforce a no-tolerance policy for unethical behavior.

Discretionary ethics typically involve those issues that are not necessarily illegal or against the organization's standards; however, they may still be perceived as unethical actions. The manager must set the organizational standard by acting in a fair and honest manner in all business dealings. Telling a "white lie" to close a sale is an example of discretionary ethics. Typically, these are issues that have to be conducted at a personal level. Asking such questions as "Will you be comfortable and guilt-free from your behavior in this matter?" or, "Does this behavior match stated guarantees or commitments?" could go a long way in determining the proper ethical response.

The best way to help ensure ethical conduct is through focusing on the three R's: respect, responsibility, and results.

1. RESPECT. Respect is required at all levels of the organization, both internally and externally. Obviously, respect is required on a personal level and should be granted to all co-workers, customers, and vendors by treating them with dignity and courtesy. Respect for the organization and the work environment is equally as important. All members of the organization

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can protect the work environment by following the established rules and regulations regarding use of equipment and materials and by using organizational time effectively. Using equipment for non-organizational activities or taking office supplies ("because everybody does it") is disrespectful and unethical. It is also unethical for an employee to spend large amounts of time on non-organizational activities during work time, such as updating social media accounts or managing fantasy sports teams. These are activities that should be completed in moderation during work breaks or at lunchtime.

2. RESPONSIBILITY. It is the responsibility of all members of the organization to provide timely and high-quality goods and services to the customers. The community's perception of the organization should be that they would uphold and follow through with all commitments in





It is the responsibility of management to define the organization's ethical standards and to ensure that all unethical practices will not be tolerated. It is the responsibility of the employee to follow the ethical standards and maintain personal responsibility for their actions.

a legal manner. In simple terms business dealings should be completed by looking a person in the eye, making an agreement, and having trust that the agreement will be completed to the best of the organization's abilities.

Each member of the organization has the personal responsibility of working collaboratively with others and ensuring that their work performance adds value to the organization and meets the expectations of management.

3. RESULTS. Results are the measurement in which the organization is evaluated. Ethical results are only achieved when an organization derives them in legal and moral manners. Most unethical behavior in business occurs by falsifying results – typically by providing false financial statements. This was certainly the case in two of the biggest business collapses of the last decade – Enron and Arthur Andersen. To some extent lending institutions that falsified their results started the current economic crises that we are entangled in.

It is the responsibility of management to define the organization's ethical standards and to ensure that all unethical practices will not be tolerated. It is the responsibility of the employee to follow the ethical standards and maintain personal responsibility for their actions. Ethical behavior can be achieved by following these five maxims that are important in all phases of our lives:

- 1. Don't take what is not yours.
- 2. Don't accept what you have not earned.
- 3. Maintain confidentiality.
- 4. Be honest.
- 5. Don't bend the rules to get results.

COMMUNICATION

Communication is key to success in any organization, and an effective leader must be a good communicator. It is even more critical in uncertain times that management keeps an open line of communication with the employees, customers, and vendors. Constant communication is vital



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21c Museum Hotel | Oklahoma City OK architects: Deborah Berke Partners & Hornbeek Blatt Architects original architect: Albert Kahn photographer: Mike Schwartz

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in providing all essential information regarding the organization. The message must be articulated in a manner that is clear and understandable to everyone.

The message must be consistent at all levels of the organization, and studies indicate that repetition is often required for understanding. The most effective leaders are open and honest in all communications. Uncertainty can

Even in these tough economic times, an effective leader should have an eye towards the future in charting a path for the company's growth.

make it difficult to access the right direction in the business environment. Effective leaders will present their vision of the future with honesty and humility, and simply level with people by acknowledging there are limitations in forecasting future trends and that the current strategies may change. Honesty and transparency will earn creditability from all levels of the organization. This will go a long way in gaining the employees' trust.

An effective communicator is also an excellent listener. It is important that communication flows at every level of the organization. Some of the best intelligence that you gather will be from frontline employees who interact with customers and suppliers. Their feedback can be valuable in determining the existing business climate and developing future strategy. It is also important that you listen to any ideas they may have in improving operations. By asking for their opinions (and implementing their ideas when they make business sense), it can not only lead to cost-saving procedures but it will also elevate the employees' commitment to the organization.

The flow of information can be provided in various forms. The most effective method is through staff meetings. When change is fluid, it is imperative that meetings be held more frequently. Depending on the size of the organization and the speed of change in the business climate, it may be required to meet on a weekly basis.

Exchanging information on methods, initiatives and processes will benefit the organization. This can be accomplished through internal forums that state the organization's goals and benefits. It is important to provide internal and external stakeholders with timely updates regarding the organization's progress in reaching these goals. Communication can be provided through the regular maintenance of intranet and internet sites that also provide the organization's policies, procedures, points of contact and other resource information for employees, customers and vendors. The best workforce is an informed workforce.

INVOLVEMENT

Due to the rapid changes occurring in the business world, it is no longer permissible for company leaders to sit in their "ivory towers" and manage through delegation. The managers must make themselves available to every level of the organization to obtain all relevant information concerning performance. An effective manger must jump right into the game; this is not the time to sit on the sidelines and watch. Nothing can be accomplished by managing from the outside.

A prime function of involvement is to ensure a continuous focus of the organization's operations. This can be accomplished through a series of meetings with senior management and specially assigned task groups. Senior management personnel should conduct quarterly meetings to review strategies and ensure that the organization is taking full advantage of its capabilities in meeting these strategies. The implementation and review of new products and/or processes should also be discussed in these meetings.

Management should also assign

a task group within the organization with the responsibility of defining best practices. Management should meet with the task group on a regular basis through a series of briefings or updates to determine the progress of implementation of these practices.

Top management should be accessible to the employees; this can be accomplished by frequently walking the plant floor or by eating lunch in the employee cafeteria. Accessible managers give employees a sense of comfort regarding the direction of the organization.

SPIRIT

The manager will be charged with firing



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up the employees in uncertain times. This is of particular importance in organizations that have had a significant reduction in the workforce. Employees that have remained may feel threatened by the potential loss of their job or may be overworked from taking on extra duties due to staff cutbacks. A recent poll of American workers found that nearly 40 percent of employees are worried that they are going to lose their job within the next twelve months.

This troubling statistic illustrates the need for organizational leaders to inspire employees because a motivated workforce is a more productive workforce. People need to feel needed and wanted and they need to realize that

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they can and do make a difference. An effective leader can promote spirit in an organization in the manner in which a coach inspires an athletic team.

The first step in this process is to make certain that the organization still has the fundamental core vision that may have attracted many of the employees. Troubled economic times have forced many companies to diversify their products and markets to stay solvent. If these changes have altered the organization's original core vision, some employees may feel alienated and become dissatisfied with their new role. Now is the time to evaluate the core vision of the organization and clearly define the mission moving forward.

Spirit is encouraged through team building. Management should promote collaboration among the employees give everybody an equal opportunity to participate. The employees need to feel valued, and setting goals and tracking the progress towards the goals can achieve this. Everybody has an internal desire to win, so if you set achievable goals, employee morale will increase as the goals are met.

One area where a manager can build team spirit is at staff meetings. It is the responsibility of the manager to ensure that these meetings are used as a time to enforce a positive message about the organization. The focus should be on making the meetings effective by exchanging information and discussing viewpoints and ideas that will aid the organization's future growth. The overall spirit of the organization will be positive if the purpose of the meetings is to pull people together to solve problems rather than focusing how bad the problems are.

FLEXIBILITY

The only thing certain in today's business climate is change. The manager must be able to navigate the organization's strategy through an uncertain climate. To effectively manage change a configured response is required, the manager should not rely on an adherence to pre-figured routines. An important attribute of a manager is that

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they must be flexible and have the ability to drop whatever they are doing to tend to the more pressing issues as they come up.

Flexibility is also required in planning. The organization should follow the action-feedback model by planning and acting on information in short intervals. During times of consistent change, it is best to treat everything as a temporary measure.

VISION

A key role in leadership is setting the direction of the organization and then influencing people to follow. Even in these tough economic times, an effective leader should have an eye towards the future in charting a path for the company's growth. All organizations require growth at some level to succeed. Growth does not necessarily have to be in the number of employees or physical sites; it can be measured in such important business variables as effectiveness, quality or production.

An important attribute of a good

leader is to provide vision for the future. Vision is achieved by long-range planning and is most effective when the organization has a true vision statement. The most successful leaders write down their goals, values, and visions for the organization and use them as a barometer for performance.

A vision statement – or a mission statement as it is sometimes referred as – defines the organization's longrange planning and identifies the steps required to achieve success. To establish a successful vision statement, the company's core values must be defined. Unless the long-range planning is intended to stir the organization away from its core business – a tactic almost never recommended – the vision should focus on improving sectors within the organization's core values.

A vision statement can be prepared by answering a few questions about the current state of the organization, including:

What are the core values of the organization?

- What does the organization do best?
- Which sectors are growing and what is required to compete in the future?

Once the vision statement is prepared, it should be shared with all stakeholders in the organization and management should define their roles in meeting this vision. The vision statement should be referenced at all strategic planning meetings to determine if the set goals are being accomplished.

Successful leadership involves making key decisions that affect an organization – and then following through on those decisions to accomplish the desired results.

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CONSTRUCTION LAW

WRITTEN BY BRIAN OBLOW



Are COVID-19 Liability Waivers Enforceable?

THE NOVEL CORONAVIRUS, or COVID-19, has fundamentally changed the way Americans do business. Because of the pandemic, business owners now face the dilemma of either trying to keep up with constantly changing orders, rules, and guidelines to keep their doors open, or staying closed and possibly losing their businesses forever.

In this ever-changing world, businesses, especially those providing essential services, need to be proactive to limit the risks associated with the pandemic. This requires businesses to not only protect their employees and customers; it also requires them to protect their bottom line. In addition to complying with all applicable government rules and regulations, many companies are seeking to limit their potential exposure to COVID-19 related claims by seeking liability waivers from their customers.

A liability waiver is a contract between a business and a customer that educates the customer about the risks he or she is undertaking when participating in an activity and seeks to limit the business's liability for such risks. When customers sign a liability waiver, they acknowledge that they understand the risks associated with the activity and agree to accept them. The customer also typically agrees to waive or limit the right to sue the business for injuries sustained as a result of the activity. Most people have been presented with a liability waiver at some point or another before participating in a potentially risky activity, such as sports, scuba diving, skydiving, or outdoor adventures. However, due to the risks associated with COVID-19, these waivers are now becoming increasingly prevalent for more common and traditionally less risky activities, like dining in a restaurant, shopping in a store, or simply entering business establishments as they begin to reopen.

At this point, it is too soon to tell how much weight these waivers will carry in court. Ultimately, the effectiveness of the waivers may vary from state to state. For example, Virginia and Montana do not allow any liability waivers. New York law provides that a liability waiver is only enforceable so long as it does not violate the public's interest, it is clear and coherent, and the intention of the parties is unambiguous. (See Gross v. Sweet, New York 1979.) Illinois courts strictly construe liability waivers against the party that drafted them (i.e., the business). (See Harris v. Walker, Illinois 1988, which held "exculpatory clauses are not favored and must be strictly construed against the benefitting party, particularly one who drafted the release.") And Connecticut courts rarely uphold liability waivers in personal injury claims. (See Hanks v. Powder Ridge Rest. Corp., Connecticut 2005, where a liability waiver was found unenforceable for snow tubers who had no ability or right to control the activity.)

While there may not be a common set of rules for liability waivers among the states, there are some basic legal principles that are almost universally accepted. One is that waivers that limit actions arising from intentional or grossly negligent conduct are unenforceable. (See Mero v. City Segway Tours of Washington DC, D.C. 2013: "Because In this ever-changing world, businesses, especially those providing essential services, need to be proactive to limit the risks associated with the pandemic.

District of Columbia law prohibits release from liability for grossly negligent, reckless, or intentional acts, the Agreement will not be held to indemnify defendant with respect to such conduct.") This means parties cannot immunize themselves from claims where thev have acted intentionally or with gross negligence. (See Restatement [Second] of Contracts § 195 [1981]: "A term exempting a party from tort liability for harm caused intentionally or recklessly is unenforceable on grounds of public policy.") Although states and jurisdictions may define gross negligence and intentional acts differently, the overarching premise is its intended conduct, reckless activity or, at the very least, something more egregious than simply failing to act with ordinary care. Depending on how the laws are interpreted and applied to the facts of a particular situation, there is certainly a possibility that exposing someone to a known risk of contracting coronavirus could be considered intentional or grossly negligent, thereby negating the effect of any liability waiver that may have been signed.

Additionally, courts generally will not enforce liability waivers that are considered to be contrary to public policy. In other words, most jurisdictions will not enforce a waiver that involves a matter of great interest to the public. Given the contagiousness of the disease and its potentially deadly impact, it is certainly possible that courts will find that COVID-19 claim waivers are against the public's interest. However, a counterargument could also be made that these waivers are essential and mandated by public policy because without them, coronavirus-related personal injury or wrongful death claims could potentially force businesses into bankruptcy.

The federal government is currently considering legislation that will create a safe harbor for businesses and nonprofit organizations that follow federal and state guidelines for COVID-19 to protect them against lawsuits. Perhaps they should also consider a COVID-19 compensation fund, similar to the one created by Congress following the 9/11 attacks, to compensate victims and insulate businesses from liability. It is unknown whether any such legislation will pass and even if it does, what protections it will provide – particularly if it requires compliance with the ever-changing and often confusing federal and state guidelines to be effective. Unless or until there is clear legislation and legal precedent governing COVID-19 liability for businesses, business owners may want to seriously consider obtaining liability waivers from their customers to create an additional legal hurdle to bringing a claim or, at the very least, to try and mitigate their liability by providing proof that the customers signing the waivers acknowledged the risk associated with the activities they voluntarily agreed to participate in. R

ABOUT THE AUTHOR: Brian Oblow is a Partner at Cotney Construction Law who represents clients in all aspects of construction law and arbitration. Cotney Construction Law is an advocate for the roofing industry and serves as General Counsel for NRCA, FRSA, RT3, NWIR, TARC, WSRCA and several other roofing associations. For more information, <u>visit</u> <u>www.cotneycl.com</u>.

AUTHOR'S NOTE

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WRITTEN BY CHARLES "CHIP" McGOWAN

5 Considerations for Resilient Zinc Roofing in Coastal Applications

FOR CENTURIES, zinc roofing materials have proven reliable in Europe's marine environments and other extreme climates. In recent decades, the enduring qualities of zinc have gained interest and use in North America. Here are five aspects to consider when working with zinc in coastal roofing applications.

1. NATURAL MATERIAL

Zinc is an abundant natural resource. Based on known ore reserves, the world's zinc supply is estimated in excess of 200 million tons and expected to last approximately 700 years.

Zinc's inherent metallic properties allow the material to deliver non-corrosive, self-healing, low-maintenance and long-lasting performance. No paint, varnish or sealants are required, and its run-off is non-staining and non-toxic.

In North America, ASTM B69-16, "Standards Specification for Rolled Zinc," is the primary reference document for both Type 1 and Type 2 alloys and their expected characteristics.



Non-corrosive, non-combustible and self-healing, zinc's long-lasting performance has been demonstrated its resilience in coastal environmental for more than 200 years. Pictured here is the Nordisches Aquarellmuseum, Skärhamn, Sweden.

Rolled zinc is efficiently produced by alloying Special High-Grade, 99.995 percent pure zinc with very small quantities of copper, titanium and aluminum. The zinc alloy composition determines whether the metal will tend toward a blue-gray or graphite-gray coloration.



2. DYNAMIC APPEARANCE

A time-proven, dependable material, zinc roofing products complement both contemporary and traditional architectural styles, and foster a connection to their surrounding natural environment.

Untreated, architectural-grade zinc is bright, shiny and light reflective. Over time, a natural matte patina develops, creating a dynamic appearance as the material ages. A patina's formation is a process of the gradual growing together of zinc carbonate "freckles." The rate of its formation is related to the slope of the surface. The patina will form slower on a vertical wall surface than on a slightly pitched roof. The patination speed varies between six months and five years or more, depending on climatic conditions. The more exposure to wetting and drying cycles, the guicker the patina will develop.

Specific to coastal communities, the natural patina will appear lighter when used in marine locations where the air contains chlorides (salt). Deposits will not be as visible on lighter blue-gray zinc.

Some manufacturers offer pre-weathered zinc material that accelerates the patina formation under controlled conditions. Factory-finished options also are available to achieve an initial, uniform aesthetic.

3. PRODUCT VERSATILITY AND VARIETY

A soft, lightweight metal, zinc can be fabricated to fit almost any slope, curve or linear run, as well as perforated and fashioned into ornamental accents. Zinc roofing products can be installed on low sloped, steep sloped, flat and mansard roofs, and used for



hip and ridge caps, drip edges, alleys, step flashing, dormers, cupolas, parapets and more.

Seam profiles can be customized to the project's requirements. For example:

- Double-lock and single-lock seam joints between roof panels stand 1 inch or 1.5 inches up from the draining plane. A raised seam height can emphasize the roof as a design element and have a functional purpose in coastal climates with snow.
- Vertical standing seam profiles with mechanical lock connections are the most common zinc roofs.
- Flat seam profiles rely on gravity

and at least a 4:12 slope to maintain weathertightness.

- Low-profile zinc shingles and interlocking or overlapping tiles applied parallel to the eave present another familiar aesthetic. They involve a technically easier installation method than vertical joints and always are applied as a "dryjoint" roof system without solder or sealant. Tiles can be small. They provide good wind resistance, but cannot provide the same level of weather protection as a vertical seam.
- For vertical seam profiles, vertical joints are attached to one vertical side joint, overlapped and closed

on the opposite side. The soft metal simplifies the task of hand-seaming or power-seaming zinc panels. Long panel lengths can make this design more vulnerable to oil-canning (panel waviness), panel disengagement and wind uplift. Accommodating longer panels, taller seams and those with added capillary breaks offer better water and wind resistance, critical in many coastal applications.

4. RESILIENT RESULTS

Installed properly, zinc roofing systems will resist corrosion, air and water infiltration, and withstand high winds reaching up to 150 mph. In marine environments that are susceptible to fires, zinc also offers a noncombustible solution.

Common installation considerations and cautions include:

- Zinc roof profiles should be applied as a ventilated dry-joint cladding or a "rainscreen" roof strategy, not as the primary waterproof barrier. This design alternative allows for pressure equalization, backside drying and moisture escape.
- Above-sheathing ventilation mats must be a requirement of every zinc roof assembly. Use an 8 to 10 mm structured underlayment comprised of entangled nylon wire to elevate the zinc roof panel, creating a capillary break with a 0.95 cm airspace to help keep the underside of the profile dry. Do not accept a substitution of this air space and capillary break with a backside paint coating or other barrier strategy.
- Self-adhered high-temperature roof underlayments are recommended. Synthetic felts may be utilized on steep pitch roofs in combination with self-adhered high-temperature underlayments at vulnerable roof conditions and roof penetrations.
- Red rosin paper, conventional felt and any other moisture-holding material should be prohibited in every zinc application and related specification.

- To facilitate moisture drainage from the vented space, the roof panel usually should have a soft bend past the drip edge (cleat). This open hook promotes water drainage from the end pocket formed by the panel hook. Zinc profile end folds also should be "soft" with the raw zinc edge parallel to the ground and not closed tight.
- Excessive use of sealants can plug weep holes, limit airflow, trap moisture, create adverse reactions or restrict the metal's movement.
 For any proposed use of tube or tape sealants within laps or other concealed applications, first consult the zinc manufacturer.

5. SUSTAINABILITY AND LONGEVITY

The sustainable benefits of architectural zinc products support criteria for several green building programs including BREEAM certification, the Green Globes system, the U.S. Green Building Council's LEED rating system, and the Cradle to Cradle Products Innovation Institute.

Products that have earned Cradle to Cradle certification demonstrate their product's material does not release any toxic substances during usage, deconstruction and recycling; that it retains its original properties without loss of performance; and that can be re-used as a new item of at least equal value. This is known as upcycling; whereas downcycling results in recycling material to become inferior products, and non-recyclable products will be sent to a landfill. More than 90 percent of zinc-containing products are recycled at the end of their lifecycle.

During their many years of use, zinc roofs do not rot, rust or need repainting. They require very little maintenance. For aesthetic reasons, it is recommended to clean the surface of the material with clean water (not seawater) at least twice a year in maritime climate zones, depending on local conditions. Follow the manufacturer's cleaning instructions. If the metal is scratched, scuffed or fingerprinted, zinc will heal itself by re-patinating. With time and exposure to wetting and drying cycles, the former blemish will patinate and blend to match.

The resilient performance and natural beauty of zinc has been demonstrated for more than 200 years in marine environments and coastal communities. Collaboration between roofing contractors and zinc manufacturers will help ensure a roof that provides long-lasting functionality and appearance, achieving the best results for the building owner.

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

Detailing for Resilience, Part 3

The Resilient Parapet Roof Edge

EXPERTS CITE — and codes and standards reflect — that most roof damage done by winds starts at the roof edge. From coping blow-offs, which often take the wood blocking on top the parapet wall with it, to removal of the membrane and more, evidence shows the roof edge is a key element in attaining a high-performance, resilient roof edge. (See Photo 1.)

When I was president of RCI (now IIBEC), Reid Ribble was the president of NRCA (he is now its CEO). He and I felt that the parapet was the way to go in regard to providing safety on the roof for roofing crews, HVAC crews, and maintenance crews alike. Great idea, right? You won't believe the fight we received, and you wouldn't believe the greatest argument came from the firefighters who might have to drop over a 42-inch parapet. When was the last time you saw a fire where the firefighters accessed the roof? I only see them pouring water on it from a hose from a lift. But I digress. Despite this argument, more and more parapets are gaining height.

WHAT MAKES A PARAPET RESILIENT?

A parapet whose height deflects some of the straight-line winds is a great start. For our discussion, let's start by defining what we mean by parapet: roof edge, part of the perimeter exterior wall system that extends above the roof. For this article, we will concern ourselves with those rising to a





height of 30 inches or more above the roof, where the roof membrane/base flashing extends up and over the top of the parapet.

Well, since we are talking roofing, it's the combination of parapet wall construction and the integration of the roof cover that is crucial. Let's take a quick look at what the parameters might be. Types of parapet construction include:

- Precast panels
- Brick concrete masonry units
- Brick on structural metal studs (Egh – I hate this type of construction.)
- Metal panels on structural metal studs (Egh – see Photo 2. Point proven.)
- Anything on structural metal studs (Egh.)

The parapet height places several outward forces on the roofing (base flashing) that are not experienced by lower roof edges, and thus certain enhancements need to be considered:

- Proper substrate. (OK you roofers, how often do you see a wall substrate board specified where membrane will be adhered?)
- For metal stud walls, heavy gauge metal plate to secure the roof base anchor attachment. (See The Hutchinson Files article "The Stud Wall and the Roof" in the January/ February 2019 issue of Roofing.)
- Stoppage of air transport into the parapet construction. (This topic requires its own article on the requirements and detailing.)
- Proper anchorage of any wood blocking on top of the parapet.
- Enhanced membrane anchorage.
- Membrane peel stops.
- Mid-wall securement: wall peel stops.
- Base flashing that extends up and over the parapet and adheres to the exterior cladding. (Under no circumstances should the base flashing be installed loose; it must always be adhered.)
- And for those designers out there, a positive securement of the air barrier to the roof vapor barrier or membrane.

- ANSI-ES1-compliant copings
- These enhancements will also protect delaminating base flashing from pulling off the parapet wall and taking with it the roof cover. This condition is the result of poor roof edge design, air transport and condensation.

DETAIL DRAWINGS

The resilient parapet should incorporate several enhancements and be specifically detailed and specified. Shop drawings and mockups are required.

Below are five examples of the types of enhancements that I suggest would help make the parapet more resilient. Details that I suggest being incorporated into the drawings include:

1. Wood Blocking atop the parapet

If wood is incorporated atop the parapet (and it's nice if you can detail it without it), it needs to be adequately anchored to the building structure. Nails are never used, and drive-in and Tapcon anchors are not sufficient. For masonry walls and pre-cast walls, I suggest expansion anchors. I like them at least at 2 feet on center (O.C.), staggered to prevent warping. Atop structural metal stud walls, first the top plate needs to be secured, the wood installed with self-tapping screws at 1 foot O.C. and then the wood blocking strapped to the studs with heavy-gauge metal -20 gauge or heavier. Joints should be scarfed at 45 degrees and screwed. If a second layer of wood is required, shim it for taper to the interior and secure with coated wood screws at 1 foot O.C. staggered, and stagger the joints. The strapping then would go over both layers.

2. Seal the membrane to the exterior edge:

The roof base flashing should be extended up and over the parapet, fully adhered to both the back and top of the parapet, down and onto the face of the exterior wall. It should be adhered and nailed. (See Photo 2 and Figure 1.)

3. Wall peel stop:

Due to a variety of issues (lack of air seal, condensation, inadequate adhesive application, weight of the material, and air pressure, to name a few), the base flashing can delaminate. Delaminated base flashing create a condition that I like to refer to as "pulling tape off the floor." With each flutter of



Figure 1. Sealing the roof base flashing to the exterior wall face prevents wind from moving up behind the membrane, where I have observed coping "popping off." A specific detail like this should be included in the drawing so that there can be no confusion as to what is required.





resulted in this roof failure, requiring replacement. I make no secret of my disgust with stud wall parapet construction, as I have seen way too many failures.



Photo 4. Four-foot parapet wall on metal studs run up the exterior outside the concrete floor. We were asked to observe the construction and advised to install a wall peel stop over a 16-gauge steel plate, but only this anchor strip was funded. Note the superior anchoring of the anchor strip into the 1/2-inch substrate board and a few studs.



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Figure 2. Including a wall peel stop as part of the roof edge design is both prudent and, on metal stud walls of good height, a standard of care design.

the membrane, a little bit more is detached until the force is great enough to pull the membrane anchorage out of the plates through the membrane. Thus, a wall peel stop is required: A batten bar installed on the wall and flashed in. The location of the batten bar is dependent on the parapet height and construction; I like to start out with the mid-point and no more than 3 feet from the coping and the base anchor. (See Photos 3-5 and Figure 2 for an example of a wall peel stop.)

4. Enhanced membrane base anchorage:

Manufacturers (whose requirements are often market-driven minimums) require a base anchor (for single plies) of 12 inches O.C. Not good enough. We enhance that spacing to 6 inches or 9 inches O.C., depending on the location. Very seldom do we specify 12 inches. (See Figure 2.)

5. Roof peel stop:

Like the wall peel stop, I suggest a roof peel stop so that in the chance that the roof cover detaches, only a small portion of the perimeter is in jeopardy. This peel stop should be located along the perimeters. Depending on the construction, I like to locate them every 2 feet (half an insulation board). The insulation is stopped at this location and the membrane taken down to the vapor retarder/roof deck, sealed with

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FIELD MEMBRANE TO BE --TURNED DOWN TO THE VAPOR RETARDER ON THE ROOF DECK AND TERMINATED ±2'-0" FROM THE PARAPET

ALL VOIDS TO BE FILLED -WITH SPRAY FOAM INSULATION

CONTINUOUS $\frac{1}{2}$ "x I " BATTEN BAR SET OVER MEMBRANE WITH WATER BLOCK BEHIND AND SCREW FASTENED INTO STEEL DECK AT 6" O.C.



Figure 3. A roof peel stop is another quality assurance detail that should be included as part of your resilient roof system design.

water block, and anchored with a batten bar and screw fasteners. The remaining insulation is then set, the void spray foamed with insulation, and the new membrane taken over and adhered/welded to the main roof cover. (See Figure 3.) Included here are several examples of enhanced and resilient parapet roof edge detailing. (See Figures 4 and 5, page 59.) Showing the detail in depth or by exploded location will help you as the designer to know what is going on and will communicate to the contractor what is required. While the design of roof edge parapets will more often than not be different from project to project, I hope the concepts here provide the impetus for enhanced detailing.

IT ALL STARTS AT THE EDGE

Resilient roof system design is needed for our clients, whether they know it or not. The survival of the roof system during enhanced climatic events starts at the roof edge, and thoughtful design and detailing of the parapet will help protect the roof – and help you sleep at night.

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Figure 4. Parapets that are tall and hollow can be particularly difficult to properly detail, given consideration of air transport, potential condensation, and membrane delamination. Including wall and roof peel stops and enhanced perimeter anchoring will at least allow a failed condition to not result in losing your roof.

Figure 5. Noting and detailing the enhancement is required to properly communicate to the contractor what is required on masonry/precast parapets. Noting a second coat of adhesive on such porous surfaces is always a good idea.



EDUCATION

WRITTEN BY JUSTIN KOSCHER

Roofing for the Green Future

The Kendeda Building for Innovative Sustainable Design Lives Up to its Name

> hen the Georgia Institute of T e c h n o l o g y (Georgia Tech) decided to design its new build-

ing as a "Living Building," the project team knew they had to be extremely thoughtful in their design choices and building materials selections. The Living Building Challenge is the world's most ambitious green building program and requires that projects meet 20 rigorous performance requirements throughout the construction process and for a full year after completion. Made possible through a partnership with the Kendeda Fund, the new Kendeda Building for Innovative Sustainable Design is the first academic and research building in the Southeast to attempt this certification and is designed to use one-third the energy of a comparable building.

With a combination of great

insulation. energy-efficient svstems, and a rooftop solar array, the 46,800-square-foot Kendeda Building is engineered to actually produce more energy than it consumes. The roof is also designed to capture rainwater for collection into a 50,000-gallon underaround cistern where it is filtered for reuse throughout the building, including as drinking water. The building's roof is also host to a 1.000-squarefoot accessible roof deck and a 4,300-square-foot rooftop garden with a honeybee apiary, pollinator garden, and blueberry orchard.

The photovoltaic array is comprised of 913 solar modules covering approximately 15,860 square feet of area, with a total capacity of 330 kW. It forms a floating canopy above the building. The panels will tilt from the horizontal plane by 5 degrees to face south. This slight adjustment increases solar exposure and improves drainage.

The Kendeda Building is engineered to produce more energy than it consumes and capture rainwater for collection in an underground cistern for reuse.

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MULTI-FUNCTIONAL ROOF

As you can imagine, a roof with so many functions demands the use of only the most exacting roofing products. The project team chose a 3-inch base layer of non-halogenated polyiso roof insulation to cover nearly the entire roof and approximately 13,000 square feet of thermoplastic polyolefin (TPO) membrane. GAF supplied the polyiso insulation and 60-mil EverGuard Extreme TPO roof system for the project, and it was installed by Roof Management Inc., headquartered in Norcross, Georgia.

The design team also chose to direct rainwater into capture systems by the judicious use of tapered insulation over the flat material, which created the proper rooftop slope and drainage.

Even without this water catchment system, tapered insulation can be a very beneficial design feature for low-slope roofs. Ponding or standing water can add enormous stress to a building's roof and lead to premature failure of roofing materials if water stands on the roof surface for more than 48 hours. If unaddressed, frequent ponding of water can lead to serious problems such as structural deflections of the roof deck, the growth of bacteria or unwanted vegetation on the roof, and can ultimately cause water intrusion into the building that can be costly to remediate. That the Kendeda Building roof can use this design to also collect water for reuse is an added bonus.

The Living Building Challenge specifies that materials in Living Buildings should avoid the use of certain chemicals. Polyiso insulation products manufactured with non-halogenated flame retardants satisfy this challenge while offering superior performance.

Polyiso insulation offers superior performance qualities, including:

- High R-value per inch compared to other types of insulation of equivalent thicknesses.
- High moisture resistance.
- Improved fire resistance.
- Lightweight boards for easy handling and installation.
- Blowing agents with zero ozone depletion potential and negligible global warming potential.

Beneath its carefully designed roof, the building holds classrooms, laboratories, offices, an auditorium, and a student commons. But the educational mission of the building extends beyond these learning spaces. The entire project – from its low-waste construction to its low-consumption energy use – offers unique learning opportunities for designers, builders, and building operators, such as how a building's design can conserve energy and water while mitigating a region's humidity and potential droughts.

SALVAGED MATERIAL

The Living Building Challenge is organized into seven performance areas – one of which addresses the materials used on a project. New building projects are required to include one salvaged material per 500 square meters of gross building area, which worked out to 10 salvaged materials for the Kendeda Building. These included the following:

• Slate shingles: The project acquired a number of pallets of gray slate shingles when the aging roof of the Georgia Tech Alumni Association was renovated. These singles were used as tile on the walls and floors of showers and restrooms.

• Nail-laminated floor decks: 500 10-by-6-foot nail-laminated floor decks were created from two-byfours salvaged from movie sets, including those form the show "24" and movie "Rampage," with support from the Georgia Works training program.

• Heart pine joists: 140-year-old Tech Tower provided heart pine joists that serve as treads for the Kendeda Building's monumental staircase.

• Lumber from felled trees: George Tech's ground crew helped by collecting fallen trees across the campus, which were then turned into lumber used to make counters and benches.

· Granite curbs: Atlanta's old State

Archives Building provided granite that was used for curbs in the landscaping.

• Wood boards: A former church in Atlanta was the source of the wood that can be found on some of the decorative wall as well as the lobby's ramp.

The Living Building was designed by a collaboration between Lord Aeck Sargent and the Miller Hull Partnership, constructed by Skanska, and funded through a \$30 million grant from The Kendeda Fund, one of the leading philanthropic investors in civic and environmental programs in the Atlanta area with a commitment to ecological and social causes.

Certification by the Living Building Challenge 3.1 is anticipated in 2021, and the project is also pursuing the U.S. Green Building Council's LEED



certification at the Platinum level. R

ABOUT THE AUTHOR: Justin Koscher is the president of the Polyisocyanurate Insulation Manufacturers Association (PIMA), a trade association that serves as the voice of the rigid polyisocyanurate insulation industry and a proactive advocate for safe, cost-effective, sustainable and energy-efficient construction. For more information, visit <u>www.</u> polyiso.org.

THE KENDEDA BUILDING FOR INNOVATIVE SUSTAINABLE DESIGN GEORGIA TECH ATLANTA, GEORGIA

TEAM

ARCHITECTS: Lord Aeck Sargent, Atlanta, Georgia, <u>www.</u> <u>Lordaecksargent.com</u>; and The Miller Hull Partnership, Seattle, Washington, <u>www.millerhull.com</u>

GENERAL CONTRACTOR: Skanska USA, Atlanta, Georgia, <u>www.usa.</u> <u>skanska.com</u>

ROOFING CONTRACTOR: Roof Management Inc.,

Norcross, Georgia, <u>www.</u> <u>roofmanagementinc.com</u>

MATERIALS

TPO MEMBRANE: EverGuard Extreme 60-mil TPO, GAF, <u>www.GAF.com</u>

INSULATION: EnergyGuard Nonhalogenated (NH) Polyiso Roof Insulation Board and EnergyGuard NH Tapered Polyiso Roof Insulation, GAF

VAPOR RETARDER: GAF SA Vapor Retarder, GAF

INSULATION ADHESIVE: OlyBond500 Insulation Adhesive, OMG Roofing Products, <u>www.OMGroofing.com</u>

COVER BOARD: 1/2-inch DensDeck, Georgia-Pacific, www.buildgp.com

SOLAR PANELS: X-Series X22-360-COM, SunPower, <u>https://</u> us.sunpower.com

State of the Art

Custom-Colored Metal Panels Create Standout Roof for Pennsylvania School

atrobe Elementary School is a state-of-the-art facility featuring two-story classroom wings, a cafeteria with a stage, a full-prep kitchen, gymnasium, media center, science and technology classrooms, band/music rooms, a center for student creativity, administrative offices and support spaces designed to serve nearly 700 students.

Located outside of Pittsburgh in Latrobe, Pennsylvania, the school is within easy driving distance of several popular ski areas, and the building's design, by Monroeville, Pennsylvaniabased Axis Architecture, has a bit of a Swiss chalet in its roofline.

More than 18,000 square feet of Petersen's Tite-Loc Plus roof panels in a distinct, custom Marquis Orange finish help emphasize the angled gables topping the new school. The 22-gauge panels, along with 3,800 square feet of .032 gauge PAC-750 soffit, complement the classic terra cotta-toned brick that clads the upper two-thirds of the school's façade.

The roof also features low-slope sections where a hot asphalt roof

system from The Garland Company was installed.

INSTALLING THE ROOF SYSTEMS

The roof systems were installed by Pennsylvania Roofing Systems (PRS), headquartered in Bakerstown, Pennsylvania. PRS handles all types of commercial roofing, including slate, tile, hot asphalt, built-up, single-ply and sheet metal.

The new construction project was appealing to the company for several reasons, including the size and the







scopes of work that included metal and hot built-up roofing.

Two different crews tackled the metal roofs and flat roofs as the sections were being built by the general contractor, The Foreman Group.

On the low-slope sections, one crew installed the Garland hot asphalt roof system, consisting of insulation, base plies, and Garland's modified cap sheet. Another crew tackled the metal roof, installing 16-inch-wide PAC-CLAD Tite-Loc Plus panels, which were mechanically seamed.

Pennsylvania Roofing Systems faced quite a challenge on this project as the acoustical deck for approximately half the building was running in the wrong direction. This posed a problem, as attaching the clips for the metal panels would perforate the acoustical deck. PRS came up with a solution to the problem. The company fabricated a 16-gauge hat channel that was installed over the acoustical decking, and the clips were fastened to it.

The roof panels were rolled on the site. PRS used its own Series 1100 National Crane and a Skytrak to lift material to the roof. Crews also installed 3,800 square feet of .032 gauge PAC-750 soffit.

THE SNOW GUARDS

School administrators were concerned about mounting snow on the new metal roof and the safety of schoolchildren down below, so material supplier Brock Associates suggested installing ColorGard snow retention by S-5! The S-5! system is exclusively recommended by both Petersen, the roof manufacturer, and Brock Associates, the panel supplier.

Manufactured from certified, high-tensile aluminum and extensively tested for load-to-failure results, ColorGard controls roof snow migration and dramatically reduces the risks associated with rooftop avalanches.

PRS installed the snow retention system on 10 sections of the metal roof. The non-penetrating system was easy to install and perfectly matches the roof color. After the panels are mechanically seamed, the non-penetrating S-5-V Clamps are installed. The



ColorGard system features a continuous extruded aluminum crossmember, and strips of prepainted metal are slid into the face of ColorGard to match the roof.

GREAT TEAMWORK

The complicated project went smoothly, according to PRS, thanks in part to excellent coordination between the general contractor and various trades. PRS management noted the company selected Petersen's PAC-CLAD products because of the manufacturer's excellent local representation, including distributor Brock Associates. Petersen's reputation for good field support also played a role in this selection.

LATROBE ELEMENTARY SCHOOL LATROBE, PENNSYLVANIA

TEAM

ARCHITECT: Axis Architecture, Monroeville, Pennsylvania, <u>www.</u> <u>axisarchitecturepc.com</u>

GENERAL CONTRACTOR: The Foreman Group, Zelienople, Pennsylvania, <u>www.foremangroup.com</u>

ROOFING CONTRACTOR: Pennsylvania Roofing Systems, Bakerstown, Pennsylvania

SUPPLIER: Brock Associates, Pittsburgh, Pennsylvania, <u>www.</u> <u>brock-assoc.com</u>

MATERIALS

METAL PANELS: Tite-Loc Plus, PAC-CLAD | Petersen, <u>www.pac-clad.</u> <u>com</u>

LOW-SLOPE ROOF SYSTEM: Three-Ply Mineral Mod Bit System in hot asphalt with two plies Type IV Felt and Stressply FR Mineral, The Garland Company, <u>www.garlandco.</u> <u>com</u>

SNOW RETENTION SYSTEM: ColorGard, S-5-V Clamps, VersaClip and SnoClip II, S-5! <u>www.s-5.com</u>

EDUCATION

WRITTEN BY LOUISA HART

Strength, Flexibility, Resilience

New Roof System Addresses Challenges at Clarkson University's Athletic Facility



ow do you put a new roof on a 66,300-squarefoot hyperbolic paraboloid?

It takes a lot of skill, a lot of attention to safety, and the right choice of a roofing membrane – especially when the roof has to protect a full-service fitness center that serves thousands of college students and includes a swimming pool, locker rooms, a Jacuzzi and saunas. But we're getting a little ahead of our story.

Faced with the combined threats of a global pandemic and major storms served up by the 2020 hurricane season, school buildings, their designs, and their resilience are being scrutinized now more than ever. School boards, university administrators, parents, students and teachers are looking at these structures with an eye to their impact on the health of the people who work and live there. Additionally, entire communities may be counting on school buildings to house and protect their citizens during a cataclysmic weather event.

When Clarkson University embarked on a project to rehab the roof of its Indoor Athletic Facility three years ago, to most of the American public, pandemics were something that happened in other countries, preferably distant ones. But given Clarkson's location, in northern New York state, energy conservation during the harsh winters was a dominant concern. Just as important, the new roof needed to stand up to freezing temperatures and frequent ice storms. Winters in Potsdam, New York, where Clarkson is located, can serve up average lows of 9 degrees. A "warm" winter day might see a high temperature of 26 degrees.

The Clarkson staff was spurred to

action by the deteriorating conditions of the existing roof, resulting in multiple leaks. They were working on a very tight time frame, and wanted to complete the work during the three-month window between the end of the fall semester and beginning of the spring semester. And, as a university committed to focusing on sustainable energy solutions and environmental technical innovations, they wanted the most energy efficient roof available for their climactic conditions. The design of the roof itself – the 66, 300-square-foot hyperbolic paraboloid referenced above presented additional challenges.

Initially, the design team considered reflective roofing but were soon convinced that a dark membrane would offer maximum energy efficiency in the northern climate, and keep energy costs down during the cold winter months. Additionally, given the installation challenges presented by the building's structure, the membrane needed to be flexible but durable in the face of winters that promised snow and ice. Given those parameters, the team chose EPDM membrane to be installed in a fully adhered system. This meant that the membrane could be fully fastened to the underlying insulation,



leaving no unsightly metal fasteners protruding through the membrane and detracting from the rooftop's appearance. But this choice was about more than aesthetics: the fully adhered system increased the roofing system's wind uplift resistance due to the strength of the adhesive and the reduced number of membrane seams present on the fully adhered system (as compared to a mechanically fastened system).

DEMANDING INSTALLATION

RSI Roofing from nearby Gouverneur, New York, served as contractor for the job, working through a series of special challenges presented by the building itself and the site of the structure. Temporary roads were installed to accommodate the use of manlifts and forklifts. Given the slope of the roof surfaces, all workers on the job needed to be tied off using harnesses and lanyards for fall protection. To ensure that the roof was aesthetically pleasing, membranes needed to match all the way around the building with laps and sheet length going the same way on each section.

The first step in this installation was tearing off the existing roofing membrane and installing new perimeter wood blocking around the existing wood deck. The crew then installed a vapor barrier directly to the wood deck, followed by mechanically installing two layers of 2.6-inch polyiso insulation, and a half-inch layer of cover board.

The final step was installation of the new 115-mil FleeceBACK EPDM roof system from Carlisle SynTec





Systems. The installation crew applied adhesive to the cover board, and then rolled out the EPDM membrane. The use of the adhesive added thermal efficiency to this already energy-efficient system for even greater environmental protection and reduced energy costs. Once the membrane was in place, RSI installed perimeter sheet metal with new gutters and downspouts.

The Clarkson gym was designed to shelter students as they engaged in a wide variety of physical activities. But with its durable and energy efficient EPDM roof, like many other educational buildings throughout the country, it could most likely provide a resilient shelter during a cataclysmic storm or other natural disaster.

While there may be debate about the cause, 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 hurricanes. These extreme weather events are assaulting the built environment with record-setting strength and intensity, creating an urgent need for more resilient structures. Since the roof of a building is a first line of defense, any discussion of resilience must include careful consideration of roofing systems.

In June 2017, the Federal Emergency

CLARKSON UNIVERSITY'S INDOOR ATHLETIC FACILITY POTSDAM, NEW YORK

TEAM

ARCHITECT: LaBella Associates, Rochester, New York, <u>www.</u> <u>labellapc.com</u>

ROOFING CONTRACTOR: RSI Roofing, Inc., Gouverneur, New York, <u>www.</u> rsiroofing.com

MATERIALS

R00FING SYSTEM: 115-mil FleeceBACK EPDM membrane fully adhered with FASTTM Adhesive, Carlisle SynTec Systems, <u>www.carlislesyntec.com</u>



Management Agency (FEMA) reported that many of the nation's fifty million school children are at risk because of aging school buildings, or buildings that do not meet basic resilience standards to withstand a natural disaster. The FEMA report, "Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety," points out that "many of our nation's school buildings are older unreinforced masonry structures that are vulnerable to severe damage and collapse in the next earthquake, or are of lighter frame construction that is vulnerable to other types of natural hazards such as a tornado, hurricane, high winds, or flash floodina."

The FEMA report noted that the average public school building at that time was 44 years old. And while some of these schools have undergone major renovation, "the original construction of numerous school buildings predates many of the modern building code requirements protecting occupants from natural hazards." In other words, millions of schoolchildren are being educated in buildings that are using 20th century construction standards to meet 21st century hazards. And those 21st century hazards are becoming more and more of a threat.

Given these challenges, FEMA is offering extensive specifics on upgrading school structures to improve safety and notes the critical importance of roofing systems to protect the integrity of a school building. It warns that a roof that is damaged in a hurricane "will result in significant interior damage due to water leakage" and any roofing system that is "extremely susceptible to wind damage ... should be mitigated as soon as budget permits."

Whether your focus is a new gymnasium for college students, the renovation of a high school, or the repair of an elementary school, the roof is an essential component of a resilient building. If the roof fails, the structure as a whole will be compromised. The occupants of the building, students or members of the community who are literally seeking shelter from the storm, will be exposed to the potentially deadly impact of severe weather.

To assist the educational community in creating resilient buildings, the EPDM Roofing Association has published its second edition of Building Resilience: The Roofing Perspective. This report includes excerpts from the FEMA School Safety Report, as well as links to the complete report. The report as a whole provides insights on how to create a resilient roof, and the contributions that EPDM can make to a resilient roofing system. You can find the ERA report at <u>https://epdmroofs.</u> org/wp-content/uploads/2020/05/ <u>Building-Resilience-051320-3.pdf</u>

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



Landmark Student Residence Restored

New Roof Systems Top University of Minnesota's Renovated Pioneer Hall

ioneer Hall is a central fixture on the University of Minnesota campus. Built in 1934, the five-story structure serves as a freshman dormitory and dining hall. The building was almost totally rebuilt as part of a \$104 million renovation project in 2019.

A key goal of the project was to keep the distinctive, highly visible brick facades on the four outer wings in place while totally replacing the main section of the building. Work included entirely renovating the interior, replacing all mechanical systems, and installing a new roof.

Working along with McGough Construction, the St. Paul-based general contractor on the project, Minneapolis-based Central Roofing Company installed the new roof systems on the building, which included 47,000 square feet of synthetic slate, as well as built-up roofs, EPDM roofs, and a garden roof.

Central Roofing has been in business since 1929, and the company is a fixture on the University of Minnesota campus. "We do a wide variety of different types of commercial roofs, ranging anywhere from flat to steep to sheet metal roofs," says Michael Mehring, vice president of commercial sales for Central Roofing. "We also have a metal panel division. There is no system that we cannot do in regard to flat roofs. On steep roofs, we do both tile and shingle as well as sheet metal. In addition to that, we have one of the largest service divisions in the Midwest."

The project involved multiple scopes of work, including the DaVinci Roofscapes synthetic slate on the steep-slope sections, Johns Manville built-up roofs on the main roof and green roof area, as well as sheet metal work, gutters and downspouts. Central
Roofing developed a detailed plan to bid on all the scopes of work – and execute everything.

"The project was interesting in the sense that approximately 75 percent of the building was demolition," notes Mehring. "That included all of the internal parts of the building. The four bays around the perimeter were saved because of historical ramifications. The university wanted to try and keep those four bays because of the distinctive windows and the brick. The middle porproduct was approved for the project because it so authentically duplicates real slate.

"We started by making presentations of product options to the project architect," says Germain. "The architect moved forward with the DaVinci product because of the aesthetics, value, and long-term benefits to the university."

Selection of a roofing color was also a critical factor. DaVinci created a custom color blend of dark purple, medium brown, dark stone, medium



tion of the structure was pretty much demoed out. So much internal work was needed on the mechanical and electrical systems that they couldn't save it."

SYNTHETIC SLATE ROOF

Central Roofing worked closely with McGough Construction and the project architect, St. Paul-based TDKA Architects, to ensure the new synthetic slate roof system would closely replicate the structure's original slate roof. According to Henri Germain, project manager/estimator with Central Roofing, the DaVinci Multi-Width Slate green and dark green for Pioneer Hall. "The capability of DaVinci to develop the custom color blend was amazing," says Germain. "The roofing colors really complement the dormitory plus other structures on campus."

INSTALLATION BEGINS

Work began on the steep slope sections with the installation of the synthetic slate system on the brand-new metal deck. "From a scheduling standpoint, the first thing that we did was the tile areas," Mehring recalls. "In order to maintain the milestones that McGough had, we had to essentially get them watertight within 60 days. To do that, we did the tile work in phases utilizing 15-20 workers every day."

The men were split into three crews. A crew of six to seven roofers began installing the substrate board and Grace Ice & Water Shield, which served as the vapor barrier. The second crew came in behind the first to install the wood blocking and insulation, which was capped with plywood and covered with Grace Ice & Water Shield and GAF FeltBuster synthetic underlayment.

A third crew of four or five technicians then installed the DaVinci synthetic slate tiles. The product was easy to install, notes Germain, but the numerous details – including some 93 dormers – posed some challenges. Crews also installed RG 16 Snow Guards from Rocky Mountain Snow Guards Inc.

"There were many details, and because of the extreme difficulty in accessing the area after the scaffolding was removed, everything was treated as if it would never be returned to in the lifetime of the roof – not for caulking, not for anything," Germain says. "The thought was to make sure it was done once and done right."

As the tile work progressed, the sheet metal crew started installing the gutters. The waterproofing, gutter installation and tile application had to be coordinated carefully to make sure everything was tied in perfectly. "It was a sequencing nightmare," says Mehring.

Central Roofing crews installed the wood blocking, sheathing and waterproofing in the decorative cornices, which had been recreated out of fiber reinforced plastic (FRP) by another subcontractor. Central Roofing then fabricated and installed the copper internal gutters, as well as the downspouts, which were constructed of pre-finished steel to match the window frames.

On the smaller flat roof areas abutting the steep-slope roof, a 60-mil EPDM system from Johns Manville was installed. These areas were completed as work progressed on each section.

BUILT-UP ROOFS

On the low-slope sections of the main roof, crews applied a four-ply built-up

roof system manufactured by Johns Manville. Approximately 31,500 square feet of JM's 4GIG system was installed and topped with a gravel surface.

The built-up roof areas were bordered by parapet walls, which were east to tie into, notes Mehring. "What made this project a tad bit easier is that the other scopes of the work – the flat roofs – didn't have too many sequencing issues with the tile work and the gutters," he says. "The built-up roofers were on their own and had their own schedule."

On the 13,000-square-foot area for the green roof, a Johns Manville threeply system with a modified cap sheet was installed. The green roof features a built-in leak detection system from International Leak Detection (ILD). "The leak detection system is encapsulated between the polyiso and the cover board," notes Mehring. "We installed a JM modified cap sheet. All of the seams had to be reinforced with their PermaFlash liquid membrane to maintain the warranty because of the green roof."

INSTALLATION HURDLES

Challenges on the project included a tight schedule and difficult weather. "Essentially we had a 40-day schedule to get all of the built-up roofing on," Mehring says. "The challenge with not only the built-up but the tile as well is that the work started in the late fall and we had to work through the winter. You can imagine the problems with the Minnesota weather."

Days were lost to rain, snow, cold temperatures and high winds. The green roof system couldn't be completed until May, near the end of the project, when Central Roofing installed the growing medium and plants. After a drainage layer was installed over the cap sheet, crews applied engineered soils and sedum mats supplied by Hanging Gardens, Milwaukee, Wisconsin.

Access at the site was also difficult. Central Roofing used its Potain cranes to get materials on and off the roof. "Those self-erecting stick cranes can go 120 feet up in the air and they also have the ability to deliver materials 150 feet from the setup location," Mehring explains. "That was critical because we only had two locations we could set up: on the south side, in between the opening of the two wings, and on the north side, also in the opening between the wings. We had to have the ability to get material to the middle section and the corners of all four wings, and that was the only way to do it."

Another logistical challenge was posed by a large tree at the southeast corner of the building – the oldest tree on campus. Great care had to be taken to avoid damaging it. "The tree goes as high as the steep roof, and you had to work right by it," notes Germain. "While working and using the crane, we couldn't touch it. The guys were very careful and very conscious of it. Adam Fritchie, the foreman on the project, did a great job communicating with the university and the crews to make sure everyone understood the project goals."

SAFETY PLAN

As part of the site-specific safety plan, crew members were tied off 100 percent of the time on the steep-slope sections – even with scaffolding in place for the project. The flat roof areas were bordered by parapets, but they were only 2 feet high, so safety railing systems were installed. "We used Raptor Rails all the way around, and when we were installing the railings, we used Raptor carts," Mehring says. "Our men were fully tied off while installing the railings – and taking them down."

It was a complicated project, but executing complicated projects with multiple scopes of work is one of the company's strengths. "Overall, I think we had more than 20,000 hours on this project," Mehring says. "So, I think that a roofer having the ability to garner 20,000 hours on a project speaks for our ability to finish large and challenging projects within the milestones required - as well as keeping safe protocols and paying the bills. The tile, the copper, the sheet metal, the built-up roofing, the green roofing, the EPDM all of those were self-performed by our guys."

"This was such a special project,"

Germain says. "Aside from the sheer size, it captures the heart. When we look at the finished structure we're extremely proud. Our team, which also included Lloyd Carr, Matt Teuffel and Corey Degris, played a big part in re-establishing Pioneer Hall as a key building on the University of Minnesota campus."

PIONEER HALL UNIVERSITY OF MINNESOTA MINNEAPOLIS, MINNESOTA

TEAM

ARCHITECT: TDKA Architects, St. Paul, Minnesota, <u>www.tkda.com</u>

GENERAL CONTRACTOR: McGough Construction, St. Paul, Minnesota, <u>www.mcgough.com</u>

ROOFING CONTRACTOR: Central Roofing Company, Minneapolis, Minnesota, <u>https://www.</u> <u>centralroofing.com</u>

MATERIALS

SYNTHETIC SLATE: DaVinci Multi-Width Slate, DaVinci Roofscapes, <u>www.davinciroofscapes.com</u>

BUILT-UP ROOFS: Four-ply 4GIG system and, Johns Manville, <u>www.</u>JM.com

EPDM ROOF: 60-mil EPDM, Johns Manville

VAPOR BARRIER: Grace Ice & Water Shield, GCP Allied Technologies, www.gcpat.com

UNDERLAYMENT: FeltBuster synthetic underlayment, GAF, <u>www.GAF.com</u>

LEAK DETECTION SYSTEM: International Leak Detection, https://leak-detection.com

SNOW GUARDS: Rocky Mountain RG 16 Snow Guards, Rocky Mountain Snow Guards Inc., <u>www.</u> <u>rockymountainsnowguards.com</u>

GREEN ROOF: Sedum mats, Hanging Gardens, Milwaukee, Wisconsin, www.hanging-gardens.com



Texas-Sized Project

Massive High School Re-Roofing Addresses Urban Heat Island Concerns

> arcus High School is one of more than 65 facilities that comprise the Lewisville

Independent School District (LISD). Located north of the Dallas/Fort Worth International Airport, the massive127square-mile district serves more than 53,000 students. Over a decades-long partnership, Johns Manville and Martin-Tomlinson Roofing Company (M-T) have built a great track record with LISD and have completed dozens of roofing projects for the school district together.

On this project, the roof systems were replaced on several attached buildings with a roof area totaling approximately 195,000 square feet. This massive project covered only half of the Marcus High School campus, and there were very few places where M-T had flat surfaces to work on. With the client requiring minimal disruption to students, most of the work was completed over summer break. Then, exceptional care was taken once school was back in session to keep students and faculty apart and safe from the jobsite where M-T's 10man crew continued to progress.

The new roof also needed to be highly reflective and compliant with the International Energy Conservation Code, as required in the southern United States. The heat island effect is a concern under the relentless Texas sun.

THE NEW ROOF SYSTEM

After evaluating the roof, Martin-Tomlinson and a third-party roofing consultant determined that some of the existing insulation could be left in place and that the tear off only had to go down to the cover board - not down to the roof deck, a few inches below. Salvaging existing insulation benefited the school financially, and it is better for the environment since fewer materials had to be discarded and replaced. Additionally, not removing those additional inches from the roof saved time, which lowered the installation cost for the school district. Before starting the tear off, specialized equipment was brought in to remove loose gravel to create a clean working surface. Then, the existing four-ply builtup roof was removed.



The updated roofing system is a twoply JM SBS heat-welded modified bitumen roof system with highly reflective surfacing. JM ENRGY 3 polyiso roof insulation and DensDeck cover board were applied with JM RS Urethane Adhesive low-rise foam. The roof was covered with the SBS roofing system, which consisted of one-ply each of JM DynaWeld Base and DynaWeld Cap FR CR G. Heat island concerns are diminished with the cap sheet, and the roof is Energy Star certified.

M-T Vice President Jesse Byrd credits the technical knowledge of his JM sales rep and the outstanding service of his JM support person with the success of this job. "I never needed to call technical support with questions," he says. "I went right to Joel Lewallen, the most knowledgeable roofing guy I know, and I know lots of them. We never had to stop work waiting on materials. JM technical representative Andy Austin was always available for support and he made sure we could keep working."

MARCUS HIGH SCHOOL FLOWER MOUND, TEXAS

TEAM

ROOFING CONTRACTOR: Martin-Tomlinson Roofing Company, Dallas, Texas, <u>www.m-troofing.</u> <u>com</u>

MATERIALS

MODIFIED BITUMEN ROOF SYSTEM: DynaWeld Base and DynaWeld Cap FR CR G, Johns Manville, <u>www.</u> JM.com

INSULATION: ENRGY 3 Polyisocyanurate, Johns Manville,

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

EDUCATION

Sustainability Is Elementary

Recycling Membrane Saves School District Money and Protects the Environment

> hen the roof on Bishop Elementary School outlived its warranty, the Lincoln Consolidated

School District put the roof replacement project up for bid. The school district already had a specific product in mind, and that made things pretty straightforward for Superior Services RSH Inc., headquartered in Lansing, Michigan.

Founded in 1975, Superior Services focuses on commercial and industrial low-slope roofing. The company also has an architectural metals division and a dedicated service and maintenance department. According to Derek Heins, its vice president, the company works closely with Duro-Last Roofing, and that relationship was key to being awarded the bid to re-roof Bishop Elementary School in Ypsilanti, Michigan.

"The existing roof that was on this building was a Duro-Last roof. It had been on there for more than 20 years, and the school had been very happy with its performance," Heins says. "Most of the other buildings in the Lincoln Consolidated School District have Duro-Last roofs, so they are really comfortable and really familiar with the product. The school likes the single-ply PVC and the reflectivity of the white membrane, and have been really happy with the performance."

During the bidding stage, Heins suggested a way the project could save money while putting less stress on the environment. "We suggested utilizing the Recycle Your Roof program with Duro-Last Roofing," he says. Through the program, mechanically attached Duro-Last PVC membrane can be returned to the manufacturer at the end of its useful life.

Heins explained the benefits of the recycling program to the district, which included a lower installation cost. "You're reducing landfill costs by not bringing in dumpsters and paying for disposal of the old membrane," he notes. "We essentially take it directly to Duro-Last's factory, where they grind up the material and use if for making products including flooring and rooftop walkway pads."

The school district agreed, and more than 8,700 pounds of the existing PVC roofing membrane was recycled as part of the re-roofing project. More than 8,700 pounds of the existing PVC membrane was recycled as part of the Bishop Elementary School re-roofing project as part of Duro-Last Roofing's Recycle Your Roof program

REMOVAL AND REPLACEMENT

The 77,000-square foot roof featured different elevations. The center area where the two wings met was divided into several sections, most separated by parapet walls. The roof also features a large skylight, which was replaced as part of the project. The site-specific safety plan incorporated for each section included a perimeter warning line system and personal fall arrest systems (PFAS). A guardrail system was set up around the skylight.

The first step was the tear-off. The roof removal process is critical for the recycling program. "When we started the project, we sliced the roof membrane at the fastening rows," explains Heins. "By doing this, it allowed us to roll up the loose membrane between the fastening rows. The rows were approximately 5 feet wide. After rolling them up, we tack welded the rolled-up material using a hot-air welder."

The rolls were removed from the roof with the assistance of a telehandler, stacked on pallets, and secured with straps. Crews then removed the fastening tabs and fasteners from the existing roof system, using screw guns to back out the fasteners from the metal deck.

The next step was inspecting the underlying polyiso insulation for any moisture, damage or deterioration. It was replaced as necessary, but the vast majority of it was reused, which offered additional cost savings.

New tapered drain sets were installed for all of the internal drains on the building. "We used the Duro-Guard insulation tapered drain sets," Heins notes. "We cut out the existing insulation and put in new wider drain sets to help promote water flow on the roof."

The tapered drain sets are prefabricated and pre-sloped. They are available in two sizes: 4 feet by 4 feet, and 8 feet by 8 feet. "We try to use larger size drain sets whenever possible," Heins says. "They unfold to form an 8-foot box around the drain. The marked center circles allow you to simply lay it over the drain sump and cut out the sump opening."

Crews then installed the 50-mil Duro-Tuff PVC roof system, which was mechanically attached. Enhancements at the perimeter were made using a RhinoBond induction welder.

"We install a hybrid perimeter using RhinoBond induction welding," Heins explains. "We run two wind rows around the perimeter of the building. Then we roll out the 10-foot wide membrane rolls. With the membrane rolled out, we fasten it down per the manufacturer's specifications. After we finish putting the membrane down, we go back and use the RhinoBond machine to weld the membrane down to all the perimeter plates for our wind laps."

FINAL DETAILS

Crews then installed prefabricated accessories, including custom-manufactured wall flashings, curb flashings, and stack flashings. Drains were fitted with new drain inserts and strainers. Crews also installed a new Bilco S-20 roof hatch.

Perimeter metal and copings were supplied by Exceptional Metals. "We used their two-piece compression metal," Heins notes. "We also installed custom scupper collector boxes and downspouts on the project as well. By using Exceptional Metals, a division of Duro-Last, we were able to include everything in their Edge to Edge Warranty."

Heins points to the large skylight as one of the most difficult details on the project. The existing skylight was replaced with a new custom-made Velux double dome skylight, which was installed after the roofing work was completed. When the new skylight arrived at the site, crew members lifted it to the roof and removed the existing skylight. The temporary flashings were replaced with new flashings as the new skylight was installed.

The biggest challenge on the job was the tight schedule. The project was completed in two weeks during July of 2019. "We had a limited window of time to complete this project," says Heins. "Like most school construction projects, we were required to complete the roof during the summer break, making it essential to finish as much work as possible each day."

RECYCLING

At the end of the project, the old membrane was put on a trailer and returned for recycling.

Heins is proud to promote the Recycle Your Roof program as a win-win proposition. "It's best for everybody to be conscious of the environment," he says. "We focus on being environmentally friendly, and we also focus on the cost savings. Recycling the membrane and reusing the insulation that is in in good condition offers a big cost reduction for our customers – and it keeps the material out of the landfill."

According to Heins, this project

The recycled material was secured to pallets in a staging area and then taken to the Duro-Last factory on a trailer. The recycled material is used to make products including flooring, walkway pads, and concrete expansion joints.

highlights some of the strengths of Superior Services. "One of the things this project demonstrates is our commitment to utilizing the latest roofing technologies," he says. "One example is Duro-Last's prefabricated accessories. Duro-Last has always been a frontrunner in providing prefabricated and custom accessories, and Exceptional Metals offers further custom fabrication. It is important to us, as a company, to strive to be on the leading edge of technology, both on the roof and in the office. It's part of our culture, as well as emphasizing sustainability and energy-efficient roofing." R

BISHOP ELEMENTARY SCHOOL YPSILANTI, MICHIGAN

TEAM

ROOFING CONTRACTOR: Superior Services RSH, Inc., Lansing, Michigan, <u>https://</u> superiorservicesrsh.com

MATERIALS

ROOFING MEMBRANE: 50-mil Duro-Tuff PVC, Duro-Last, www.durolast.com

EDGE METAL: Exceptional Metals, <u>www.exceptionalmetals.com</u>

ROOF HATCH: S-20 Type S Roof Hatch, BILCO, www.bilco.com

SKYLIGHT: Custom-Size Double Dome Acrylic Skylight, Velux, <u>www.</u> <u>veluxusa.com</u>

EDUCATION

Gym Dandy

State-of-the-Art Wall System Protects New Gymnasium Complex

state-of-the-art \$6 million gymnasium for Pacific Christian School in Victoria, British Columbia, replaced the school's existing facility, constructed nearly 40 years earlier.

The new facility created a

double-sized gymnasium with a mezzanine, changing and locker rooms, and a commercial kitchen. The school has 900 students enrolled from preschool to grade 12.

The Pacific Christian School project demanded a wall system that would perform well with the wet weather conditions of the Pacific Northwest. Since school was in session during the project, a fixed timeline was imperative. Brytar Contracting worked around the school's daily routine, and certain parts of the school were off limits, with only one door accessible to construction staff.

For the building's walls, Brytar

Contracting proposed IKO's Enerfoil system because of its superior R-Value and ease of installation. According to Brytar Contracting Business Development Manager Les Starling, the company full service general contracting company that specializes in wall panels. "Our work includes lots of multi-family and high rise projects, so we were looking for an alternative to a rigid wall solution for this project," he says.

In all, approximately 8,640 square feet of wall systems were installed on the project, which qualified for an IKO AquaBarrier Waterproofing Material Warranty. "While we used AquaBarrier AVB on another school project, this was Brytar's first time to install the IKO Enerfoil insulation product," notes Starling. "Both are outstanding products and performed perfectly. As we see it, all-insulated wall systems are the way of the future."

This was the first significant project supplied by Roofmart in Victoria using IKO Enerfoil and IKO AquaBarrier AVB, according to Rob Strickland, Regional Manager, Roofmart Vancouver Island.

PACIFIC CHRISTIAN SCHOOL VICTORIA, BRITISH COLUMBIA, CANADA

TEAM

ARCHITECT: HDR, Vancouver, British Columbia, <u>www.hdrinc.com</u>

GENERAL CONTRACTOR: Kinetic Construction Ltd., Victoria, British Columbia, <u>www.</u> <u>kineticconstruction.com</u>

WALL CONTRACTOR: Brytar Contracting, Vancouver, British Columbia <u>www.brytarcontracting.</u> <u>com</u>

DISTRIBUTOR: Roofmart, Vancouver, British Columbia, <u>www.roofmart.ca</u>

MATERIALS

WALL SYSTEM: Enerfoil Wall Insulation and AquaBarrier AVB System, IKO, <u>www.iko.com</u>



EDUCATION

WRITTEN BY THOMAS RENNER

Keeping Students Safe

Acoustical Smoke Vents Are Key Priority for School's Theater Renovation

oofing experts are well aware smoke vents can save lives and reduce the amount of property loss. While life and property safety are their

primary function, acoustical smoke vents also play an important part in noise mitigation. When Middlesex School in Massachusetts renovated the 55,000-square-foot Bass Pavilion for the Arts and Danoff Visual Arts Center, the architectural team from CBT Architects selected four acoustical smoke vents manufactured by The BILCO Company.

"The features that were included in the smoke vents were geared to student safety," says Michelle Oishi, the lead architect on the project for CBT. "That was of paramount importance. They were also space considerations, and the automated aspect of the vents was important due to the fact that we wanted very few things interfering with the rigging sets."

BROAD SCOPE

The primary objective of the project aimed at improving the existing theater and creating a space where the school's entire 400-plus students and nearly 100 faculty members could assemble. The previous structure was built in the 1960s. The school opened in 1901.

"There's a commitment to theater and the arts," says Steve McKeown, the school's project manager. "It's not any different than our commitment to clubs, sciences or athletics. We provide spaces for students who are interested in a variety of things. There's a lot of cool opportunities for students to find



their promise."

Architects, engineers and contractors needed a large dose of creativity to execute the project. The theater's original roof structure and perimeter walls needed to remain standing. In essence, the renovation was a major do-over of the existing space without adding additional square footage. "We had to work within the confines of the existing roof structure and the surrounding walls," Oishi said. "A certain amount of the existing building was out of character with the rest of the school."

The acoustical smoke vents used in the Middlesex School renovation are 6-foot-by-6-foot double-leaf smoke vents with motorized operation that allows them to be opened and closed from a remote location. They also include limit switches, which allow for monitoring if the vents are in the open or closed position.

Automatic smoke vents protect

property and aid firefighters in bringing a fire under control by removing smoke, heat and gases from a burning building. This ensures better visibility, evacuation time, and protection against fire spread, as well as reduced risk of smoke inhalation and structural damage. They are activated upon the melting of a fusible link, and are ideally suited for large expanses of unobstructed space such as factories, warehouses, auditoriums and retail facilities.

Acoustical smoke vents, however, take on the added quality of controlling noise. They are used in theaters, concert halls and other projects where it is important to limit noise intrusion.

KNOW YOUR RATINGS

Acoustical smoke vents and their ability to block out noise are determined by ratings in Sound Transmission Class and Outdoor-Indoor Transmission Class. For acoustical smoke vents, the OITC rating



is the more important figure for architects to consider.

OITC rates the transmission sound between outdoor spaces and indoor spaces in a structure. Like the STC rating, OITC measures sound intensity loss in decibels. The OITC rating was developed in 1990 and is typically used to measure sound transmission loss over a frequency range from 80 to 4000 hertz. It is most applicable for measuring the prevention of low frequency exterior sounds such as automotive traffic, construction, and low-flying airplanes through exterior building surfaces.

STC measures the extent to which sound is prevented from being transferred from one area to another. The higher the STC value, the less that sound can be transferred through a building product. STC is typically used to measure sound transmission loss over a frequency range from 125 to 4,000 hertz and is most applicable for interior areas that experience mid to high frequency noises, such as conversation, television, telephones, and office equipment.

"OITC is the preferred rating when addressing sound insulation from exterior noise – especially when transportation noise sources are impacting a building facade with significant low-frequency (bass) sound," says Harold Merck, principal and acoustician for Merck & Hill



Middlesex School recently completed an extensive renovation project of the school theater. The project included six doubleleaf acoustical smoke vents manufactured by The BILCO Company.

Consultants of Atlanta. "While STC ratings may be fine for typical interior noise sources such as voices, STC doesn't adequately address the extended low-frequency noise contribution of aircraft, traffic or even large roof-top equipment. The OITC better addresses low-frequency noise impacts and is the more applicable sound rating for roof mounted automatic smoke vents."

The BILCO Company recently unveiled a new acoustical smoke vent, with an STC rating of 50 and an OITC rating of 46, that provides the highest level of protection against exterior noise intrusion. In addition, the product has also received an ISO-140-18 sound rating when tested against rainfall sound. The rating measures the impact of sound insulation on building materials – such as roofs, skylights and roof/ceiling systems – incur when exposed to artificial rainfall.

CHECKING ALL THE BOXES

From the roof on down, the completed project at Middlesex checks all of the boxes that were the target of the twoyear renovation.

The main stage now includes balcony seating that allows the entire student body and faculty to fit comfortably as an audience for performances, guest speakers and all-school assemblies. It features a motorized orchestra pit that can be raised up to the stage level. There are gallery space and pin-up areas as new arenas to celebrate and encourage the artistic pursuits of students. There is also a new "mindfulness" space that will provide "emotional and intellectual space to reflect and recharge," according to the architect. Workers also improved a courtyard to provide accessible entry to adjacent buildings which includes a terrace that serves as an

exterior performance venue.

Thanks to the acoustical smoke vents, it also includes important life and property safety features that also limit exterior noise.

"It's an awesome space," McKeown said. "The entire community gathers there on a weekly basis, and it's very comfortable. It provides a space where our community can gather, and that's something that is very important to our school."

ABOUT THE AUTHOR: Thomas Renner writes on building, construction, and other trade industry topics for publications in the United States.

BASS PAVILION FOR THE ARTS AND DANOFF VISUAL ARTS CENTER MIDDLESEX SCHOOL CONCORD, MASSACHUSETTS

TEAM

ARCHITECT: CBT Architects, Boston, Massachusetts, <u>www.cbtarchitects.</u> <u>com</u>

CONTRACTOR: J.S. Mortimer Inc., Auburn, Massachusetts, <u>www.</u> <u>jsmortimer.com</u>

MATERIALS

SMOKE VENTS: Acoustical Smoke Vents, The BILCO Company, <u>www.</u> <u>bilco.com</u>

SHINGLES: Landmark, CertainTeed, <u>www.certainteed.com</u>

ROOFTOP LIVING

WRITTEN BY CHRIS KING

On a Pedestal

Ford Plant Transformed into Museum and Hotel Is Crowned by Rooftop Deck

he 21c Museum Hotel in Oklahoma City encompasses a contemporary art museum, a 135-room boutique hotel, event spaces, and Mary Eddies Kitchen x Lounge. It also features a rooftop deck with stunning views of the city. The hotel was built at the site of an idle Ford Motor Company assembly plant originally designed by Albert Kahn. The building was refurbished to serve as the hotel and museum in the first phase of an ambitious development project. The Ford plant's original water tower was retained during the renovation, and it is accessible via a catwalk from the rooftop deck, which also frames a green roof area.

The deck's 1,500-square foot wood paver system was manufactured by

Bison Innovative Products and installed by Elevated Paver Systems (EPS), headquartered in Oklahoma City.

According to Adam Fink, president of EPS, the company was founded in 2011 to serve the pedestal-set rooftop paver market in Oklahoma. The company specializes in difficult hardscape projects including rooftop pavers, pavers at grade, and architectural stone, including



cut-to-size marble and granite. EPS was tapped for the deck installation by Lingo Construction, the general contractor on the project.

"It is a really unique venue and it was a unique construction project," Fink says.

The building is crowned by its rooftop deck, which is comprised of 2-footby-2-foot, eight-plank Ipe Wood Tiles set on Bison Versadjust Pedestals. The pedestals were installed atop steel I-beams that were erected above the newly refurbished roof, which features a 60-mil PVC roof system manufactured by Johns Manville. The beams were installed along with the catwalk and an integrated railing system.

"This was a unique project for us because we are usually installing our systems right on top of the roof membrane," Fink says. "Here we had a newly installed steel substrate that our pedestals rested on."

Proper placement of the beams was crucial. "The flat part of the beam was pretty narrow, all things considered, so the biggest challenge in the whole scenario was to make sure that the steel was exactly right," notes Fink.

The steel beams had to be at the correct elevation and proper spacing throughout their length, with a tolerance of plus or minus a quarter inch. According to Fink, the key to success was communication between the design and installation teams. "We worked carefully on the shop drawings and dictated the on center spacing," Fink recalls. "Little things that usually don't matter very much were critical here because the tolerances were so tight. The steel subcontractor did an excellent job."

The pedestals were adhered to the beams using Dow Corning 795 silicone sealant, and the wood tiles were then locked into place. Crews used an automatic laser to make sure the tiles were level, using shims in areas where the steel beams were slightly off.

The green roof was also supported by a steel substructure. Since the roof framed the rectangular garden area, coordination was crucial here as well. The goal was to ensure that the tiles fit optimally. "We coordinated the shop drawings to make sure we didn't have any small pieces," notes Fink.

Safety concerns were minimal, as the area was surrounded by a large parapet wall and railings, and material could be brought to the roof by the freight elevator. The biggest concern for EPS crews was the trip hazard posed by the steel beams. "It was kind of like working above a kids' jungle gym," says Fink. "But it's nothing we couldn't cover in our toolbox talks."

The deck installation went smoothly, and Fink credits detailed planning for the successful outcome. "Coordination was the key," he says, noting that precise shop drawings and pre-engineering meetings were the most crucial elements of the project. "Once the steel was in place, we just took out field measurements and went at it from there," he says. "It was all a downhill slide after that."

Fink points to in-house drafting capabilities as a key strength of EPS. "We pride ourselves on our pre-construction submittals," he says. "This job went really well. There weren't any glitches because we prepared a very good plan and executed it."

21C MUSEUM HOTEL OKLAHOMA CITY, OKLAHOMA

TEAM

ARCHITECT: Deborah Berke Partners, New York, www.dberke.com and Hornbeek Blatt Associates, Edmond, Oklahoma, <u>www.</u> <u>hornbeekblatt.com</u>

GENERAL CONTRACTOR: Lingo Construction Services Inc., Oklahoma City, Oklahoma, <u>www.</u> <u>buildwithlingo.com</u>

ROOFING CONTRACTOR: Coates Roofing Company Inc., Seminole, Oklahoma, <u>www.coatesroofing.com</u>

ROOF DECK INSTALLER: Elevated Paver Systems (EPS), Oklahoma City, Oklahoma, <u>www.okeps.com</u>

MATERIALS

PAVERS: Ipe Wood Tiles, Bison Innovative Products, <u>www.bisonip.</u> <u>com</u>

PEDESTAL SYSTEM: Versadjust Pedestals, Bison Innovative Products

ROOFING MEMBRANE: 60-mil PVC, Johns Manville, <u>www.JM.com</u>

RESIDENTIAL

WRITTEN BY RICK HACKETT

After Devastating Fire, Couple Designs Home with Fire Resistant Roof

heir original home in idyllic Stonington, Connecticut, was designed in the Arts and Crafts style and was a place of fond memories and milestones for the family of four. Architect Michael McKinley, owner of McKinley & Associates, designed the home about 25 years ago specifically for his family. But a few years ago, on a very dry and windy afternoon in March while he was home with one of his two daughters, the house was ravaged in a fire.

"It didn't sound so much like a fire, but instead like a bunch of squirrels running across the roof," said McKinley.

Unfortunately, the sound wasn't squirrels. The fire tore into the roof, destroying it as well as the whole second floor of the home. Extensive water damage plagued the ground level as a result. Luckily, nobody was harmed. But the fire completely uprooted the family – who immediately relocated into a rental – and set the couple into motion.

Michael, along with wife Kathy, an interiors expert who also works for the firm, ultimately set out to rebuild; however, they decided not to build a replica of the first home. The couple instead forged a completely different design direction, ultimately deciding on another aesthetic altogether while addressing a responsibility to build more sustainably and with fire safety top-of-mind.

As was the case with the McKinley's first home, fire can erupt on the roof when embers hit the surface and one or more ignite. When trees and brush pair with fire and wind, the dangerous concoction enables the embers to blow onto the roof.

The McKinleys knew the roof material chosen would be incredibly important in reducing the risk that future embers could ignite the surface. For their new abode, the designers selected Inspire Classic Slate by Boral, a durable roofing system which mimics the beauty of natural slate and that integrates cutting-edge environmentally conscious technology. The roof is resilient to harsh weather conditions, offering a Class 4 Impact rating for hail and a 110-mph wind uplift rating. Perhaps most important to the family, the Classic Slate provides a Class A system Fire rating, the industry's highest.

THE ROOF INSTALLATION

JSD Home Improvements of Waterford, Connecticut, was contracted to install the roof. "The family had already decided to use a material with a high fire rating," says Jeff Dennison, owner and installer with JSD Home Improvements. "Hail can also occur anytime where this home is located. They considered standing seam metal roofing, but ultimately went with the Classic Slate, not only because of the performance benefits, but because it gives the look of Vermont slate, which better complemented the architecture and look of the home."

Moving away from the Arts and Crafts genre of the damaged home, the couple instead designed their new abode to pay homage to the region's historic 200-year-old farm heritage. Evoking a modern rendition of the traditional farmhouse, the home integrates the gabled roof concept. The roofscape features multiple gables and pitches.

"A mix of Olive, Ash Grey, Evergreen and Red Rock hues were combined to create an authentic look," adds Dennison. "The trick during installation was to take two of the colors and use them as accents, weaving them into the other three colors. We had to stand back numerous times to get the visual right and make sure the accent colors stood out."

In all, it took Dennison and two other team members eight days to complete the roof. No real challenges interrupted them, with the exception of a couple of rainy days.

"This roof material is extremely durable, strong, and easy to work with," Dennison adds. "Working with Bob Wood Construction on this project was also great. They are a general contractor known for orchestrating a jobsite well and keeping everything moving."

The roof adorns a home designed by the McKinleys to protect the environment while functioning well. The McKinley's daughters, now in their early twenties, have left to pursue their own paths, and the new home is much smaller than the original at 3,200 square feet, yet still encourages regular visits and stays. At four bedrooms and three baths, the home's functionality is also improved as compared to the last home, with many spaces designed to be multifunctional. Michael notes that in



the decades since designing the family's first home, his skills have been refined. "I've become a lot more creative with designing smaller spaces that are more efficient," he says. "This is a key part of the new home's sustainability story."

Eco-friendly it is. The home features large windows, making use of abundant natural sunlight, and incorporates radiant floor heating. Closed cell spray polyurethane foam insulates the home, ensuring a dramatic reduction in energy usage. The home also makes use of a geothermal system and solar power.

Waldo Renewable, an Old Lyme, Connecticut-based electrical contractor specializing in solar system design and installation, led the photovoltaic install. The 6.4 kW grid-tied rooftop system includes 20 LG 320 solar panels and SolarEdge 7600H with a DC optimizer. The Waldo Renewable team utilized flashing for a seamless installation with the Inspire Classic Slate.

The McKinleys designed one additional intuitive feature into their roof. An elaborate drainage system collects water from the roof and stores it underground in a cistern for use in the garden where Kathy grows vegetables.

Michael and Kathy McKinley created an incredible new home. The combined materials and systems ensure optimized performance and return on investment for the long term, with fire safety to boot. And one glance at the home proves curb appeal wasn't sacrificed for that performance. The home is ultimately a testament to the meaningful material and construction advances of the past two decades.

"We are 25 years into the future," says Michael, speaking of his home's vast improvements over the last one. "No matter how well you did it then, it's not the same. All the factors have changed."

ABOUT THE AUTHOR: Rick Hackett is product manager with Boral Roofing, a leading provider of durable and energy-efficient new and retrofit roofing solutions. He can be reached via email at Rick.Hackett@boral.com. For more information about Boral Roofing, visit www.BoralRoof.com.

MCKINLEY RESIDENCE STONINGTON, CONNECTICUT

TEAM

ROOFING CONTRACTOR: JSD Home Improvements, Waterford, Connecticut

SOLAR CONTRACTOR: Waldo Renewable, Old Lyme, Connecticut, <u>www.waldorenewable.com</u>

MATERIALS

ROOF SYSTEM: Inspire Classic Slate, Boral Roofing, www.boralroof.com

SOLAR SYSTEM: 20 LG 320 solar panels, <u>www.lg.com/us</u>, and SolarEdge 7600H, <u>www.solaredge.</u> <u>com/us</u>



WRITTEN BY CHRIS KING



he Molly Jenkins Carriage House is located in the historic Country Club District of Omaha, Nebraska. The home, original-

ly built in the 1920s, needed a new roof after it sustained hail damage and multiple leaks were discovered. The homeowners wanted an aesthetically pleasing, durable roof system that would be true to the style of the neighborhood and capture the look of the house as it was originally designed.

Omaha-based Everlast Exteriors was called in to consult on the project after the storm. "Their insurance agent recommended us to the homeowner," says Brent Hall, co-owner of Everlast Exteriors. "The Country Club historic district is an early 20th century Omaha neighborhood that was marketed to attract homebuyers who expected an exceptionally high level of quality. The community was added to the National Register Of Historic Places in 2004. On this home, the existing asphalt shingle roof had to be replaced, as did the inlaid gutters, which were also damaged."

Hall recommended asphalt shingles due to their beauty and performance. After consulting with the homeowner, the company installed CertainTeed Carriage House shingles, which are a Class 4 impact resistant shingle.

The first step was to replace the gutter system. "We had to remove the first 3 feet of the roofing and put down a high-temp ice and water shield," explains Hall. "We installed it within the inlaid gutters, and then ran it 3 feet up the roof. Then we fabricated and installed the inlaid gutter, before we went back and roofed it. We had to do it that way because the gutter system extends under the shingles and underlayment."

The gutters were custom fabricated





out of 24-gauge pre-finished galvanized steel and installed in the existing wood frame. "We also re-flashed the chimneys using the 24 gauge pre finished steel color to match shingles." Hall says.

The new shingles were installed over a synthetic underlayment and ice and water shield. New accessories included lead boots for the plumbing vents, a new gutter apron, drip edge and exhaust vents.

Standout features included a custom-fabricated turret cap and a new weather vane. "We fabricated a copper turret cap that might be the biggest one we've ever made," says Hall. "She also purchased a copper weather vane, and we installed that for her, too."

The copper turret cap was the final touch on the project. According to Hall, the homeowner really wasn't sure what she wanted, so the project was put in the hands of Todd Sterba, a top metal fabricator at Everlast Exteriors. "Executing something like this takes the right tools and the right



fabricator," notes Hall. "He worked on it in our shop and even took it home to his own workshop to put some finishing touches on it. We never even saw the final product until he brought it out to the job. The homeowner really loved it."

The style of shingle was chosen because it fit in with the character of the area. "It's an old house in a historic neighborhood, and that asphalt shingle really has a timeless look," says Hall. "It's made to emulate a slate roof, and it looks like something they might have installed in the era when the home was built."

Everlast Exteriors submitted the project to the Asphalt Roofing Manufacturers Association for the ARMA Excellence In Asphalt Roofing Awards program, which recognizes industry professionals for their high-performing steep-slope and low-slope asphalt roofing projects across North America. The Molly Jenkins Carriage House received the Gold Award in 2020. The company received a check for \$2,000 at the 2020 International Roofing Expo.

"We were really happy to learn that we won," Hall recalls. "We try and just knock out the coolest, best roofs around. We use the best products out there and provide the best workmanship. That's our goal. Our top priority is to put out the best product not get the biggest profit – so it's nice to get recognition."

According to Hall, the award-wining project showcases the company's strengths. "We match high-end material with high-end labor," he says. "We try to bring together the best shingles and accessories, with the best labor practices to install the best product we can while meeting every customer's budget. We provide a transferable lifetime labor warranty so we make sure every roof we do is aesthetically pleasing and maintenance free."

Submissions are being accepted for ARMA's 2021 Excellence in Asphalt Roofing Awards. For more information, visit <u>www.asphaltroofing.org</u>.

MOLLY JENKINS CARRIAGE HOUSE OMAHA, NEBRASKA

TEAM

ROOFING CONTRACTOR: Everlast Exteriors, Omaha, Nebraska, <u>www.</u> <u>everlastexteriorconstruction.com</u>

MATERIALS

SHINGLES: Carriage House Gatehouse Slate, CertainTeed, <u>www.certainteed.com</u>

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