CHAMBERLIN Roofing & Waterproofing

NEWSLET

BAMC's Skylight Resuscitated

SPRING 2022

After storm damage, Brooks Army Medical Center's 25-year-old massive skylight was replaced. Picture of construction in progress shows new panels on the right and existing panels on the left.

Brooks Army Medical Center (BAMC) is the U.S. Department of Defense's largest medical center and only Level One Trauma Center. Providing safe, quality care to our military service members, their families, veterans and civilian emergency patients, this sits as the most robust and productive healthcare organization within the Military Health System. Located on Fort Sam Houston Army Post, Joint Base San Antonio (JBSA) BAMC is a

425-bed Academic Medical Center and is home to the Center for the Intrepid, an outpatient rehabilitation facility.

The skylight in the lobby of the medical center was built 25 years ago. A 2019 summer storm rolled into San Antonio bringing high winds and hail. The wind caught the corner of the skylight at BAMC ripping some of the panels

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CONSULTANT'S CORNER



Bob Cusumano President Coatings Consultants, Inc.

The Case of the Delaminating **Exterior** Paint

People often say, "Concrete is easy to paint because it's so stable." If that's so, then why do we see so many exterior coating failures on concrete buildings? The answer is that often we are painting some other material in addition to the concrete on these buildings. In addition to that concrete, we may be painting a patch of unknown material.

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(BAMC continued from pg. 1)

off the building. Chamberlin was contacted to provide a temporary fix for the portions of the skylight where panels were missing. After all damages were assessed, a full replacement was recommended. Chamberlin was awarded the job to replace the skylight at BAMC under general contractor JG Contracting.

Field measurements were taken to allow the manufacturer, Kingspan, to start production. Once the panels arrived on site in January 2021, each skylight was lifted individually onto the roof by crane. A schedule was created to maximize productivity while keeping the building sealed and minimizing disruption to the hospital.

Crews removed a certain number of existing panels each night and installed permanent panels. Where permanent panels met existing panels, a temporary seal was used until additional permanent panels were installed during the next work shift. Communication and coordination were key elements of this plan.

KEEPING SAFETY SKY HIGH

BAMC was operating at Fort Sam Houston for the duration of the

project so keeping the hospital personnel and patients safe was a top priority. The skylight is located 80 to 90 feet over the main lobby of the hospital. Part of the solution for working on the skylight in a high traffic area and getting the job completed safely was to work overnight from 5pm to 3am. During this time, the lobby was shut down. All entrances were barricaded with warning and directional signage to re-route foot traffic. Keeping the lobby clear mitigated the possibility of someone getting injured if something were to fall from the open skylight. All furniture had to be moved daily and covered with tarps.

Keeping the crew safe on this job was also a primary focus, and special consideration was given to work performed on a roof that had an open skylight at times. Chamberlin began by developing a site-specific safety plan for the project, and the superintendent communicated the plan to all crew members.

A Job Hazard Analysis (JHA) was also developed for this project which covered each task on the job, potential hazards associated with those tasks and how to prevent those hazards from causing an

(Continued pg. 3...see BAMC)



Chamberlin crew members worked nights for minimum disruption to the hospital lobby the skylight covered.

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Photo 1: Bubbling behind the paint is a coating failure that could be avoided if proper tests are performed before job start.

For example, tilt-up wall construction remains one of the most recommended construction methods for large commercial buildings. Tilt-up walls are less expensive to build than cast-in-place concrete, and construction can be quicker and safer.

Often, when tilt-up concrete panels are erected, there are small voids or holes at the surface, usually referred to as "honeycombs" or "bug holes". These form as a result of air entrapment during placement, compaction, and curing of the concrete. Prior to painting, it is customary to fill these holes with a cementitious patching or sacking material. As long as the patching is confined to filling the small holes, there shouldn't be a problem with primer and paint adhering to the concrete, provided the substrate has been properly cleaned. Problems arise when the patching is not limited to the small voids but rather is applied to large wall areas due to cups, dips, grinding of seams, etc.

Cohesion Failure

Recently, I was involved in a case that exemplifies the necessity to pay attention to all of these materials. The work was done on several large warehouse buildings where the entire exterior was painted. The acrylic coating system, which comprised a primer and topcoat, was spray applied and back rolled. Within one year, the paint was spontaneously delaminating (Photo 1).

Adhesion tests were performed, and all patched areas, which were numerous, failed. In every instance, it was noted that some of the patching material stayed adhered to the rear of the delaminated paint while some remained on the wall. The client called me in to investigate this failure.

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Boma Cooperation

(BAMC continued from pg. 2)

accident. The superintendent reviewed it with crew members each evening before work began.

All equipment was inspected daily by a competent person before use. Personal protective equipment was always worn, and Chamberlin's zero tolerance fall protection policy was in place as every crew member had to be tied off while working on the skylight. Weekly toolbox talks were held covering pertinent safety topics and reinforcing Chamberlin's safety policies and procedures.

IN THE WAITING ROOM

The project began at the end of January in 2021, and shortly after the crews were delayed due to weather. Two weeks into February of 2021 a winter snowstorm and freeze began. During this time it was unsafe for the crew to work on the roof due to snow and ice. Additionally, no materials would cure properly in that low of temperature. After a week, the crew could get back on site and resume work.

The project went smoothly after the freeze. With portions of the skylight being open at times and lowered visibility due to working at night, clear skies were a must for this project. The eight-man crew installed 144 panels in all. This included 72 clear panels on the inside and 72 white panels as the finish on top.

DOCTORING UP THE SKYLIGHT

Teamwork was essential to getting the 45-foot skylight panels to the upper level of the roof. The panels were first moved by crane to the lower roof level, where they were tied down and stored. Then they were moved by hand to the upper level via secured ladders. Every crew member had a vital role to play in making sure the panels were safely hoisted to the upper roof without any damage.

The crew demolished and installed eight new panels per night including the top and bottom sections. One crew member worked ahead, focused on the demolition and installation of the perimeter tracks while the other seven crew members followed behind working on the panels. After removal, the old panels were hoisted down the ladder to the lower level. A crane was then used to lower them to the ground. Dow 795 silicone sealant was used to caulk the jambs at cast stone, and Carlisle WIP 300HT under sheet metal flashing was used at the sills. The crew was able to install both the interior and exterior panels from the outside.

ALL BETTER

Chamberlin's attention to detail and expertise gained from decades of roofing and waterproofing experience helped them successfully replace BAMC's sizable skylight on schedule, in less than five months, with zero safety incidents. The team found solutions to deliver high-quality installations on an operational building and keep it watertight throughout despite the nature of the project.



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Testing, **Testing**

My investigation involved several field tests. Painting contractors should perform these tests before starting a job to avoid expensive failures later on.

Several standards from the Painting and Decorating Contractors of America (PDCA) provide guidance on painting tilt-up construction. PDCA P17, "Field Painting of Smooth-Faced Tilt-Up Concrete," states that prior to applying coatings, the painting and decorating contractor should determine the pH of the surface of both the smooth-faced tilt-up concrete and the patching material. pH is a measure of the acidity or alkalinity of a substance.

ASTM D4262 describes the procedure for pH measurement. A pH of 7 indicates neutrality, while readings below 7 indicate increasingly acidic conditions, and pH readings above 7 indicate increasingly alkaline conditions. The pH of properly cured cementitious products, like concrete or stucco, is in the range of 8 to 10. Higher numbers could indicate an improper mix or cure or the presence and migration of moisture. The pH on the surface of the concrete and patch should be determined by marking the area with a pH pencil, moistening the area with distilled water, and comparing the color to a pH chart.



Photo 2: Coating application should not be installed until the surface pH is within the coating manufacturer's recommendations. This photo shows a highly alkaline substrate.

Coating application should not be initiated until the surface pH is within the manufacturer's recommended range for the specified coating system. If the pH is higher than 10, the concrete or patch may not be fully cured. High substrate pH can lead to paint failures such as alkali burn and saponification. Photo 2 shows a highly alkaline substrate in this particular case, which indicates that the patching compound had not completely cured.

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ROOFING CONTRACTORS

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TEXO

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PDCA P4 states that while the contracting entity has the responsibility to determine that a surface is complete and that the "quality of appearance" is such that it is ready for finish painting or wallcovering, the painting and decorating contractor is required to inspect surfaces to determine, by reasonable and visible evidence, that the finish coat will satisfactorily adhere to the surfaces and will perform as specified.

One such visual means is a chalk test in which the stability of the patching material is assessed in accordance with ASTM D 4214. In this test, a black cloth is rubbed against the surface of the patching material. If a large amount of powder or dust is transferred to the cloth, then multiple chalk tests at the same location should be performed. If each successive test has high levels of chalk transfer, then the patching material is friable and dusting; it is not just superficial powder. If this occurs, do not prime or paint this surface!

In my experience, the most important test is to assess the adhesion of the painting system. PDCA P17 recommends that the painting and decorating contractor prepare a benchmark sample of the specified coating system, which, in this case, involves preparing, priming, and painting several of the smooth-faced tilt-up concrete panels in accordance with PDCA Standard P5. Once the coating has cured, adhesion tests should be conducted in accordance with either ASTM D3359 or ASTM D7234.

ASTM D3359 describes testing for adhesion using tape. In this test, incisions are made through the coating in an X pattern if the coating thickness is 5.0 mils (127.0 microns) or greater. A cross-hatch pattern is used if less than that. Tape, such as Scotch 202 adhesive, is firmly applied to the area and then removed in accordance with the test method. The adhesion of the coating is then evaluated by the amount of paint that is removed. This adhesion test method is best used when the coating system is smooth and relatively thin. In this instance, all adhesion tests conducted over patch material yielded poor results, whereas all tests with the paint applied directly to the concrete had good results.

When a coating is textured and relatively thick, the tape will not properly adhere.



Photo 3: This photo shows the poor testing results obtained on the warehouse buildings.

In these cases, adhesion should be assessed per ASTM D6677, "Standard Test Method for Evaluating Adhesion by Knife." The first step of this test is to make two cuts into the coating down to the substrate. Using a sharp knife, the cuts should be made at a 30- to 45-degree angle between legs and should intersect to form an X. Using the point of the knife and beginning at the vertex of the angle, one should attempt to lift up the coating from the substrate or from the coating underneath. Photo 3 depicts a poor result of this test on the warehouse buildings.



Photo 4: A photomicrograph of a cross-section of delaminated paint, showing a layer of patch attached to the rear of the primer.

Prevention Plan

The paint was delaminating because of a cohesion failure of the patching material, as seen in Photo 4. Cohesion is the force that holds a material together. In these instances, the patching material was friable, or crumbly. Unfortunately, there is no topical fix for this problem. Had this issue been discovered prior to application of the primer, then a special primer may have yielded satisfactory results. If poor adhesion is determined after the primer and paint are applied, then all patching and paint must be removed, a suitable high-strength patch applied where needed, and the paint system re-applied.

The delamination failures mentioned in this article could have been anticipated and even prevented had the painting contractor performed simple tests and prepared benchmark patch samples, prior to proceeding with the job, to assess the adhesion of the coatings. Taking a little time to perform these important tests on benchmark samples can save hundreds or thousands of hours redoing the job and a tremendous amount of aggravation for the painting contractor.

This article was originally published in the May 2019 issue of CoatingsPro Magazine.

Photos courtesy of Coatings Consultants, Inc.

Bob Cusumano is president of Coatings Consultants, Inc. His consulting firm analyzes paint failures, writes coating project specifications, and provides expert witness testimony. He teaches classes on blueprint reading, estimating, and management skills to painting contractors, and he frequently speaks and writes articles regarding coatings failures.

Bob is a former painting contractor and a former national PDCA President. He was chairman of the PDCA's Cost and Estimating Committee and the principal author of the PDCA Cost and Estimating Guide. He has taught classes on blueprint reading and painting estimating to industrial, commercial, and residential painting contractors around the country since 1975.

His education includes a Bachelor of Metallurgical Engineering and a Master of Science Degree in Engineering, specializing in corrosion research, both from the University of Florida. Contact info: bob@coatingsconsultants.com.

ABC Excellence Awards



Wursthalle in New Braunfels, Texas, is the main event center for Wurstfest, a non-profit corporation designed to promote local commerce and preserve the community's heritage. After a fire destroyed the Marketplatz and damaged the iconic Wursthalle, Chamberlin was selected by Design/Builder Byrne Construction for concrete restoration and waterproofing installation.

The concrete restoration was a delicate business. No mechanized tools were used for fear the vibrations would cause even more cracking and damage. Due to the age of Wursthalle, the concrete buttresses and wall still had the imprint of the original forms. The crew had to match those imprints so the patches and repairs would blend evenly with the parts that were not destroyed in the fire. Through several mock-ups and trial runs, a solution to diligently match the imprints to make the building cohesive was found.

Chamberlin was able to rectify the buttresses and wall to stabilize Wursthalle as well as help rebuild the Marktplatz within a short time frame and with zero safety incidents. Their work earned them recognition at their local Associated Builders and Contractors (ABC) Central Texas Chapter where they received an Excellence in Construction (EIC) first-place Eagle award.

Austin Q2 Stadium was another project awarded an ABC Central Texas EIC honor. This one-of-a-kind soccer stadium was built from the ground up. Under Austin Commercial, Chamberlin performed both roofing and waterproofing scopes including the installation of a wing-shaped roof. The accolades were presented to Chamberlin at the ABC Central Texas Excellence in Construction Banquet on Thursday, October 14, 2021.

The EIC awards program represents the nation's most innovative and high-quality construction projects built by members of the association, which helps bring awareness to the top-notch work merit shop contractors produce. Judges select the winning entries based on attractiveness of design, project complexity, workmanship, innovation, challenges overcome and more.

Projects that are awarded first or second place by their local chapters advance to compete in the National ABC EIC competition. Chamberlin received a National ABC EIC second-place Pyramid award for their Wursthalle work. Senior Project Manager Brett Schropp and Estimating Manager Nick Flory, pictured above left to right, represented Chamberlin at the 32nd Annual National Excellence in Construction Awards on March 16, 2022, in San Antonio, Texas.

Employee Profile

Andrew Malis Senior Project Estimator Dallas, Texas



A day in the life:

Andrew's day starts with a trip to the break room for a cup of coffee. He then digs into his estimates, which occupies the bulk of his time. When he can, he visits clients, jobsites and attends industry association events. If there is time at the end of the day, he plays a little ping pong.

Outlook on customer service:

Open and clear communication is a necessity for a great working relationship. Andrew believes being willing to have honest conversations and take responsibility when it's due is the best way to work together for successful projects.

Favorite part of Chamberlin:

After eight years, Andrew has gained several close friends at Chamberlin. These relationships lend themselves to productive communication and working through issues together when they arise.

Outside the office:

When he's not working, you can often find Andrew in front of a canvas creating abstract art with oil and acrylic paints. He also enjoys running in the afternoons. This past year he dedicated much time to renovating a house that had been badly damaged by a fire. He and his wife, Aubrey, moved in this past December.

Alternate career:

If Andrew could choose a dream job, he would be an extreme sports athlete. Specifically, he would compete in downhill longboarding which entails racing downhill on skateboards at over 50 mph. He grew up in skate parks and still loves the adrenaline rush.

We asked Andrew to choose his favorites from this random list of things as a way to get to know him a little better:



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HISD - BELLAIRE HIGH SCHOOL - HOUSTON, TX

Remedial Waterproofing

Contract Amount: \$1,500,000 (approx.) **Owner: Houston Independent School District** Architect: PBK General Contractor: Turner Construction Company Scope of Work: Installation of sheathing joints, fluid-applied

waterproofing, below-grade waterproofing, air barrier, thermal insulation, sheet metal, flashing and sheet metal, expansion joints, site sealants and garage pavement sealants Project Description: Public high school

UTSA - MAIN BUILDING RESTORATION - SAN ANTONIO, TX

Remedial Waterproofing

Contract Amount: \$1,200,000 (approx.) **Owner: University of Texas San Antonio** Architect: Wiss, Janney, Elstner Associates, Inc. **General Contractor: Sullivan Contracting Services** Scope of Work: Installation of hot-applied waterproofing, demo stucco and backup wall plus re-installation of sheathing, air barrier, metal flashing, site sealants and expansion joints Project Description: Multipurpose university building

DREXEL APARTMENTS - HOUSTON, TX

New Construction Roofing & Waterproofing Contract Amount: \$650,000 (approx.) **Owner: OH Drexel, LLC Architect: The Davies Collaborative** General Contractor: OHT Houston Construction, LLC Scope of Work: Installation of traffic coatings, expansion control, TPO roofing, cap wall and curb flashings, expansion control, flashing and sheet metal Project Description: Multi-family housing

TFC LBJ OFFICE AND ANNEX GMP3 - AUSTIN, TX

Remedial Roofing

Contract Amount: \$1,400,000 (approx.) **Owner: Texas Facilities Commission General Contractor: Kitchell Contractors** Scope of Work: Removal of existing built-up bituminous roofing and installation of wall and curb flashings, roof hatches, new built-up bituminous roofing, sheet metal flashing and trim Project Description: Office building

DELL CHILDREN'S MAIN CAMPUS 4TH BED TOWER **EXPANSION - AUSTIN, TX**

New Construction Roofing

Contract Amount: \$750,000 (approx.) **Owner: Ascension Texas** Architect: HKS, Inc. **General Contractor: Hoar Construction** Scope of Work: Installation of wood blocking, TPO roofing, sheet metal flashing and trim Project Description: Four-story, 72-bed expansion

TRINITY CHRISTIAN ACADEMY - NEW MIDDLE SCHOOL - DALLAS, TX

New Construction Roofing & Waterproofing

Contract Amount: \$550,000 (approx.) **Owner: Trinity Christian Academy** Architect: GFF Architects **General Contractor: Balfour Beatty Construction LLC** Scope of Work: Installation of fluid-applied waterproofing, thermal insulation, air barrier, joint sealants, site and paving sealants, expansion control, sheet metal flashing and trim, shingle roofing, wood blocking, vapor barrier, TPO roofing, sheet metal fascia and soffit panels Project Description: Non-denominational Christian school

NORMAN REGIONAL FSED FOUNDATION -NORMAN, OK

New Construction Waterproofing Contract Amount: \$150,000 (approx.) **Owner: BW Norman II. LLC** Architect: HGA General Contractor: JE Dunn Construction Co. Scope of Work: Installation of sheet waterproofing, bentonite waterproofing, air barrier, firestopping, joint sealants and site sealants Project Description: Non-profit office

ACU MOODY COLISEUM - ABILENE, TX

New Construction Waterproofing Contract Amount: \$450,000 (approx.) **Owner: Abilene Christian University** Architect: HOK General Contractor: Hoar Construction Scope of Work: Installation of air barrier, joint sealants, site and paving sealants, expansion control, sheet metal flashing and trim Project Description: 4,600-seat multipurpose arena

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