FALL 2022 Beneficial Chamber Line Roofing & Waterproofing

21-Story Luxury Sky Tower Hotel Revitalization



The Choctaw Casino and Resort Durant expanded their resort with Chamberlin's efforts.

The Choctaw Casino and Resort in Durant, Oklahoma is a luxury resort destination for great entertainment. It originally opened in 2006 with a 100,000 square-foot casino. Later in 2010 a twelvestory hotel tower was added, with major upgrades to the Choctaw Lodge and Inn, in 2012. In 2015, the Grand Tower, Grand Theater and The District Family Entertainment Center were opened to attract people all over the world.

For over four years, Choctaw Casino and Resort Durant wanted to expand their resort to provide more hotel rooms for visitors to stay, more amenities for entertainment, along with new permanent jobs. This particular project, completed in 2021, added 1,000 new luxury hotel rooms in a 21-story hotel tower addition, along with 3,300 new slot machines and over 40 new game tables, new amenities including but not limited slot machines and over 40 new game tables, new amenities including but not limited to: a new pool, parking garage and a retail space with entertainment, dining options, conference facilities and additional parking. This project fulfilled Choctaw Casino and Resort Durant's wishes in creating an atmosphere to provide more than 1,000 new, permanent jobs.

Chamberlin was selected to be a part of the roofing and waterproofing process by general contractor

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CONSULTANT'S CORNER



Jon R. Cavallo Registered Professional Engieer

Failures of Improper Use of High-Voltage Holiday Detectors

Industry guidance and standards for the use of high-voltage holiday detectors can sometimes conflict with each other. As a result, an inspector can unknowingly or unwittingly perform the tests improperly and damage the coating without understanding why. For example, if you set the voltage too high, you can burn a hole in the coating and cause damage to an otherwise fine coating. Instead of being a nondestructive test, it winds up being destructive.

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Tutor Perini Building Corporation. Tutor Perini chose Chamberlin as they were the only subcontractor that passed the third-party performance testing on the Exterior Insulation and Finish System (EIFS) caulking, which is what most of the project consisted of. The other subcontractors tried two to three times and could not achieve a successful passing result like Chamberlin did.

Chamberlin's scope of work continues with adding below-grade waterproofing to ensure the walls and slabs of the building's foundation the walls and slabs of the building's foundation were watertight. Following up with adding cementitious waterproofing to create a waterproof barrier on the negative side of slabs and walls. They also installed traffic coating on the balconies to aid in protecting against any damage or deterioration that can be caused in high-traffic areas within the resort tower. Chamberlin used pre-formed expansion joint systems and firestopping, along with exterior EIFS joint sealants to seal any joints or gaps. It also included lightweight insulating concrete, fleece back PVC membrane, sheet metal and flashing to aid in the roof expansion production process.

HIGH END QUALITY CONTROL

Chamberlin was mindful of quality control throughout the duration of their project.

The supplier, Sika Sarnafil conducted over twenty-seven interim jobsite inspections to ensure proper installation would lead to a leak-free roof to turn over to the owner. Sika also helped develop details related to the extensive expansion control requirements for these new buildings.

Chamberlin performed daily QA/QC reports throughout the entirety of the project. Due to Chamberlin's strict internal QA/QC combined with Sarnafil's top-tier product, there have been no issues with the roof since construction has completed.

FOCUSING ON SAFETY

Chamberlin makes safety their primary focus on each job they take. Especially on the areas of the roof that were protruding out from the wall hanging over other levels of the resort.

Level 17, which is an eyebrow roof protruding from the South side of the new Hotel, is a radiused, three feet wide by 150 feet long roof section. In order to complete this roof safely, Chamberlin needed to come up with a plan. The operations team worked with Tutor Perini to make a safer scenario, leave-outs werecut into the level 21 concrete deck overhang, to allow the ropes from the crew members' fall protection to pass through and be attached to roof davits up on the main hotel roof. Throughout the duration of Level 17, 14 different tie-off points were needed to avoid any type of swing hazard. After all of this preplanning, Chamberlin left the owner with a great roof that was installed safely and without incident.

In addition to that, swing stage scaffolding was used during most of the caulking process. It was also used during traffic coating on concrete bands that were approximately three feet wide on multiple floors.

An additional tool used during Choctaw Casino and Resort Durant project was Chamberlin's Safe Performance Self-Assessment (SPSA) process. SPSA helps to prevent the risks that come with unforeseen conditions that arise during



Chamberlin installed traffic coating to aid in protecting against damage or deterioration.

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Holiday Definitions and Discrepancies

Nowadays, NACE SP0188, "Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates," is widely used in the industry, and it includes a modern definition for a holiday. It is defined as "a discontinuity in a protective coating that exposes unprotected surface to the environment." In other words, it's a hole in the paint that goes all the way down to the metallic substrate.

ASTM D5162, "Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates," also has a standard for holiday testing. Like NACE SP0188, it defines holiday as a term that identifies a discontinuity. What's a discontinuity? The ASTM standard defines it as a void, flaw, crack, thin spot, or foreign was to go all the way to the substrate.

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inclusion. In this definition, it doesn't have to go all the way to the substrate.

These two standards are used interchangeably in a lot of industries, and that creates a problem because one defines a holiday as going all the way to the substrate while the other doesn't.

When looking at the differences between ASTM, NACE (now under Association for Materials Protection and Performance, or AMPP), and other standards, the first question to ask is what's the minimum dry film thickness (DFT) that you can use a high-voltage holiday tester on? The answer to that varies. Each standard has a different range of voltage per various thicknesses. In some cases, the standards even contradict themselves.

Anyone who has been through AMPP's Coating Inspector Programs (CIPs) 1 and 2 knows that the rule of thumb is using 100 volts per mil of coating thickness; however, that doesn't show up in the standards. So where did it come from?

It turns out that 100 volts per mil came from the testing of old water pipe that had asbestos cloth and bituminous cutback — in other words, coal tar enamel — on it in the early to mid 1900s. That's the rule of thumb they used when they didn't have

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each workday and encourages workers to stop and go through a thought process before proceeding with all tasks they complete:

1. Assess the risk. What could go wrong? What is the worst outcome if something does go wrong?

2. Analyze how to reduce the risk. Do I have all the necessary training and knowledge to do this job safely? Do I have all the proper tools and Personal Protective Equipment (PPE)?

3. Act to ensure safe operations. Take the necessary action to ensure the job is done safely. Ask for assistance, if needed.

Taking the proper amount of time before starting a task to recognize potential hazards and identify preventative measures that can be taken, helps protect employees and those working around them.

EXTENUATING CIRCUMSTANCES

During the construction process of this particular project Chamberlin's roofers were faced with rain and snow during the February 2021 freeze. The freeze fortunately didn't have any negative impact on the work Chamberlin had already started on the roof. It did



Most of the project consisted of EIFS caulking.

coating installation process. They had to work as a team to ensure that the twopart coating and epoxy had a good finish, without any bubbling or outgassing due to the moisture from the weather.

To aid in keeping the weather out, Chamberlin provided temporary waterproofing to keep the hotel dry before its walls were properly constructed for all 21 of its floors. Conduit holes ran through the concrete decks allowing water to pour in from the unwalled upper floors and drain down to the enclosed lower floors. Chamberlin sealed those holes on the open floors with a vapor barrier to prevent this from happening.

Chamberlin also faced a predicament where teamwork paid off immensely. They were forced to switch superintendents on the project in the final two months, due to an employee resignation. This called for the Field Operation Manager Richard Sanchez, to get in tune with the project at a deeper level, that way they could get the new superintendent, Sebastian Alvarez, prepared to take over. Even with this setback, Chamberlin was still able to deliver high-quality work, safely and on time.

HARD WORK PAYS OFF

Although Chamberlin's project with Choctaw Casino and Resort Durant had a tight schedule, harsh weather and internal team changes, they were still able to grow exponentially in the final two months of the project and deliver a watertight expansion for the casino.

This expansion was not only successful for Chamberlin as a company, but it also posed many benefits for people in need of jobs, funding for services needed by the tribal members, millions in economic growth for Oklahoma and money leftover to invest in education and infrastructure improvements for Oklahomans.

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standards to do high-voltage holiday testing, and it's survived to this day. But 100 volts per mil doesn't appear in either the AMPP or ASTM standards. How confusing is that?

Example of a Failure

Using voltage will give meaningful results, but you don't want to damage a coating film by using too much voltage and burning a hole in it. This is especially possible when multiple coats of different products are used. Popular references such as NACE Table 1 and the ASTM D5162 standard do not give recommendations for multiple coats of different products.



Different coating products will have different conductivities, or dielectric strengths. To add to the complexity, the primer may be less resistant to electrical current flow than the topcoat. And if you're using three coats, who knows? You should first go to the coating manufacturer when you don't know the dielectric strength of the coatings. Get the dielectric strengths from the technical people at the coating manufacturer, then try to figure out what the voltage is.

To further add to the confusion, the newer high-volt- age holiday detectors have three programmed voltage range settings in them. These preprogrammed voltage settings reflect the Table 1 recommended voltage range that's in the NACE SP0188 standard today; however, the detector manufacturers may not have talked to the coatings manufacturers on this. Is everybody thoroughly confused? Most people are. Here's an example of why this can lead to failure. A recoat of the inside of a carbon steel piping system had two coats of a high-build epoxy. Each coat had a different thickness, but the total dry film thickness was 40–50 mils (1,016.0–1,270.0 microns). After the coatings cured, the inspectors then did 100 percent high-voltage holiday testing.

They did testing on most of the mainline pipe in the ditch, and the pipe was being recoated in place. Most of that testing was done, and they found very few holidays. Then they got to an area where the diameter of the pipe was slightly smaller than the mainline pipe, and they put the coating on and found all sorts of holidays.

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There wasn't time to do a long, drawnout failure analysis; that wasn't viable. The type of detector is fine. The contractor is a good contractor. This was a brand-new holiday detector that was within its calibration — actually within its factory calibration. It appeared to be working correctly.

The contractor used the preprogrammed settings, per the dry film thicknesses, that were in the instrument, and the instrument was working correctly as it was designed to work. The contractor's work was technically compliant with the contract documents. The contractor did not do anything incorrect within the requirements of the contract specification. Unfortunately, the coating manufacturer wasn't consulted to verify that the voltages that were used were correct for that coating system.

That's where things went off the rails.

There was never an in-situ failure analysis in the pipe or the lining after these holidays were found, to physically examine them, because there wasn't time. What the owner decided to do was take off the affected area of coating, remove the coatings back down to the substrate, and recoat those areas. In this case, they were able to recoat them and put the piping back in service after the coating had cured.

Testing Challenges

Metallic Filters

Metallic fillers in a coating will not permit, or will not present, a dielectric strength strong enough to detect holidays. For instance, inorganic zinc particles are so numerous and so conductive that you won't have dielectric strength. A straightforward way to improve testing is if coating manufacturers labeled the actual voltage to be used to test coatings that they are applied properly and cured. Currently, that isn't a requirement, but it would be useful if done.

You can also establish the voltage by using samples of the applied coating and placing pinholes. For example, there's an ASTM standard for rubber linings. You can make a sample coupon out of the conductive substrate, such as carbon steel, and apply the sheet rubber lining or synthetic rubber lining to that metallic



substrate, poke a hole into the lining until it hits the substrate, and that is your criteria for whether something is a holiday or not.

Holiday testing is very important on linings because a number of these cases of corrosion are microscopic. In the case of the ASTM standard, there could be inclusions in the coating that are conductive, and you could get a failure after you put this lining into service that you might have caught with a highvoltage holiday test. High-voltage holiday testing, when appropriate by thickness and such, is a good thing to do.



Thinner or Variation in Coats

A slightly thinner coating than was expected or a variation of thicknesses can also result in holidays. And if you have three different coats in a system by three different manufacturers for example, coating A at 3 mils (76.2 microns), coating B at 6 mils (152.4 microns), and coating C at 6 mils — you would have to determine the dielectric strength for each of the three coats. That would be extremely difficult when you're using three different coating manufacturers. Mixing systems can get tricky.

To do it correctly, you need to know the dielectric strength of each of the coatings. Then look at coating A, coating B, and coating C with dielectric strength, knowing the thicknesses of the three coats, and calculate a test voltage. Most modern high-voltage detectors have a sensitivity dial to increase or decrease the ability of the instrument to detect holidays. If you haven't been trained and aren't experienced with using a sensitivity dial, it could produce erroneous results; however, the manufacturers of these devices are usually very receptive to questions and will usually offer to help get the testing right.

Good Practices

It's important to use high-voltage holiday detectors properly to get the most accurate results. In the event of a failure due to excessive voltage, there could be liability issues to consider. My license is in mechanical engineering, so I'm not an attorney, but if a failure were to occur, the court would have to look at what percentage of the overall failure cost would be attributable to each of the involved parties in a project.

Most good inspectors will set their instrument to the low end of the range to prevent inadvertent damage. This, in addition to the other suggestions provided here, is a good practice when performing testing.

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Photos courtesy of Coatings Consultants, Inc.

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Chamberlin's Industry Honors for Safety and Quality

Chamberlin Roofing & Waterproofing has been recognized by established A/E/C industry organizations for their team's commitment to safety, quality and teamwork on their projects and their dedication to delivering more to their clients.

American Subcontractors Association (ASA) Houston Chapter awarded Chamberlin with Gold-Level Commitment to Safety (CTS) status. The CTS program was developed to increase the number of specialty contractors who uphold effective safety programs and training for management and employees. ASA recognizes companies with exemplary safety and health programs, site-specific safety and health processes as well as continuous progress in the area of employee safety.

Additionally, Chamberlin was an APEX award winner at the Associated General Contractors (AGC) Houston chapter's gala on September 24, 2022. Evaluation criteria for the awards program include quality or workmanship, contribution to the community, timely completion and difficulty of construction. The APEX awards recognize firms for their excellence in construction, their valuable contributions to the community and their demonstrated commitment to skill, integrity and responsibility.

Chamberlin won a gold APEX award in the specialty contractor category



American Subcontractors Association Houston Chapter awarded Chamberlin Gold-Level CTS.

of Renovation/Restoration for work performed on the POST Houston project in Houston, Texas.

In 2015, Lovett Commercial acquired what was once the city's massive Barbara Jordan Post Office. Construction began in 2019 to turn this 555,000 square foot building into Post Houston. The old post office now houses a food hall, co-working space, rooftop garden, live music venue and more. For this space to be ready for the grand opening in November 2021, roofing and waterproofing was necessary. Chamberlin kicked off the project to rectify the water intrusion in the tunnel, waterproof and roof the roof deck and install air barrier and membrane flashing systems at various locations around the building.

Chamberlin's roof scope of Post Houston, which serves as a rooftop park and urban farm above an occupied mixed-use space, was to ensure the structure below the rooftop park and urban farm was waterproofed and protected from leaks. Due to the fastpaced schedule on the roof the crew had to work in line with the general contractor and subs. This required a massive amount of coordination.

The hot-applied waterproofing had to be protected with plywood and insulation at most areas since different trades were working on top of the installation. Added penetrations such as piping, conduit and fasteners in areas where the waterproofing system was complete was a constant challenge as the crew had to make sure the system was not compromised as unsealed penetrations lead to leaks. Another large portion of the scope was the polyurethane grout curtain injection in the tunnel. Due to Chamberlin's expertise, Post Houston is fully watertight.



Due to Chamberlin's expertise, Post Houston is fully watertight.



Chamberlin was an APEX award winner at the AGC Houston chapter's gala.

PROJECTS IN PROGRESS

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MERCY OKC WOMEN'S CENTER - OKLAHOMA CITY, OK THE RENAISSANCE ON TURTLE CREEK - DALLAS, TX

New Construction Waterproofing

Contract Amount: \$600,000 (approx.) **Owner: Mercy Health Oklahoma** Architect: REES General Contractor: JE Dunn Construction Co.

Scope of Work: Installation of sheet waterproofing, fluid-applied waterproofing, bentonite waterproofing, water repellents, air barrier, firestopping, joint sealants, expansion control, site and paving sealants

Project Description: Love Family Women's medical clinic

SHERATON HOTEL - AUSTIN, TX

Roof Replacement & Remedial Waterproofing

Contract Amount: \$900,000 (approx.) **Owner: Brookfield Property Partners** Consultant: Building Consultants, LTD **General Contractor: Brookfield Properties** Scope of Work: Removal of existing wall flashing, PVC roofing, counterflashing, sheet metal flashing and trim and installation of wall flashing, PVC roofing, counterflashing, sheet metal flashing and trim, cementitious and reactive waterproofing **Project Description: Downtown Austin hotel**

DPS - HURST - DALLAS, TX

Remedial Roofing

Contract Amount: \$600,000 (approx.) **Owner: Teak Construction Company General Contractor: Teal Construction Company** Scope of Work: Installation of base wall and curb flashings, hot modified roofing, flashing and sheet metal Project Description: Department of Public Safety

UH HILTON HOTEL - HOUSTON, TX

New Construction Roofing Contract Amount: \$300,000 (approx.) **Owner: University of Houston** Architect: Kirksey Architecture General Contractor: DPR Construction, Inc. Scope of Work: Installation of wood blocking, modified roofing, flashing and sheet metal, standing seam roofing Project Description: Hotel on University of Houston campus

Remedial Waterproofing

Contract Amount: \$650,000 (approx.) **Owner: First Service Residential** General Contractor: FS Residential Scope of Work: Installation of balcony railing painting **Project Description: Condominium complex**

JEFFERSON BANK - SAN ANTONIO, TX

New Construction Roofing & Waterproofing Contract Amount: \$3,500,000 (approx.) Owner: Milam Real Estate Capital, LLC Architect: HKS

General Contractor: Joeris General Contractors Scope of Work: Installation of hot-applied waterproofing, below grade-sheet waterproofing, fluid-applied waterproofing (PUMA), traffic coating, thermal insulation, air barrier, flexible flashing, roof pavers, firestopping, joint sealants, site and paving sealants, sheet metal flashing and trim, vapor barrier wall flashing and sheet metal roofing

Project Description: Bank headquarters

THE SPIRES - PARKING GARAGE REPAIRS - HOUSTON, TX

Remedial Waterproofing

Contract Amount: \$ 2,500,000 (approx.) **Owner: Spires the Condominium Consultant: Walker Consultants** Scope of Work: Installation of traffic coating, water repellents, thermal protection, steel column repair, steel beam repair, joist bearing repair and steel beam addition Project Description: Condominium parking garage

SUMMIT LOFTS - GEORGETOWN, TX

New Construction Waterproofing Contract Amount: \$300,000 (approx.) **Owner: Novak Companies** Architect: HEDK Architects Inc. General Contractor: Wade Construction Group Inc. Scope of Work: Installation of drainage composite, hot-fluid rubberized asphalt waterproofing, below grade waterproofing, sheet waterproofing, traffic coating, firestopping, joint sealants, expansion control, flashing and sheet metal Project Description: Luxury lofts apartments

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