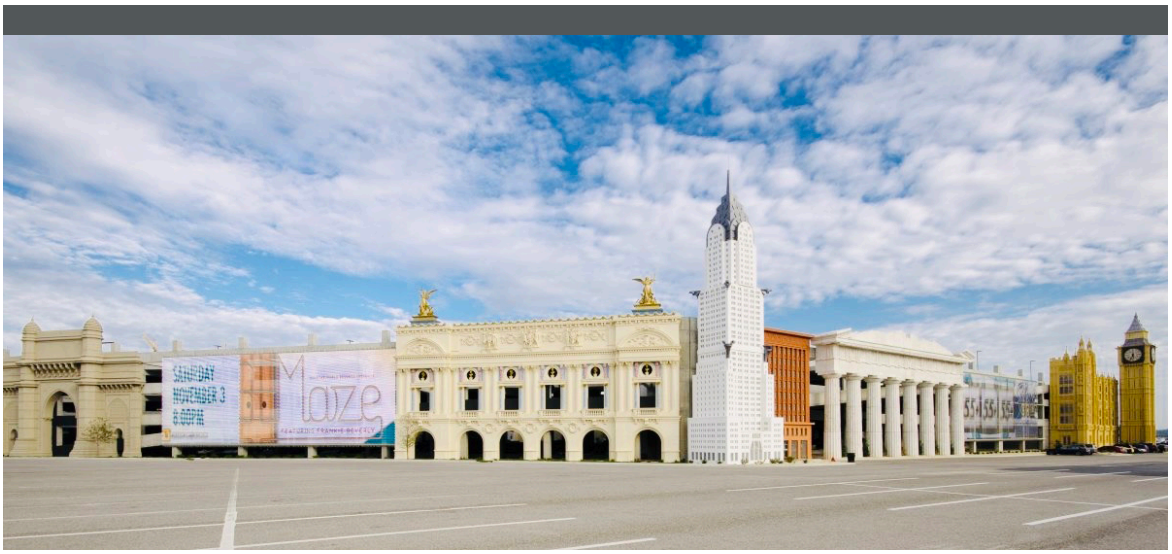
SUMMER 2021 CHAMBERLIN Roofing & Waterproofing NEWSLETTER

Garage Restoration Hits the Jackpot



The parking garage at WinStar World Casino is watertight after five years of water infiltration.

The WinStar World Casino is a luxury resort destination for entertainment. Originally designed and built in 2011, a 400,000-square-foot, four-level, 1,400-space parking structure is located at the northwest corner of the casino in Thackerville, Oklahoma. The garage is accented with a glass fiber reinforced concrete (GFRC) facade to imitate various historical buildings around the world.

For over five years, the WinStar parking garage struggled with water infiltration and spalling of the concrete, specifically at expansion joints and the interior ramp. Expansion joint blockouts were originally very shallow, which caused a multitude of failures and issues within the parking garage. The structural repairs on the ramp were critical as the garage was becoming inoperable due to exposed concrete in the post-tension cables.

Chamberlin was selected to find a permanent solution for the expansion joints and ultimately stop the water infiltration. Additionally, their scope for the parking garage renovation included structural concrete repairs and traffic coating.

BETTING ON SAFETY

With safety as a primary focus on each job they undertake, Chamberlin began by developing a site-specific safety plan for the WinStar Parking Garage project. Being a fast-paced project, it required a great amount of communication to operate safely and protect the crew as well as casino patrons. The superintendent communicated the plan and disciplinary system in place to all respective field workers so everyone understood the safety expectations.

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GUEST COLUMN

Pete Keener, RRC, RRO, CIT
Department Manager - Building Science Solutions
Intertek

High Voltage or Low Voltage?

This question has been asked for years in the roofing industry when discussing Electronic Leak Detection (ELD). This article will attempt to explain the differences between the two technologies, the pros and cons of each and the limitations of both. In the "good old days", architects and roof consultants could simply require a flood test of the asphalt or coal tar pitch built-up roof (BUR) system. Unless the system was a complete failure, the

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A Job Hazard Analysis (JHA) that covered each task on the job, potential hazards associated with those tasks and how to prevent those hazards from causing an accident was also developed for this project. The project supervisor would complete a daily JHA before work began. Additionally, daily equipment checklists were completed by the operator to confirm proper functionality.

SHOW ME THE MONEY

Chamberlin suggested the Silspec RFS expansion joint assembly to replace the failing joints in the garage because they are comprised of a compressed foam joint with integral carbon fiber rods inside, a first of its kind. Because of the reinforcing rods, vehicular traffic can drive over the joints without the need for bumpy cover plates. These joints would also give the parking garage a longer lifespan and higher movement without increasing the cost for the owner.

The crew began by removing the existing deteriorated wing joints and epoxy nosing. They installed rigid insulation in the expansion joint to create a proper form for the new epoxy nosing while also preventing debris from sandblasting and grinding to travel to the parking decks below. The blockouts were then prepared to receive the new epoxy nosing which was poured and cured to create a solid and trafficable joint opening. The rigid insulation was then removed from the joint opening and the Silspec RFS expansion joint assembly was installed in the joint opening.

HIGH-ROLLER SCHEDULING

The garage was in use during construction and busy with casino patrons coming and going throughout the weeks. The crew could only work Monday through Thursday because the casino had to utilize the full garage during their busiest time, Friday through Sunday. Scheduling had to be extremely precise so the crew did not leave any partially completed areas that would restrict the use of that part of the garage.

When working on the structural repairs and traffic coatings, they were faced with yet another challenge. There was only one ramp that granted access to all floors of the garage. The crew worked from the top floor down and timed their

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Chamberlin crews installed Silspec RFS expansion joints

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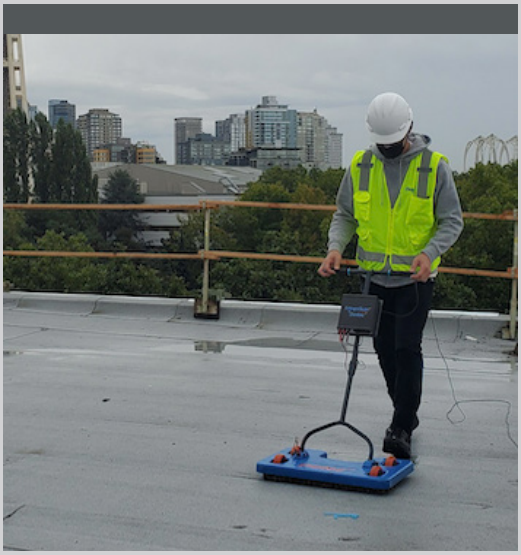

multiple layers of protection in a BUR would keep the water on top the roof system until the drain plugs were removed and the design team could be sure there are no breaches in the roofing system. Today with EPDM (ethylene propylene diene terpolymer), PVC (polyvinyl chloride) and TPO (thermoplastic polyolefin), all single-ply membranes, flooding the roof system may become more problematic. Punctures in the membrane, open seams and cold welds open the roof system up to failure if the roof system is flooded with water and the above-mentioned breaches are present. Small breaches can go undetected until damaging water leaks into the building. Flood testing the entire roof is time consuming, labor intensive and may introduce excessive loads on the building structure.

For over two decades, the waterproofing industry has used electrical current to precisely locate membrane openings or “breaches”. Very simply, an electrical charge, either high voltage or low voltage, is created which detects differences between a non-conductive roof membrane and a grounded conductive structural substrate. Here is where the similarities and differences in high voltage and low voltage start. High voltage and low voltage testing methods have the same requirements:

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sequencing to allow multiple floors to be in use while work proceeded.

Chamberlin used barricades, warning lines, danger tape and flagging to control access points and block off work areas. When work finished on Thursdays, these items were left in place to allow materials to cure over the weekend. Then, late Sunday night when our next work area was clear of patron's cars, crew members moved these safety items, materials and equipment to control access of Monday morning traffic and blockade our next work area plus parking spaces below. This required full coordination with the Chickasaw Nation maintenance department.

WINNING HAND

Chamberlin remedied persistent water infiltration issues, specifically at expansion joint locations, for the WinStar Casino parking garage. They repaired and replaced 1,300 linear feet of expansion joints and 21,000 square feet of traffic coating in just over a year. The installation of the new expansion joint system was the largest to date at the time of the project.

Chamberlin Senior Project Manager Kraig Murray spoke highly of the crew saying, “Despite the restricted schedule and the fact that the casino stayed open throughout the duration of the project, the crew handled everything efficiently and kept safety as a priority. Not only did they make sure other crew members were safe, but they paid close attention to the safety of the casino patrons and made sure they stayed clear from possible injury.” The project left the casino watertight and concluded on time, within budget and with zero safety incidents. ■

Original wing joint before restoration

Epoxy nosing to fill in blockouts

Completed Silspec RFS expansion joint

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1. A conductive substrate directly below the membrane (or a conductive path of water from the membrane to the grounded deck).
2. An exposed membrane (no overburden like plants, soils, gravel or other medium on top of the roof surface).
3. There must be a good ground connection to the metal or concrete deck.
4. There must be a good electrical path to ground. (The ground is established by wet insulation down to the roof deck and/or a conductive substrate directly under the roof membrane.)

LOW VOLTAGE ELD

Low voltage ELD requires a wet roof surface to “activate” the conductivity of the system. The technician either places a “trace wire” around the area to be tested or uses an ELD system that has “built-in trace wire”. The wet roof surface becomes the upper conductive surface, and the conductive roof deck becomes the bottom conductive surface. If you have a wood deck with no conductive primer under the roof membrane, the system will not be “conductive” and you will not be able to test the system. The roof membrane and roof insulation

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become the insulator between the upper and lower conductive surfaces. If you have a breach in the roof membrane the current between the upper conductive surface and the lower conductive surface creates an electronic short between the two surfaces. It is at this point, ELD becomes confusing and controversial.

In July of 2019, ASTM published the first industry-wide standard on electronic leak detection for roofs (ASTM D-8231-19 Standard Practice for the Use of a Low Voltage Electronic Scanning System for Detecting and Locating Breaches in Roofing and Waterproofing Membranes). This new ASTM standard does not cover high voltage which we will discuss later in this article. ASTM D-8231 provides clear direction and a clearer understanding of low voltage testing. The new standard tries to clarify some of the misunderstanding and misconceptions not addressed in the first ASTM standard (ASTM D7877). This new standard also describes how moderately conductive membranes like black EPDM and cold-applied liquid membrane roofing can now be electronically tested. The new ASTM standard mandates that testing must be performed before overburden (soil, pavers) is installed. This is significant when dealing with plaza decks, pools, planter boxes and balconies. The test standard states that once an overburden is installed, even a small overburden like a drainage mat, it may cause the test to be compromised and inconclusive. The ASTM standard provides guidelines for equipment calibration and requires the detection sensitivity of the testing equipment is factory certified once per year to assure maximum confidence in the results of the test.

The most significant change presented in the latest ASTM standard comes from section 5.3 which states:

The substrate material directly below the membrane must be sufficiently conductive (approximately 10 4 ohms-per-square or less as determined using Test Method D4496) for the test method described in this practice to detect membrane breaches reliably. In most instances, a concrete substrate is sufficiently conductive to successfully detect membrane breaches using this method. In membrane assemblies, where the substrate is nonconductive, a conductive material can be placed directly under the membrane to facilitate testing.

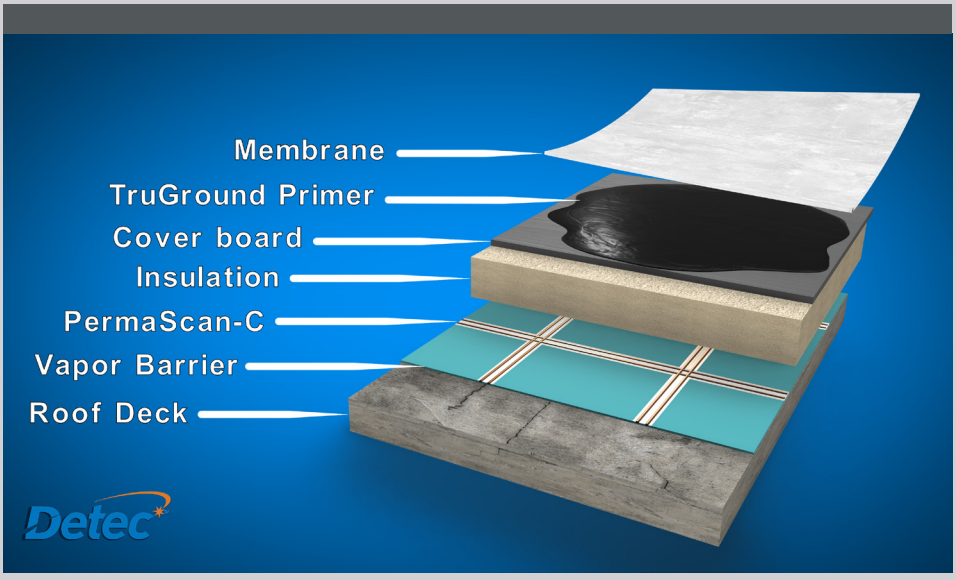
The way I interpret this statement is, a conductive primer or a conductive material directly under the membrane is the only way to achieve a conclusive test and find the breach in the membrane. This creates an issue for the roofing and design industry. Unless the designer of record specifies a conductive primer or conductive material (wire mesh) directly under the membrane any ELD test of the membrane may not be accurate or conclusive. If there is no conductive material directly below the membrane, water would have to enter the membrane through a breach and travel through all layers of the system until it reaches the conductive deck. The water then creates a short circuit through all the materials causing the ELD equipment to alert. For new construction, the designer of record can simply specify a conductive primer when writing a waterproofing specification. On existing buildings without a conductive material directly under the membrane, the breach will have to be significant and create a short circuit between the membrane and the conductive deck. This “short-circuit” is water inside the waterproofing system.

Low voltage ELD is good for testing wide open waterproofing membrane that is not obstructed by penetrations and wall flashings. It is possible to test horizontal surfaces using low voltage ELD, however, special training and special roller equipment is required.

HIGH VOLTAGE ELD

High Voltage ELD requires a dry surface. A wet surface will provide false readings and make pinpointing breaches in the membrane impossible. The high voltage ELD finds breaches by detecting moisture in or around the breach. Unlike the low voltage ELD, the high voltage ELD does not require a “trace wire” around the area being tested. The ELD technician simply finds a ground to the deck. This ground could be a roof drain, a soil stack, a lightning rod terminal, or anything that is grounded to the deck. After grounding the ELD unit, the technician simply pulls a wand with conductive brass brushes attached over the membrane surface. Once a breach with moisture is found, the ELD equipment will activate and produce an audible beep when the brushes pass over the breach. The sensitivity of the ELD equipment can be adjusted to penetrate thicker membranes. The high voltage ELD can even be calibrated to detect areas where a liquid membrane does not meet the minimum thickness requirements of the specifications even if no breach is present.

High Voltage ELD has a high probability of false positive alerts if the equipment is not calibrated properly or there



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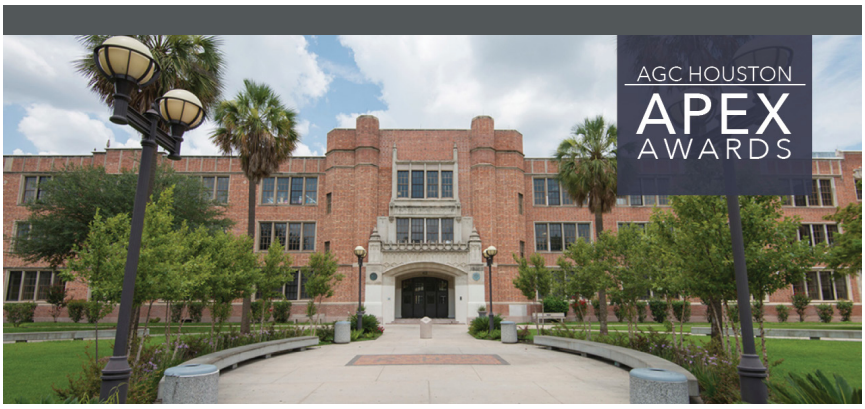
is moisture in the membrane. High voltage ELD cannot be used on conductive membranes like EPDM. If the waterproofing system has a conductive medium directly under the membrane, high voltage ELD will work in a similar fashion as the low voltage ELD.

CONCLUSIONS

Since ASTM published ASTM D8231-19 the industry now has guidelines for Electronic Leak Detection (ELD). The testing standard directs the ELD user to low voltage systems with conductive medium directly under the membrane. Does that mean that you cannot complete ELD on membranes without a conductive medium directly below the membrane? Absolutely not. The new ASTM standard does state for a test to be conclusive, a conductive medium must be placed directly under the membrane and the testing equipment shall be properly calibrated by the equipment manufacturer. Building owners and designers can still require ELD test on all projects, however, they must accept the fact that those tests may not be reliable. ■

Mr. Keener started his roofing career as a technical consultant in 1988. He was designated "Rooky of the Year" with The Garland Company. He developed extensive knowledge in SBS, APP and BUR roofing and trained to perform core sample analysis, field testing and quality control. His expansive work background includes project management, facility directorship, owning and managing his own roof consulting company, roof and building envelope consulting, assessments, inspection, maintenance program development and management and sales of roofing products. Pete has managed projects for schools, colleges, federal government, national retail chains and more. Pete joined Intertek in 2020 and is a Department Manager and Senior Consultant for their Building Science Solutions Department. He is a Registered Roof Consultant (RRC), Registered Roof Observer (RRO) and Certified Infrared Thermographer -Level 1 (CIT).

Industry Honors for Quality and Safety



AGC HOUSTON APEX AWARD

Chamberlin was an APEX award winner at the Associated General Contractors (AGC) Houston chapter's gala on May 22, 2021. Evaluation criteria for the awards program include quality of 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 silver APEX award in the specialty contractor category of Renovation/Restoration for work performed on the Heights High School project in Houston, Texas.

The school's basement, housing an ROTC classroom in the upper half and a mechanical space in the lower half, suffered severe water infiltration issues due to unknown causes for over 20 years. Once on the job, Chamberlin discovered excessive water underground in addition to gas lines and underground structures not shown on the building drawings. With attention to detail and their expertise gained from decades of waterproofing experience, Chamberlin overcame these challenges to successfully install positive-side waterproofing, urethane grout injection and a French drain system around the building. The school is leak-free for the first time in decades, providing adequate classroom space for the ROTC cadets to learn and grow.

ASA NATIONAL SAFETY AWARD

Chamberlin Roofing & Waterproofing was honored to be an American Subcontractors Association (ASA) national safety award winner. The company was nominated by ASA's Houston Chapter (ASA-HC) for their dedication to safety. The nominees are evaluated by three ASA-HC safety consultant member companies based on their company safety culture and elements that make their safety program stand out from others.

ASA-HC Commitment to Safety (CTS) Gold participants were eligible to apply. This program was developed to recognize specialty contractors who implement effective construction safety and health programs, and provide effective safety and health training for management, supervisors and employees. Gold is the highest program level.

PROJECTS IN PROGRESS

CHAMBERLIN
Roofing & Waterproofing

LOCATIONS:

HOUSTON
4545 Langfield Road
Houston, TX 77040
Ph. (713) 880-1432
Fax (713) 880-8255

DALLAS/FT. WORTH
2170 Diplomat Drive
Farmers Branch, TX 75234
Ph. (214) 273-9110
Fax (214) 273-9120

AUSTIN
2755 Business Park Drive
Buda, TX 78610
Ph. (512) 275-1600
Fax (512) 523-9350

SAN ANTONIO
13111 Lookout Run
San Antonio, TX 78233
Ph. (210) 822-6536
Fax (210) 822-8211

OKLAHOMA CITY
912 Messenger Lane
Moore, OK 73160
Ph. (405) 680-0506
Fax (405) 680-0508

Also licensed in Arkansas and Louisiana

SASH San Antonio State Hospital BP1 - San Antonio, TX
New Construction Waterproofing
Contract Amount: $3,000,000 (approx.)
Owner: Health and Human Services Commission
Architect: HKS
General Contractor: Vaughn Construction
Scope of Work: Installation of below-grade waterproofing, air barrier, flashing, joint sealants, expansion joints, hot-applied waterproofing, pavers and traffic coating
Project Description: San Antonio State Hospital

Barbara Bush Literacy Plaza - Houston, TX
Remedial Waterproofing
Contract Amount: $400,000 (approx.)
Owner: City of Houston, Texas
Architect: Kerry Goelzer Associates
General Contractor: JE Dunn Construction
Scope of Work: Installation of hot fluid-applied rubberized asphalt waterproofing, site sealants and paving sealants
Project description: Plaza at Jesse H. Jones Central Library

UT Townes Hall - Austin, TX
Remedial Waterproofing
Contract Amount: $300,000 (approx.)
Owner: The University of Texas System
Architect: BGK Architects
General Contractor: Spawglass
Scope of Work: Installation of hot-applied waterproofing, pavers, expansion joints and stone replacement
Project description: Law building at the University of Texas

Pearland Shadow Creek Library - Pearland, TX
New Construction Roofing and Waterproofing
Contract Amount: $1,500,000 (approx.)
Owner: City of Pearland
Architect: PGAL
General Contractor: Spawglass Construction
Scope of Work: Wood blocking and installation of hot modified roofing, flashing and sheet metal, cap wall and curb flashings, pavers, elevator pit waterproofing, expansion joint sealants and fluid-applied air barrier
Project description: Brazoria County library

Bureau of Engraving and Printing - Fort Worth, TX
Remedial Roofing
Contract Amount: $800,000 (approx.)
Owner: Department of the Treasury
Architect: Raymond Pond Solutions
General Contractor: GC Works, Inc.
Scope of Work: Removal of existing roofing and installation of PVC membrane roofing, flashing and sheet metal, gutters, cleats, receivers, gravel guard, coping and counterflashing
Project description: Texas outpost of the U.S. Treasury

Greenwood Rising - Tulsa, OK
New Construction Roofing
Contract Amount: $300,000 (approx.)
Owner: 1921 Tulsa Race Massacre Centennial Commission
Architect: Selser Schaefer Architects
General Contractor: Crossland Construction Company
Scope of Work: Installation of modified bitumen roofing, coping, flashing and sheet metal
Project description: Tulsa visitor center

Tidwell Bible Building - Baylor - Waco, TX
Remedial Roofing
Contract Amount: $400,000 (approx.)
Owner: Baylor University
Architect: RBDR Architects
General Contractor: Vaughn Construction
Scope of Work: Removal of existing roof system and installation of TPO roofing, PVC membrane roofing and wall panels
Project description: Department of religion building

New Mary Carrol HS - Fireproofing - Corpus Christi, TX
New Construction Waterproofing
Contract Amount: $900,000 (approx.)
Owner: CCISD
Architect: Gignac Architects
General Contractor: Fulton Coastcon
Scope of Work: Installation of joint sealants and spray-applied fireproofing
Project Description: Public high school

For a complete list of specialty contracting services, visit www.chamberlinltd.com.

ROOFING/SHEET METAL
- Modified Bitumen/BUR
- Single ply
- Reflective coatings
- Vegetative roofing
- Metal standing seam
- Roof related sheet metal
- Tile

WATERPROOFING/CAULKING
- Joint sealants
- Membrane waterproofing
- Elastomeric wall coatings
- Traffic coatings
- Expansion joints
- Dampproofing/flashing
- Water repellents/metal flashing

BUILDING/GARAGE RESTORATION
- Concrete/Masonry restoration
- Exterior cleaning & coating
- Epoxy & grout injection
- Bearing pad replacement
- Structural repair
- Paver repair & replacement

ROOF MAINTENANCE/LEAK REPAIR
- Roofing & waterproofing expertise
- Leak repair specialists
- Preventative roof maintenance plans
- Roof & building envelope surveys
- Proactive Roof Asset Management
- On-call service 24 hours/365 days a year
- Free estimates