FALL 2017

CHAMBERLIN
Roofing & Waterproofing

NEWSLETTER

OSU Parking Garage Restored in Two Weeks

Chamberlin restored the Monroe Street parking garage at Oklahoma State University.

The Oklahoma State University (OSU) Monroe Street parking garage was first built in 2008. Located at the corner of Monroe Street and Hall of Fame Avenue, it is near the hub for the OSU transit system which allows students to easily get around campus and the City of Stillwater.

Chamberlin Roofing & Waterproofing was contracted during the original construction of this parking structure to perform waterproofing services. Nine years later, the natural movement of the garage caused by settling and other thermal and structural impacts resulted in cracks and spalling in the concrete. Sizable areas on the vertical walls and overhead were deteriorated and breaking off, causing possible safety hazards for pedestrians and vehicles. Extensive cracks in the slab were open to moisture, which in colder temperatures would freeze and further expound the problem by worsening the cracks and damaging more concrete.

The parking garage was in need of a renovation, and quick. The project was scheduled to take place during winter break while most students were not on campus. This allowed only two weeks for the four-story parking structure to be restored. Chamberlin was ready to step

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CONSULTANT'S CORNER:

By Karl Schaack, RRC, PE

Karl Schaack, RRC, PE
President, Price Consulting, Inc.

Wet Sealing

What is a wet seal? An Australian-based clothing company or a drenched sea mammal? A "wet seal" as it relates to the building envelope industry is generally referred to as the application of an elastomeric, gun-grade joint sealant at the interface of a glass unit and the adjoining frame and/or gasket of an existing window unit. "Wet seal" is not officially defined in ASTM C 717, "Standard Terminology of Building Seals and Sealants." According to the Sealant and Waterproofing Restoration Institute (SWRI), a wet seal is commonly referred to as a cap bead application. The

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up to the plate and return to their old stomping grounds to work on the OSU Monroe Street parking garage once again. This time around Chamberlin performed concrete wall repair, beam and column repairs, embed repairs, slab crack sealing, joint sealant replacement and epoxy injections.

CONCRETE RESTORATION

Sections of the garage walls, vertical beams and columns had severely deteriorated over time. The concrete was chipped, broken off and worn down to the rebar in some places. Using hand grinders, the Chamberlin crew first cut out the damaged areas in squares and removed the old concrete. Then, using a BASF grout, they filled in those areas bringing the grout flush with the existing concrete for a smooth finish. This not only improved the facility aesthetically, but also prevented the concrete in those damaged areas from continuing to crack and break off.

UNKNOWN CONDITIONS

Steel support beams were embedded into the pony walls of the Monroe Street garage during original construction. Movement in the garage over time caused cracking and spalling around this embed. While routing the embed repairs, Chamberlin crew members discovered another concern. The rebar surrounding the damaged concrete in the walls was partially rusted. If left untreated, the rust will continue to spread and cover the rebar entirely. If that happens, the rebar could fail and cause structural damage to the pony walls.

To address this issue, the Chamberlin crew removed not only enough concrete to repair the damaged areas, but continued demolishing until all of the rusted rebar was exposed. They then removed the rust and applied a coat of rust inhibitor to the rebar before filling the areas back in, completing the embed repairs.

SUSTAINABLE MOVEMENT

Sealant was used to repair the cracking in the concrete slab. Since the cracks were initially caused by structural shifting, the Chamberlin crew first cut the cracks open with a grinder to achieve the correct width-to-depth ratio for the sealant to have optimal movement in the future. Tremco Dymeric 240FC was chosen for this scope, which is a cost-effective urethane caulking useful for keeping moisture out without being too rigid. The same material was also well suited to replace the failed joints on the vertical precast panels.

The concrete in the parking garage had sustained extensive corrosion and damage.

While performing embed repairs, rust was discovered on the rebar.

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(WET SEALING Continued from pg. 1)

Figure 1: *Short gasket at corner of frame*

primary function of a wet seal is to alleviate water infiltration occurring within a window assembly. The window assembly subject to receiving wet sealing can be an individual punched opening, a storefront system, a structural skylight or a multitude of window wall/curtainwall systems.

Water infiltration can occur within window assemblies for a variety of reasons including, but not limited to, the following:

- Improper installation of the assembly
- A lack of or inadequate/improper end dams
- Loose, missing or unsealed fasteners within the assembly
- Unsealed joints
- Deteriorated or improperly installed gaskets

Leaks can also appear to be associated with window assemblies, but the actual source of water penetration through

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(OSU PARKING GARAGE Continued from pg. 2)

QUICK AND PRECISE

With only two weeks to complete this project, Chamberlin tripled manpower and worked extra hours to meet the deadline. Timing was also a factor in material choice, and most of the materials chosen were rapid setting. Though many students were out of town for winter break, the garage was still in use and had a low volume of pedestrian and vehicular traffic.

The products applied needed to have quick cure times to avoid interference from dust, dirt and people. The concrete patching hardened enough in less than two hours to be secure, and the joint sealant material skinned over in just an hour. It would take a week for the joint sealants to fully cure, but in the mean time they were protected from the elements. The weather was fairly cold during this project, further complicating the already tight schedule. The ideal installation temperature for most of the products used is 60 to 75 degrees, so a fair amount of the work had to wait until it warmed up, usually after 10am.

Since the parking garage was in use during the renovation, careful coordination was required to flag off the areas where Chamberlin crews would be working ahead of time to ensure those parking spots remained unoccupied. The areas where they were actively working were coned off for their safety from vehicular traffic. Additionally, HEPA vacuums were attached to all grinding equipment. These devices suck the dust created from grinding the concrete into a vacuum before it can disperse in the air, protecting Chamberlin employees and pedestrians from inhaling it. Chamberlin crew members also wore a face shield and dust mask when grinding.

Chamberlin worked efficiently and safely to increase production and complete the restoration of the OSU Monroe Street parking garage within a tight time frame while keeping the parking structure open to the public. ■

This picture shows an area of concrete patched on a column during the curing process.

Installation of parking garage joint sealants.

(WET SEALING Continued from pg. 2)

the building envelope and the manifestation at the windows is the result of a nonfunctioning through-wall flashing system located directly above the top or head of the assembly. Since the components of a window are typically concealed or restrained within the frame, disassembling of the units (or portions thereof) is often required to perform corrective procedures to alleviate the water infiltration problems that are directly related to issues associated with the window unit. While this can be accomplished, the work is meticulous, time-consuming, relatively costly and can be disruptive to building operations. Some units that utilize snap-on covers can be disassembled to perform remedial work without glass removal. However, this removal process could distort the covers and result in an improper fit during the reinstallation process. Other assemblies, such as lock-strip gasketed systems, typically cannot be disassembled without the removal of the glass. So, with the need to resolve water infiltration problems, together with the desire to minimize disruptions to building occupants and operations, as well as restrictions from budgetary constraints, wet sealing

Figure 2: *Loose gasket*

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(WET SEALING Continued from pg. 3)

is commonly utilized to solve water infiltration problems.

When water infiltration is experienced in window/wall systems, it is often believed that the internal gutters and weep system (collection and extrication system) are not functioning properly. Therefore, the intent of a wet seal is to "seal" all of the possible/potential sources on the exterior surfaces of the window assembly that may be sources of water infiltration. These potential sources could include the following:

- Intersection of the glass and the preformed gasket
- Intersection of the frame and the preformed gasket
- Exposed fasteners in the frames
- Exposed joints (butt or lap joints) in the frames or caps/covers that are not utilized as a weep system

Consequently, the sealant in a wet seal application becomes the primary seal and the backup system within the assembly is basically abandoned.

Water infiltration typically occurs at preformed gaskets due to either shrinkage (resulting from weathering/aging) or improper installation. Improper installation can result in gaps and/or openings between adjoining gaskets that occur at the corners of the sill and jamb intersections. During the installation of the gaskets, adjoining gaskets might not be properly mitered at the adjoining corner or the two adjoining gaskets might be "pulled/stretched" into their original end-to-end positions and then shrink back ("re-coil/relax") to their original length.

As a result of these actions, a relatively large gap (¼ inch to ½ inch) can occur at the corners of the sill and jamb intersections, which can allow an excessive amount of water to migrate into the internal network of the assembly (Figure 1). The gaskets are traditionally composed of EPDM rubber that, upon exposure and aging, will begin to shrink and develop crazing/cracking of the gasket surface. This shrinkage and development of cracks (particularly along the outer, thinner edges of the gasket) can result in a loss of compression between the gasket and the glass, which can then allow moisture migration into the assembly (Figure 2). Therefore, the purpose of the wet seal is to completely conceal the gasket with the new sealant.

This can be achieved by placing either bond breaker tape or a ¼-round backer rod over the exposed top edge of the gasket and then applying the new sealant in a fillet-shaped joint configuration (Figure 3). After the sealant is "gunned" in place, the sealant is tooled to achieve bond interfaces ("bite") with both the glass and the frame.

The bond breaker tape (typically a polyethylene strip/ribbon) or the backer rod serves two purposes:

1) Results in an unbonded portion of the bottom of the sealant to achieve a profile similar to the desired "hourglass" shape for optimum sealant performance

2) Protects/separates the sealant from the gasket to alleviate potential compatibility issues between the sealant and the gasket

Since the existing gaskets in window systems are predominantly black in color, a black-colored sealant is commonly used for this application. A silicone-based sealant is typically used for wet sealing due to its propensity for achieving long-term bonds with both glass and metal substrates. At exposed fasteners in the assembly, sealant is applied in a cap-bead configuration that conceals the fastener in its entirety. A cap-bead profile, or bridge-sealant joint, is also applied over exposed joints in the metal frames and/or covers of the assembly.

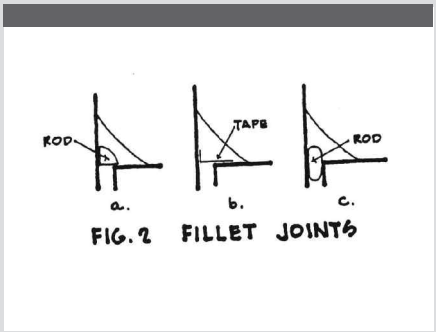

Figure 3: Fillet joint backing options

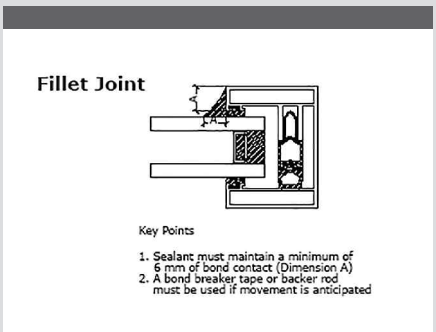

Figure 4: Sealant fillet bead at window frame

Figure 5: Lock-strip wet sealed

The cap bead is centered over the joint and can be applied directly to the metal frame. If movement is expected at this joint, a thin strip of bond-breaker tape (polyethylene) may be loose-laid over the joint prior to the sealant application, again attempting to mimic or achieve parallel bonded ends of the sealant. Silicone sealant is also typically used for this application. Sealant applied over joints in the

Figure 6: Lock-strip gasket corner

frames will commonly intersect or abut sealant that is applied between the metal frame and the exterior facade finish. Therefore, sealant compatibility between various sealants that

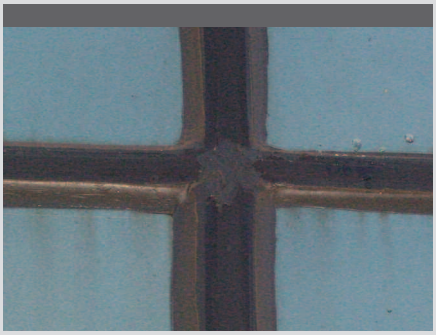

Figure 7: Wet seal of lock-strip gasket

occur in these joints should be confirmed. However, when wet sealing is performed, the sealants located around perimeters of the frame are also typically replaced, as these

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Chamberlin Builds in Buda

Chamberlin opened their newest office earlier this year in Buda, Texas, just south of Austin. The 20,000-square-foot facility has a sleek design created by Alliance Architects, and general contractor Raymond Construction led construction of the facility.

The energy efficient building contains LED lighting throughout and sensored faucets on all sinks. The 10,000-square-foot warehouse space is ideal for Chamberlin's in-house sheet metal fabrication shop. The craft and safety training room and main conference room have cutting-edge technology, allowing Chamberlin offices across Texas and Oklahoma to collaborate and communicate smarter and faster to better serve our clients. ■

(WET SEALING Continued from pg. 4)

sealants are commonly the same age as the gaskets and are weathered and deteriorated. This also allows the proper sealant selection for all of the affected joints. Surface preparation, cleaning and priming are essential in achieving proper sealant performance with this application (Figure 4).

Similar to other preformed gasket systems, lock-strip gasketed systems become vulnerable as the outer edge of the gasket or lip of the gasket loses pressure on the glass, resulting in avenues for moisture migration into the glazing pocket and manifesting as leakage in the interior at joints in the gaskets. Wet sealing of these assemblies can include injecting sealant behind the lip of the gasket and allowing the sealant to exude out to be tooled flush. Sealant is then applied in a cap bead centered over the lip or outer edge of the gasket and adhered to the gasket and the glass (Figure 5). Sealant is also applied over the gasket intersections at the corners of the four glass units, and any gasket joint that may occur in vertical or horizontal runs of the assembly (Figures 6 and 7). Mock-ups using the proposed sealant should be performed to test for compatibility issues and adhesion properties. In the past, polyurethane sealants were commonly used for this application, due to their ability to bond readily to the gaskets. However, due to their organic-based compound, this type of sealant weathered and became hardened in a relatively short timeframe (i.e., 5-7 years) and made future sealant remedial work (removal) more exhaustive.

Additionally, polyurethane sealants are typically not designed for achieving high performance when adhered to glass substrates. Improvements in the silicone sealant technology in achieving good adhesion to rubber gasket, combined with its historic ability to bond to glass have allowed silicone sealants to be effectively used for this purpose. Silicone sealants have a proven track record for long-term performance and, in certain cases, a warranty (material and installation) can be issued by the manufacturer for the sealant application.

In summary, wet sealing can be a valid and cost-effective method for alleviating certain water infiltration problems associated with window systems and assemblies. However, as with most sealant applications, assembling mock-ups and collecting pre-job adhesion testing are essential in achieving optimum results. In addition, it is recommended that the sealant manufacturer be involved in the planning phase of the project and buy-in or approve of the application. ■

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Karl A. Schaack, RRC, PE, is president of Price Consulting, Inc., a roofing and waterproofing consulting firm in Houston, Texas. Schaack has a bachelor's degree in civil engineering from Clemson University. He is a registered Professional Engineer in Texas, South Carolina and North Carolina. Karl is a member of RCI, the Roofing Contractors Association of Texas and the Gulf Coast Chapter of RCI. He is a Registered Roof Consultant (RRC) and a former director of RCI's original Region IV. In 2007, he won the Horowitz Award for best technical article in RCI Interface for 2006.

Employee Profile

Chip Goode
Senior Project Manager — Waterproofing & Caulking
San Antonio, TX

Experience:
Chip's experience in the construction industry started when he was 22, working for a company in Victoria, Texas, breaking metal. He was a recent graduate from Texas A&M with an agricultural degree. He then moved into the interior finish business and became a Superintendent. While living in Dallas, he was hired on at Chamberlin as a Project Coordinator. Once he was promoted to Project Manager, he transferred to the San Antonio office in the Waterproofing & Caulking department. In 2014, he was promoted to Senior Project Manager.

A notable project for Chip is Frost Bank in the lovely Westover Hills in San Antonio. A project that would typically take two years to complete was fast-tracked for a one-year completion. Chip rose to the challenge and managed the project to meet the tight deadline, crediting great teamwork for the outcome.

A Day in the Life:
On any given day, you can find Chip on jobsites making sure the projects are running smoothly, interacting with clients, supporting the office staff, managing any obstacles that might arise and ordering materials.

Outlook:
"Great customer service is vital because without it, we do not have work," says Chip. Safety is also in the forefront for Chip, because it is imperative that Chamberlin crew members provide for their families and get home safely every day. Doing it right the first time, every time is also crucial. Chip understands it doesn't do the client or Chamberlin any good if we have to return to a project for repairs, when the job should have been done right the first time. Chip's philosophy on teamwork is that it takes more than one person to run a project, starting from estimating through operations and into the field. Everyone is involved, and everyone plays a key role.

Outside the Office:
Outside the office, you can find Chip hunting, fishing, attending sporting clay events and spending quality time with his wife, Sherri. ■

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

CHIP'S CHOICES:

Dog	Cat
Rocky	Rambo
Beach	Mountains
Coffee	Tea
Football	Baseball

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ACC Hays Campus Phase 2 – Kyle, TX
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Contract Amount: $550,000 (approx.)
Owner: Austin Community College District
Architect: Pfluger
General Contractor: Vaughn Construction
Scope of Work: Installation of TPO roofing, standing seam roofing, joint sealants, sheet metal flashing and trim
Project Description: Training facility for law enforcement students

Oracle Waterfront – Austin, TX
New Construction Waterproofing
Contract Amount: $2,500,000 (approx.)
Owner: Oracle
Architect: TBG Architects + Planners
General Contractor: Ryan Companies
Scope of Work: Installation of below-grade waterproofing, hot fluid-applied waterproofing, air barrier, metal flashing, joint sealants, structural glazing, expansion joints, epoxy coating, traffic coating, pavers and pedestals
Project Description: Office complex for a multinational computer technology corporation

Methodist Hospital TNI Parking Garage – San Antonio, TX
Remedial Waterproofing
Contract Amount: $1,600,000 (approx.)
Owner: Methodist Healthcare System
Consultant: Raba Kistner
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: Concrete repair, structural injection, replacement of expansion joints, traffic coating, water repellent, joint sealants and bearing pads
Project Description: Renovation and repair of parking structure

Hermann Pavilion 2 – Houston, TX
New Construction and Remedial Roofing & Waterproofing
Contract Amount: $4,300,000 (approx.)
Owner: Memorial Hermann Health System
Architect: WHR Architects
General Contractor: Vaughn Construction
Scope of Work: Tie in existing roof to the wall of new building and to new roof, installation of modified bitumen roofing, PVC roofing, sheet metal flashing, coping, below-grade concrete repair, structural epoxy injection, below-grade bentonite and cold fluid-applied waterproofing, crystalline waterproofing, fluid-applied waterproofing, traffic coating and site sealants
Project Description: Hospital expansion

Oklahoma University Cross Village Residential – Oklahoma City, OK
New Construction Waterproofing
Contract Amount: $1,500,000 (approx.)
Owner: BBCS Development, LLC
Architect: Studio Architecture
General Contractor: JE Dunn Construction
Scope of Work: Installation of dampproofing, sheet waterproofing, vehicular traffic coating, water repellents, spray-applied air barrier, acoustical sealants, site and paving sealants, firestopping, joint sealants and expansion joints
Project Description: Luxury on-campus student housing

Gables Uptown Trail – Houston, TX
Remedial Waterproofing
Contract Amount: $900,000 (approx.)
Owner: Gables Construction, Inc.
Consultant: Wiss, Janney, Elstner Associates, Inc.
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: Concrete patching, waterblasting, cement plastering, painting and replacement of coating, joint sealants and expansion joints
Project Description: Upscale multi-family housing

The Epic: Deep Ellum – Dallas, TX
New Construction Waterproofing
Contract Amount: $1,000,000 (approx.)
Owner: Westdale Properties America I, Ltd.
Architect: Perkins + Will
General Contractor: Balfour Beatty
Scope of Work: Installation of hot fluid-applied rubberized asphalt waterproofing, sheet waterproofing, pre-applied sheet waterproofing, cementitious and reactive waterproofing, pedestrian traffic coatings, thermal insulation, spray-applied air barrier, sheet metal flashing and trim, flexible flashing and joint sealants
Project Description: A multi-purpose complex including office, multi-family housing and hotel space

Durant Tribal Complex – Durant, OK
New Construction Waterproofing
Contract Amount: $400,000 (approx.)
Owner: Choctaw Nation
Architect: JCJ Architecture, Inc.
General Contractor: Manhattan Construction
Scope of Work: Installation of site and paving sealants, joint sealants, sheet waterproofing and traffic coating
Project Description: Choctaw Nation's Headquarters

Frost Tower – San Antonio, TX
New Construction Waterproofing
Contract Amount: $700,000 (approx.)
Owner: Frost Bank
Architect: Pelli Clarke Pelli Architects
General Contractor: Clark Construction
Scope of Work: Installation of below-grade waterproofing, hot fluid-applied waterproofing, air barrier, joint sealants, fire sealants, expansion joints and sheet metal flashing
Project Description: State-of-the-art office building and new headquarters for Frost Bank

Westside Lexus – Houston, TX
Remedial Waterproofing and New Construction Roofing & Waterproofing
Contract Amount: $1,700,000 (approx.)
Owner: FR - Lexus II Limited
Architect: Goree Architects
General Contractor: Wier Enterprises
Scope of Work: Standing seam roofing, PVC roofing, decor rib roofing, sheet metal and flashing, below-grade waterproofing in elevator pits, removal of traffic coating on existing structure and installation of new traffic coating, traffic coating at new parking garage, site and exterior building sealants
Project Description: Renovation of existing exterior parking garage, addition of new multilevel parking garage and expansion of car dealership

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