SPRING 2017 NEWSLETTER

CHAMBERLIN
Roofing & Waterproofing

Chamberlin Waterproofs The Star

The Ford Center at The Star, Frisco, Texas

Frisco, Texas, now claims one of the most dynamic development concentrations in America with their "$5 Billion Mile," a one-mile stretch of real estate developments under construction along the Dallas North Tollway. The first of these developments is a $1.5 billion complex called The Star, a 91-acre campus encompassing the Dallas Cowboys World Headquarters, The Ford Center, two parking garages and two outdoor practice fields.

The Dallas Cowboys World Headquarters is a six-floor office building with a two-level parking garage. The Ford Center is a state-of-the-art, 510,000-square-foot indoor athletic facility containing the Dallas Cowboys indoor practice field, training room, office space and hydrotherapy. Chamberlin worked on both facilities and their parking garages installing approximately 320,000 square feet of spray-applied air barrier, 215,000 square feet of hot fluid-applied waterproofing, 200,000 linear feet of sealants and 125,000 square feet of sealer. Chamberlin's scope also included firestopping, water repellents, sheet metal flashing and trim, pavers and expansion joints. This massive scope was completed in 16 months with a total contract amount of nearly $5,000,000.

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CONSULTANT'S CORNER:

By Amrish Patel, Senior Project Manager - Simpson Gumpertz & Heger

Improving Energy Performance in Existing Buildings

Introduction

When discussing energy performance in buildings, electrical, mechanical and lighting systems are often the first elements that come to mind since they are more closely associated with the "meter reading." Building enclosure systems are often overlooked, but in many cases can have a significant contribution in the overall energy consumption of buildings.

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Problem Solved

During the preconstruction process, Chamberlin noticed a tie-in concern between the below-grade waterproofing system on The Ford Center's parking garage and the hot fluid-applied waterproofing that was to be applied to the horizontal slab on the plaza above. The below-grade waterproofing to be installed was a "peel and stick" material made of raw asphalt covered with a plastic facing, to which the hot-applied waterproofing would not adhere. Over time it would become brittle and break away, disconnecting the two waterproofing systems and allowing water to infiltrate the parking garage.

Upon discovering that no pre-existing detail would resolve this problem, Chamberlin suggested a new detail. To begin, an additional, sacrificial layer of the peel and stick was applied where the systems met. The plastic facing on the top of the additional layer was then removed using a roofing torch, revealing the raw asphalt portion of the peel and stick waterproofing system. Since the hot fluid-applied waterproofing system is also asphalt-based, they were then able to adhere together completely. Meanwhile, the bottom half of the additional piece of peel and stick would continue to adhere to the existing peel and stick waterproofing installed on the vertical wall. The two systems were successfully tied together with a full, single layer of peel and stick membrane left undamaged.

This innovative new detail keeps the parking garage watertight while keeping both waterproofing manufacturer warranties in tact. Additionally, it was the most cost-effective solution.

Creative Design

The Ford Center includes a two-story weight room with a balcony on the second level. This balcony was originally scoped for a paver system sealed with hot fluid-applied waterproofing. However, a large artificial turf area where the players can run drills for training purposes was later added. The new design included pavers surrounding only the perimeter of the mock field. The concern was if the pavers weren't locked in and secured together across the entire balcony, the extra load and foot traffic of football practice would result in paver movement and trip hazards.

Chamberlin proposed a design that incorporated the turf field and allowed the pavers to cover the whole balcony. The pavers underneath the mock field were lowered one inch then infilled with turf, making it level with the with the surrounding perimeter pavers. Since

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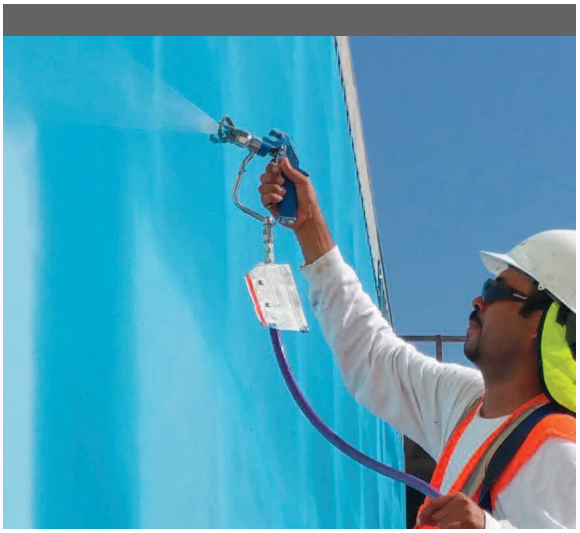
Applying "peel and stick" waterproofing to the north wall of The Ford Center.



Installing spray-applied air barrier to the exterior wall of The Ford Center.

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The building enclosure contribution to overall building energy use is a function of the occupancy, use, size and geographical location of the building. Building enclosure performance issues that result in high energy consumption can be caused by a variety of factors related to both design and installation. These can include air leakage, improper or missing thermal barriers, thermal bridging at penetrations and window openings and inappropriate selection of glazing systems. When reviewing options for improving energy performance in existing buildings, owners and managers should take a holistic approach and consider the impact of the existing building enclosure systems on the overall building energy performance, rather than simply looking for what may appear to be the most obvious upgrade for a quick payback.

Assessing Existing Energy Performance

Building enclosure systems must be perfectly installed to perform exactly as designed on paper, but this is not achievable in practice given short construction schedules, cost limitations, inclement weather conditions and other factors. The nature and quality of the installation will determine how much these "deviations" affect energy performance. Small issues such as gaps in cavity insulation may be insignificant on a whole-building basis, while issues such as poor air seals at window systems can have a significant impact on overall energy consumption. However, even if enclosure systems are nearly perfectly installed it will still experience performance issues if they are not properly designed.

Any building energy performance improvement project should include a study to understand the overall energy performance of all building systems, including enclosure systems, so that improvements can target those areas of highest potential savings. However, review

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the pavers were two inches thick, they were able to be offset by that inch and still be tied together. The paver system was installed on top of a TPO roof system since the first story of the weight room is housed below. This system effectively keeps water out of the building and limits the amount of paver movement when in use.

Unusual Circumstances

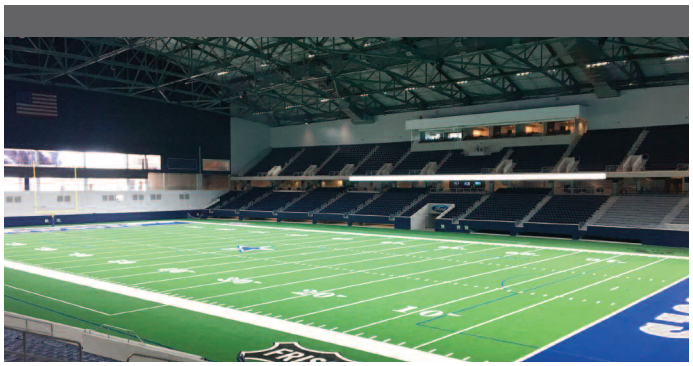
The south wall of The Ford Center was built under a tight schedule. Construction on the 38,000-square-foot wall began only three months before the building was scheduled to open, cutting normal production time almost in half. And it is no simple wall. The exterior of the south wall is comprised of metal paneling displaying a 2,270-square-foot video board above a protruding glass entryway containing twelve doors. Chamberlin stepped up to the plate and completed their scope of spray-applied air barrier, firestopping and sealants in less than a month, working 12-hour days up to seven days a week for the benefit of the owner and the project.

The plaza in front of the south wall is over the parking garage, so weight restrictions and weight distribution of large equipment had to be taken into account. In addition, an eyebrow at the top of the wall prevented Chamberlin crew members from being able to access the area they needed to install the firestopping and sealants from an aerial boom lift or swing stage. The equipment would raise them almost 200 feet in the air, but they then had to crawl on the structure's steel beams to reach the installation area. Connecting boards were installed so they could move from beam to beam. High winds further compounded this already challenging worksite.

Chamberlin created a system to allow the crew members to complete this work safely. Two men worked together, one on the steel beams above and one on the equipment below. The crew member below handled cutting material, loading caulk guns, passing materials to his partner and other preparation tasks to allow the other crew member to focus solely on installing the material.

Beam clamps were attached to every steel beam, to which the crew member installing the material tied off with dual leg lanyards. With great care and coordination, the crew member below assisted his partner by first securing one of his lanyards and then moving the other lanyard to the next tie-off point for him, one at a time, for the length of the beam. With this system, every crew member was securely tied off at all times.

This extremely challenging and unusual installation method was not only performed under extreme time constraints, but performed safely and successfully. ■



Completed indoor practice field in The Ford Center.

Dallas Cowboys World Headquarters office building.

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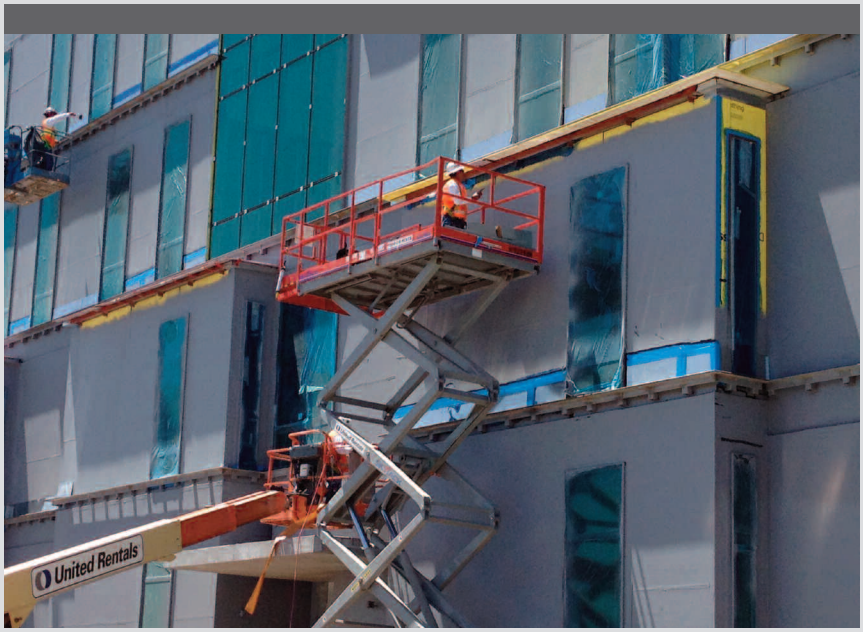
of building enclosure systems may not be as simple as reviewing design drawings, maintenance records and/or utility bills. To accurately assess the contribution of the enclosure systems to the overall energy performance of buildings requires a comprehensive study that may include some or all of the following:

- Review of available design and construction documents.
- Review of actual utility bills.
- Review of exploratory openings to verify existing construction. Unlike systems such as lighting and mechanical where capacities, efficiencies and ratings are easily visible, building enclosure systems depend on a much wider range of factors which cannot be found on a printed label.
- Data logging of existing interior/exterior ambient conditions.
- Air leakage testing of individual enclosure systems and/or whole building air leakage testing.
- Infrared thermography of enclosure systems.
- 2-D or 3-D thermal modeling.
- Hygrothermal modeling.
- Whole building energy modeling.



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Once the existing performance parameters for enclosure (and other systems) have been determined, a whole building energy analysis/model can be used to compare improvements to various building systems with other existing building systems and determine their impacts on overall energy use. Modelers, and owners and building managers, must understand that variables such as occupant behavior, heating and cooling set-points, utility use, etc., cannot be reliably predicted. Although predicting actual energy use with computer models is difficult due to the wide range of variables involved, predicting relative changes in performance by improving one or more building systems is more realistic.

It is important to remember that achieving even a 100% improvement in the thermal performance of the building enclosure systems will provide minimal improvement in a building where the energy use is dominated by other factors such as lighting, ventilation or industrial processes.

Case Studies

We have witnessed building owners ready to commit to substantial enclosure upgrades, such as full replacement of window systems, without assessing the actual cause of poor energy performance. In these cases there may be little improvement in overall building energy efficiency and decades before the improvement investment costs are returned. The following case studies are examples of projects in which we have investigated building enclosure systems contributing to poor overall energy performance in buildings. These case studies are examples and include important strategies and concepts in assessing existing performance before considering repairs or upgrades to existing building systems.

Case Study #1 – High-Rise Residential Building in New England

We were approached by a building owner to determine the payback period for a full window replacement project for an existing 30+ story high-rise hotel building where the majority of the cladding consists of strip windows and other fenestration systems. Existing windows included non-thermally broken aluminum frames with insulating glazing units (IGUs) without low-e or other coatings. The owner advised us that the purpose of the window replacement was not only to consider energy improvement, but to remediate widespread water leakage and fogging IGU problems.

To understand the existing energy performance of the building, we developed a "baseline" whole-building energy model using existing drawings for general geometry and interior space layout. Adjacent buildings were included in the model to consider shading effects. We calibrated the baseline building performance by adjusting air leakage rates and other variables such as occupancy rates in the model to more closely align the baseline performance with actual utility use data.

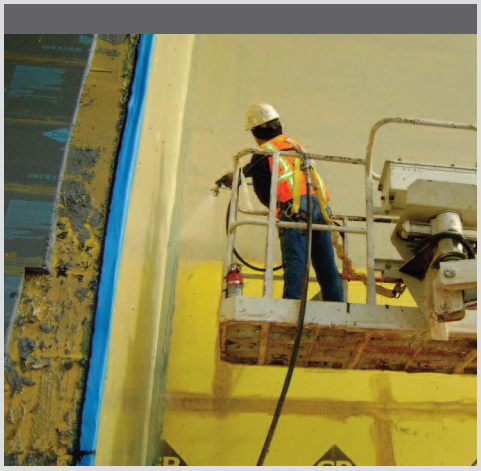
With a baseline model complete, we were then able to adjust the window system performance and air leakage rates to assess the potential performance gain of providing replacement thermally broken aluminum windows with low-e coated IGUs. The results showed less than 1% reduction in overall annual energy use with a payback period of over 100 years. Existing internal building loads such as lighting, equipment and water use were extremely high compared to the heat gain/loss through the window systems, making improvements to the window systems less effective on a whole-building basis.

This project is a good example to show even buildings that are primarily clad with fenestration systems may achieve little improvement in energy performance by implementing a very costly and disruptive window replacement project. Upgrades to mechanical, electrical and water systems would better serve this owner for improving energy performance. However, in this case the model results were helpful to the owner in that they demonstrated how similar improvements in energy performance could be achieved by purchasing less expensive windows that also addressed their water leakage and insulating glass unit problems.

Case Study #2 – Mid-Rise Office Building in New England

A university client approached us regarding a large, 10-story, over 300,000-square-foot facility that was experiencing high energy use and widespread water leakage in the exterior walls. The existing facility was constructed of cast-in-place concrete with thousands of window openings with translucent panels and less than 10% IGUs (the remainder being monolithic glazing). Many windows were experiencing deteriorating window films and approximately 75% experienced water leakage problems.

Similar to case study #1, we developed a whole-building energy model to perform an energy demand analysis. The analysis showed a comparison of the existing



whole-building energy performance versus change in heating and cooling demands for various building enclosure upgrade options. The various upgrade options included full replacement of window systems, adding insulation to the interior side of opaque wall assemblies, adding roofing insulation by roof replacement or to the underside of the roof deck and a combination of each.

To continue reading "Improving Energy Performance in Existing Buildings," visit:
www.chamberlinltd.com/articles/improving-energy-performance-in-existing-buildings/

Amrish Patel, Senior Project Manager
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AKPatel@sgh.com 713.265.6432 www.sgh.com

Amrish Patel joined SGH in 2006. He has experience in the investigation, rehabilitation and design of many building enclosure systems and specializes in roofing and waterproofing. His work experience also includes construction litigation support and consulting on various building enclosure systems for a wide range of projects including residential and commercial buildings, parking structures, plazas, schools, hospitals and many other structures in both public and private sectors.

Chamberlin Receives Three National Awards from Associated Builders and Contractors

The award-winning Project Delta team included Alex Benzor, Waterproofing General Superintendent, and Allen Polasek, Waterproofing Project Manager.

Chamberlin's work on the Dallas Love Field Modernization Program in Dallas, Texas, and Project Delta in Spring, Texas, earned first-place national Excellence in Construction Eagle Awards from **Associated Builders and Contractors (ABC)**.

The Excellence in Construction awards program is the industry's leading competition, developed to honor innovative and high-quality merit shop construction projects. The winning projects were judged on unique challenges overcome, timeliness of completion, quality, innovation and safety.

"Associated Builders and Contractors is proud to honor Chamberlin Roofing & Waterproofing with a best-in-class Excellence in Construction Eagle Award for their tremendous work in completing the Dallas Love Field Modernization Program and Project Delta safely, on time and budget," said 2017 ABC National Chair Chuck Goodrich. "The dedication to innovation, productivity and world-class craftsmanship demonstrated by Chamberlin Roofing & Waterproofing and its employees produced truly impressive results that any project owner would be proud of."

Chamberlin also received the prestigious National Safety Excellence Award that recognizes companies who exhibit a continued commitment to jobsite safety and whose safety performance and programs are judged to be exemplary by the ABC National Environment, Health & Safety (EH&S) Committee. ■

Chamberlin received a first-place national Excellence in Construction Eagle Award from ABC for their work on the Dallas Love Field Modernization Program.

Chamberlin received the ABC National Safety Excellence Award for their continued commitment to jobsite safety.

Employee Profile

Craig Ayers
Estimating Manager — Waterproofing & Caulking
Oklahoma City, OK

Experience:
After interning with Chamberlin while attending Oklahoma State University, Craig was offered a Project Estimator position in the Waterproofing & Caulking department. He has now been with the company 10 years and is currently an Estimating Manager. One of his prominent projects is the Devon Energy Center in Oklahoma City. Chamberlin performed a large waterproofing scope and green roof installation for this 1.7 million-square-foot, 50-story office tower.

A Day in the Life:
A typical day for Craig consists of many different responsibilities. In addition to his estimating role, he is also involved in approving change orders, billings, lien wavers and assisting project managers and superintendents with daily needs in order to keep projects running successfully.

Outlook:
"Being a part of Chamberlin means we are part of a team who works to produce the highest level of service to our clients." Productivity to Craig means meeting the client's schedule and delivering a project to the owner that is completed safely and on time while demonstrating quality workmanship. "All of these qualities are what sets Chamberlin apart from other contractors and helps us build strong, lasting relationships which lead to more projects," he said.

Outside the office:
First and foremost, Craig loves spending time with his wife and two daughters – Alyssa and Brynlee. He enjoys time at their Lake Texoma cabin, where you are sure to find them on the water or around a campfire. His other passion has always been classic autos, and he hopes someday to fully restore his 1969 Mustang Convertible. ■

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

CRAIG'S LIST:

Fishing	Hunting
Pulp	No Pulp
Sunrise	Sunset
Mild	Spicy
Chevrolet	Ford

PROJECTS IN PROGRESS

CHAMBERLIN
Roofing & Waterproofing

LOCATIONS:

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

AUSTIN
2755 Business Park Dr.
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

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Moore, OK 73160
Ph. (405) 680-0506
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TULSA
10828 E. Newton Street, Ste. 117
Tulsa, OK 74116
Ph. (918) 439-0055
Fax (918) 439-0067

Also licensed in Arkansas, Louisiana and New Mexico.

J.J. Pickle – Austin, TX
Remedial Roofing & Waterproofing
Contract Amount: $1,400,000 (approx.)
Owner: GSA
Architect: Jacobs
General Contractor: Hensel Phelps
Scope of Work: Modified bitumen roofing system, exterior precast restoration, cut out and re-caulk, perimeter window sealant replacement, granite injection, precast injection
Project Description: Re-roof for a Level IV federal facility

Greystar TMC Residential – Houston, TX
New Construction Roofing & Waterproofing
Contract Amount: $2,200,000 (approx.)
Owner: Medistar and Greystar – A joint venture
Architect: Preston Partnership
General Contractor: Hoar Construction
Scope of Work: Crystalline waterproofing, hot fluid-applied asphalt waterproofing, bentonite waterproofing, fluid-applied waterproofing, site sealants, traffic coating, insulation, air barrier, joint sealants, caulking, sheet metal, thermoplastic membrane roofing, coping, scuppers, counter flashing, downspouts
Project Description: 35-story luxury high-rise

Travis County Medical Examiner's Office Building – Austin, TX
New Construction Roofing
Contract Amount: $650,000 (approx.)
Owner: Travis County
Architect: BGK Architects
General Contractor: Harvey Cleary
Scope of Work: Hot asphalt roofing system, built-up roofing system, standing seam roofing system
Project Description: Two-story office building

US 281 North Via Park and Ride – San Antonio, TX
New Construction Waterproofing
Contract Amount: $300,000 (approx.)
Owner: Via
Architect: RVK
General Contractor: Sundt
Scope of Work: Expansion joints, traffic coating, joint sealants, air barrier
Project Description: Four-story park and ride parking garage

Kinsmen Lutheran Church – Houston, TX
Remedial Roofing & Waterproofing
Contract Amount: $400,000 (approx.)
Owner: Kinsmen Lutheran Church
Consultant: BES Terracon
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: PVC membrane roofing system, shingles, wall and curb flashings, sheet metal, elastomeric coating
Project Description: Church renovation

IAH Terminal D Baggage Claim – Houston, TX
Remedial Waterproofing
Contract Amount: $200,000 (approx.)
Owner: Houston Airport Systems
Architect: Pierce Goodwin Alexander & Linville
General Contractor: Manhattan Construction
Scope of Work: Shot blasting, traffic coating
Project Description: Renovation of baggage claim

Gables Uptown Trail – Dallas, TX
Remedial Waterproofing
Contract Amount: $850,000 (approx.)
Owner: Gables Residential Services, Inc.
Architect: WJE
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: Waterblasting, joint sealants, expansion control, cement plastering, painting and coating
Project Description: Residential community

CityLine Block D – Richardson, TX
New Construction Roofing & Waterproofing
Contract Amount: $700,000 (approx.)
Owner: City of Richardson
Architect: Wallace Garcia Wilson Architects
General Contractor: JLB Builders, LLC
Scope of Work: Fluid-applied waterproofing, joint sealants, firestopping, site and paving sealants, TPO roofing, flashing and sheet metal
Project Description: Multi-family community

Coffee Creek Water Resource Recovery Facility – Edmund, OK
New Construction Waterproofing
Contract Amount: $100,000 (approx.)
Owner: Coffee Creek Water RRF
Architect: BBN Architects
General Contractor: Lambert Construction
Scope of Work: Hot fluid-applied rubberized asphalt waterproofing, water repellents, air barrier, joint sealants, site and paving sealants
Project Description: Wastewater facility expansion

Texas A&M Galveston Academic Building – Galveston, TX
New Construction Roofing & Waterproofing
Contract Amount: $1,000,000 (approx.)
Owner: Texas A&M University
Architect: PGAL
General Contractor: Linbeck Group
Scope of Work: Fluid-applied waterproofing, hot fluid rubberized asphalt waterproofing, weather barrier, sheet metal flashing, site sealants, modified bitumen roofing, TPO roofing, standing seam roofing, joint sealants and traffic coating
Project Description: Academic complex containing classrooms and laboratories

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

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