FALL 2010 CHAMBERLIN Roofing & Waterproofing NEWSLETTER

Protection From Above: ORU CityPlex Towers Roof Replacement

CityPlex Towers

TPO roofing membrane delivered via helicopter

Oral Roberts University (ORU) is a charismatic Christian university founded by evangelist, Oral Roberts, in 1963. Based in Tulsa, Oklahoma, the university has an enrollment of over 3,500 students and offers more than 65 undergraduate programs.

In 1981, Oral Roberts developed several buildings just south of ORU's main campus to make up the City of Faith Medical and Research Center. The campus consists of three buildings: a 60 story clinic, a 30 story hospital and a 20 story research center. In 1989 the City of Faith Medical and Research Center closed because of financial problems and lack of demand for medical services. Today, the facility is known as CityPlex Towers. It is owned by Oral Roberts University and is now mostly leased as commercial and medical office space.

In August of 2008, as part of a complete renovation project, Chamberlin was hired by Oral Roberts University to replace the roofs on the CityPlex Towers. The scope of work included the three tower roofs, a large base building roof and five canopies.

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CONSULTANT'S CORNER:

By: Richard J. "Jeff" Gish, P.E.
Senior Associate, Terracon Consultants, Inc.

Air Infiltration and Water Penetration Testing of Glazing Systems

In recent years, the waterproofing consulting industry has witnessed an increasing demand for air infiltration and water penetration testing of the building envelope and glazing systems. This article will focus on field testing of installed fenestrations,

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Discovery Green Project Earns APEX Award

Pictured from left to right: Joe Cotten, waterproofing senior project manager; Alex Benzor, waterproofing superintendent; Lyle Coston, waterproofing estimating manager

Chamberlin was an APEX award winner at the Associated General Contractors' Houston chapter gala for their waterproofing work performed on Discovery Green, Houston's downtown interactive park. The APEX awards recognize firms for their excellence in construction, valuable contributions to the community and their demonstrated commitment to quality workmanship and safety.

Chamberlin was honored in the specialty contractor category of "Thermal/Moisture Protection" for Discovery Green. As a subcontractor to Miner-Dederick Construction, Chamberlin had an active role in almost every phase of the project because of the large amount of waterproofing throughout the park. Chamberlin's multiple waterproofing systems were installed below the Kinder Lake and model boat basin, the Fondren Foundation Performance Amphitheater, Gateway interactive fountain, and at The Grove Restaurant and park buildings.

Chamberlin also contributed value engineering ideas on the below-grade parking garage's garden roof system at the amphitheater to help bring the project within budget. Chamberlin proposed an alternate method of waterproofing the garden roof while still providing the specified warranty, which resulted in a substantial savings to the owner.

In the end, the Discovery Green project turned an underused green space and brownfield into a gorgeous facility for the citizens of Houston and received gold level LEED certification by the US Green Building Council in the process. ■

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City on a Hill

The design of the 2.2 million square foot complex is quite unique. Though they are not located in Tulsa's central business district, the buildings are an architectural landmark that boasts the second tallest building in Tulsa's skyline. Each building is triangular in shape with a golden facade and is joined together at the fifth floor by a large base structure. The base building is a spacious complex with three auditoriums, a fitness center, cafeteria, food court, convenience store and catering services among other amenities. The 60 story tower, which is the tallest of the three, is not only used for medical and office space but it also houses high power radio antennas on the roof. These antennas broadcast a local radio station and are active 90 percent of the time.

Toils and Snares

Like most renovation projects there were a few construction challenges. These challenges included multiple roof installations on varying high rise levels, inclement weather and the protection of personnel from potentially harmful radio frequencies.

Chamberlin's scope on ORU was to install a TPO adhered roofing system on all the roofs as well as canopies. One of the biggest challenges was hoisting and transporting roofing materials. With multiple crews and elevators that were not accessible, the only option for the team seemed to be hand

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storefront and curtain walls systems, and sloped glazing systems. Testing is generally done to document performance of buildings that are under construction or being renovated, but it can also be performed on existing buildings, in a diagnostic or forensic capacity, to identify improper installation, inadequate performance or material defects in the installed systems. As of late, several factors have combined to create an increased demand for testing services:

- Testing requirements are now included in most specifications and are generally required as a means of quality assurance during construction to document that the assemblies (and their integration into the barrier system) are performing to the appropriate specifications.
- Glazing systems are constantly evolving leading to new technologies and building techniques that make them increasingly air and watertight.
- Increased focus on green building (LEED®, energy efficiency, carbon footprint) demands that the systems perform to higher standards and under tighter tolerances than their predecessors.
- The public has become aware of the potential negative impact of water infiltration on building materials (mold, reduced indoor air quality, structural decay).
- Energy costs are expected to increase in the future. Leaky, inefficient systems increase a building's operating cost making owners and property managers more focused on constructing (and documenting) an air and watertight building envelope.
- In some cases, deficiencies in the design and/or installation of glazing systems result in significant damage and costly insurance claims or litigation. In these cases the source, origin and pathways of the water infiltration must be documented in order to determine the cause(s) of damage and the responsible parties.

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carrying materials through occupied offices up to the appropriate roof levels. After much consideration, Chamberlin instead chose to utilize a helicopter service to deliver materials to the roofs, which saved the team precious time on the project.

High wind conditions and harsh winter weather occurring during the peak time of the project made it extremely difficult to keep the job running on schedule. At any given time, the wind could be two to three times greater on any roof level than on the ground, so Chamberlin crews had to be extremely careful to secure all materials and equipment even as they were performing the daily roof installation.

The FM broadcast radio station antennas located on the roof of the 60 story tower emit high level radio frequency radiation. To protect personnel, Radio Frequency Clothing was required to be worn at all times by Chamberlin roofers and supervisors who worked on this particular roof. These special suits prevented Chamberlin workers from being exposed to potentially harmful radio waves while they installed the TPO roofing. Additionally, Site Superintendent, Darrell Hordern, developed a schedule for the workers which kept track of the amount of time each person spent on top of the roof next to the radio antennas.

Blessed Assurance

When work wrapped up on Oral Roberts University's CityPlex Towers in the summer of 2010, Chamberlin had successfully completed the $2,000,000 project in their given time frame, productively and accident free. The owners are now working to market and lease available space in Oklahoma's largest office center with much success. ■

Safety is a Way of Life at Chamberlin

For companies that claim safety is a priority, Associated Builders & Contractors' (ABC) Safety Training & Evaluation Process (STEP) can help them prove it; and that is exactly what Chamberlin did again this year. Chamberlin applied for the 2010 Platinum STEP Award this past spring and was recently presented with another year of Platinum status at this year's awards ceremony in Dallas, Texas. This is Chamberlin's fourth consecutive year to receive Platinum status.

To achieve ABC's STEP Platinum award, a company must have a total recordable incident rate of at least 25 percent below specific industry averages for the previous data year, maintain an Experience Modification Rate of 0.800 or below, submit their official U.S. Department of Labor, Occupational Safety and Health Administration Forms 300 and 300A on work-related injuries and illnesses for review and attain a particular STEP self-evaluation score. The self-evaluation scores are determined by general company information, safety performance data, a detailed safety assessment and company management involvement.

STEP was established in 1989 by the ABC National Environment, Health & Safety Committee. The benefit of the program is for both large and small contractors to analyze their safety program each year and develop new ways to improve upon it.

It's safe to say that at Chamberlin we are truly dedicated to providing effective training and a safe workplace on every job we undertake – it's a way of life. ■

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TESTING SPECIFICATIONS

The test methods in common use today are somewhat interrelated and are published by two organizations: American Society for Testing and Materials (ASTM) International and the American Architectural Manufacturers Association (AAMA). These organizations reference laboratory tests (to establish design performance) and field tests (to document installed performance). Some AAMA documents reference ASTM test methods but with a slightly different procedure or with additional requirements. The test procedures are also relatively new. These factors can combine to create some degree of confusion for the owners, architects, design professionals and contractors involved in the project.

Not surprisingly, the first challenge that testing consultants often face is getting everyone involved in the project "on the same page" from a testing perspective. The testing consultant will review the available specifications, drawings, submittals and manufacturer's literature in order to identify the type, frequency, number and schedule of tests, and the test pressures and allowable leakage rates for the products to be tested. Some specifications are very well written and provide all of the above data with no ambiguity. However, many specifications are ambiguous, insufficient in scope, poorly written or absent of the data required for testing. Some of the common challenges the testing consultant faces when developing a testing proposal include:

- The designated test pressures and/or allowable air leakage rates are not in agreement between the laboratory tests (performed before the project started, usually for the manufacturer) and the field tests to be performed after installation.
- The designated test pressures and/or allowable air leakage volumes for field testing are not consistent with the manufacturer's published data.

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- The project documents contain no direction as to the method of specimen selection and/or the minimum size of each test specimen.

- The project documents contain no direction as to the testing schedule (stage of installation at which to test – all tests at the end of the installation, test at 10%, 35% and 70% completion, test the first 30 linear feet of system installed, etc.) or the number of specimens to test for each test event.

- The percentage of the area to be tested is not consistent with accepted standards. On a recent small curtain wall retrofit project, the architect used a testing specification from a previous large office building. As a result, the specifications required that the consultant test nearly 90% of the total installed curtain wall.

FIELD ACTIVITIES

Once armed with a detailed and appropriate scope of testing, the consultant employs a variety of technology and equipment to perform air infiltration and water penetration testing. These test procedures range from use of a calibrated hand-held spray nozzle (AAMA 501.2) to large-scale testing using a vacuum chamber assembly and calibrated spray rack to simulate a wind-driven rain on a building under cyclic pressure (common tests include ASTM E783, ASTM E1105, AAMA 502 and 503).

The vacuum assemblies, instrumentation, spray racks and wands used in these test procedures are typically commercial systems that have been custom-manufactured specifically for testing. However, some consultants use “pieced-together” or “home-built” systems made from parts available at your local home improvement store. Regardless of the type or manufacturer of the test equipment, ASTM and AAMA require calibration of the equipment at six month intervals.

Hand-Held Testing

Prior to testing, the consultant will perform a visual observation of the test specimens and document any notable features or defects in the specimen. For a hand-held spray test (AAMA 501.2), the exterior of the specimen is sprayed with water at a given pressure and volume, and the interior of the specimen is visually observed for water infiltration. Generally speaking, if water leakage occurs, the specimen fails the test, at which point the consultant may confer with the installation contractor and project team to determine possible causes of failure and appropriate corrective actions.

Chamber Testing

In the more stringent chamber tests, pressure chambers are fitted to the interior or exterior face of the test specimen to develop a pressure differential across the specimen. The consultant will create a negative pressure differential on the interior of the specimen and document the air infiltration rate through the test specimen. If the actual rate is higher than the allowable rate, the specimen fails the test and corrective action is required.

Water penetration testing is performed after the air test; in some cases air infiltration testing is not specified so the water test is the only test required. Pressure chambers are fitted to the interior or exterior face of the building envelope around the test specimen as opposed to being fitted directly to the specimen in the air test. A water spray rack consisting of a grid of calibrated spray nozzles is fitted to the exterior of the test specimen to simulate a rain event. The consultant will create a negative static or cyclic pressure differential on the interior of the specimen and document any water penetration beyond the inside edge of the test specimen. If water penetrates beyond the innermost face of the test specimen, the specimen fails the test and corrective action is required.

Air infiltration testing at a community college technology center.

Water penetration testing at a children’s hospital annex.

Water penetration testing at a new fire station.

Chamber testing can also be used in forensic investigations of existing buildings, such as is outlined in ASTM E2128 and AAMA 511. In some cases, the appropriate test pressures may be provided by the manufacturer. Alternatively, the consultant may research the historical weather data and determine wind speed and direction at the time the specimen failed and calculate (via ASCE 7) the pressure on the specimen at the time of failure. The consultant will use that pressure as his basis for testing with the approval of the Architect/Engineer of Record.

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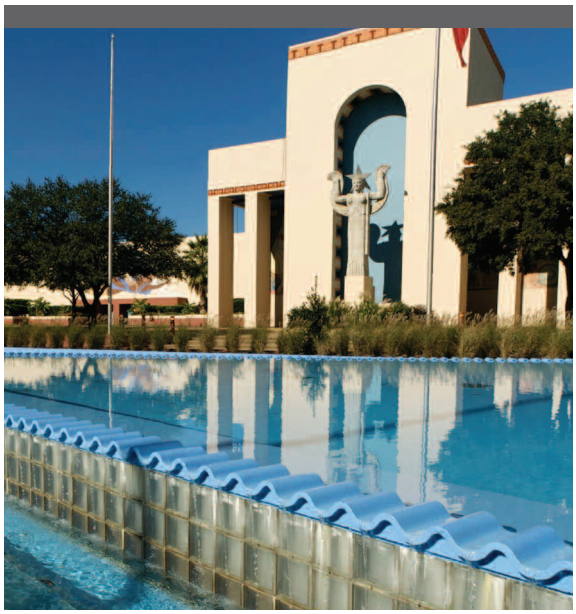
Accolades for Fair Park Esplanade Project

TEXO Building Award – Pictured from left to right: Jaime Galvan and Chris Carrington with Fair Park general contractor Rogers O'Brien; Chamberlin Project Coordinator, Joe Ayala; TEXO Chair-Elect, Tony Rader



The historic Fair Park in Dallas, home to the annual Texas State Fair, was the site of one of Chamberlin's most unique restoration projects.

Chamberlin completed the Fair Park Esplanade project in October 2009, and since that time the team has been recognized for their work by various organizations including TEXO The Construction Association's 2010 Building Awards competition and Texas Construction Magazine's Best Of Awards.

TEXO Award

The 2010 TEXO awards program was the first for the Building Awards competition. The Building Awards was designed to be a consolidation of the North Texas chapters of Associated Builders and Contractors' (ABC) Excellence in Construction and QUOIN's Summit Awards programs. The new TEXO Building Awards consists of 30 categories for both general contractors and specialty contractors in which projects may be submitted. The projects were scored on criterion ranging from unusual design or construction techniques, special obstacles, personnel management, scheduling, quality control and safety, as well as the contractor's overall performance and presentation of the project.

Chamberlin submitted Fair Park Esplanade under the "Other Specialty Construction" category. The project received the Merit Award and is now eligible to compete at ABC's National Excellence in Construction Awards competition this November.

Texas Construction Magazine Award

Fair Park Esplanade also took home the Texas Construction Magazine Best of Award. Texas Construction conducts an annual awards competition that recognizes commercial construction and design excellence from projects across the states of Texas and Oklahoma. Projects were awarded based on factors including safety, innovation, contribution to the community or industry, construction quality and craftsmanship, function and aesthetic quality of design. Each category had one "Best of" award winner.

This year saw over 180 nominated projects, and Chamberlin is proud to earn the "Best of" Award for the "Specialty Contracting" category. The award ceremony will be held this December in Houston, Texas. ■

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CONCLUSION

Who will benefit from air infiltration and water penetration tests? Everyone. Architects, engineers and contractors will have written documentation that the field installed systems are performing to manufacturer's specifications. Building owners can expect lower energy costs and an increased service life of building systems.

Building occupants and tenants are more comfortable due to reduced temperature fluctuations. The risk of future moisture related material damage and biological growth is reduced. In cases where existing systems are not performing adequately, testing by a skilled consultant will identify how, why and where the systems are failing so that the appropriate corrective actions can be taken. ■

Mr. Gish joined Terracon Consultants, Inc. in 2005 and is a Senior Associate. Mr. Gish is Terracon's Practice Leader for building envelope testing and infrared thermography and manages the Facilities Services groups of several of Terracon's Texas offices. His primary focus is the forensic assessment of failed or deficient building systems and components. He can be reached at 210.641.2112 or email to: rjgish@terracon.com.

PROJECTS IN PROGRESS

CHAMBERLIN
Roofing & Waterproofing

LOCATIONS:

Call the nearest local office or 1-800-749-1432

HOUSTON
7510 Langtry
Houston, Texas 77040
Ph. (713) 880-1432
Fax (713) 880-8255

DALLAS/FT. WORTH
2346 Glenda Lane
Dallas, Texas 75229
Ph. (214) 273-9110 / (817) 237-1927
Fax (214) 273-9120 / (817) 237-2676

AUSTIN
1515 Dungan Lane, Ste. 210
Austin, TX 78754
Ph. (512) 275-1600
Fax (512) 275-1603

SAN ANTONIO
9035-A Aero St.
San Antonio, TX 78217
Ph. (210) 822-6536
Fax (210) 822-8211

OKLAHOMA CITY
2620 South Meridian Ave.
Oklahoma City, OK 73108
Ph. (405) 680-0506
Fax (405) 680-0508

TULSA
10838 E. Newton St., Ste. 117
Tulsa, OK 74116
Ph. (918) 439-0055
Fax (918) 439-0067

Also licensed in Arkansas, Louisiana and New Mexico.

Methodist West Houston Hospital – Houston, TX
New Construction Roofing & Waterproofing
Contract Amount: $3,000,000 (approx.)
Owner: The Methodist Hospital
Architect: PageSoutherlandPage
Consultant: Wiss, Janney Elstner Associates, Inc. & PSG Consultants
General Contractor: Austin Commercial, LP
Scope of Work: Modified Bitumen roofing system, reflective roof coating, sheet metal flashing, roof expansion joints, air and vapor barrier, membrane and metal flashing, window and curtainwall primary seals, masonry sealants, expansion joints
Project Description: Hospital and medical office building

Oncor Cool River – Dallas, TX
Remedial Roofing & Waterproofing
Contract Amount: $1,100,000 (approx.)
Owner: Oncor
Architect: Corgan Associates
General Contractor: JE Dunn Construction
Scope of Work: Remove existing roof system and install new APP 180 roofing, flashing and sheet metal, joint sealants, wet glazing, exterior cleaning, sidewalk and planter waterproofing, remove and replace pavers
Project Description: Eight story commercial office building

1133 Avenue G – Arlington, TX
Roof Replacement
Contract Amount: $100,000 (approx.)
Owner: Fantozzi LTD c/o David Petrick Company
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: Remove existing roofing system and install new TPO roofing and sheet metal
Project Description: Industrial office building

Dan Little Residence Hall Phase 2 – Oklahoma City, OK
New Construction Waterproofing
Contract Amount: $100,000 (approx.)
Owner: State of Oklahoma Department of Central Services
Architect: Architectural Design Group, Inc.
General Contractor: CMS Willowbrook
Scope of Work: Fluid-applied air barrier, joint sealants, expansion joint assemblies, water repellents, firestopping and sheet membrane waterproofing
Project Description: Additional dormitory at Oklahoma School of Science & Mathematics

Texas Rehab Hospital – Fort Worth, TX
New Construction Roofing & Waterproofing
Contract Amount: $300,000 (approx.)
Owner: Health Care REIT
Architect: Earl Swensson Associates, Inc.
General Contractor: Byrne Construction Services
Scope of Work: TPO roofing system, flashing and sheet metal, joint sealants, site sealants, water repellents, insulation and below-grade waterproofing
Project Description: Two story medical office facility

United States Courthouse – Austin, TX
New Construction Waterproofing
Contract Amount: $1,200,000 (approx.)
Owner: General Services Administration
Architect: Mack Scoggin Merrill Elam Architects
Consultant: Jim Whitten Roof Consultants
General Contractor: White Construction
Scope of Work: Below-grade cold fluid-applied waterproofing, dampproofing, above-grade terrace cold applied waterproofing, vapor barrier, pavers, ballast, sheet metal flashing, silicone sheet membrane flashing, joint sealants, fire sealants, security sealants, site sealants
Project Description: LEED Silver federal courthouse

Woman's Hospital – Baton Rouge, LA
New Construction Waterproofing
Contract Amount: $1,200,000 (approx.)
Owner: Woman's Hospital
Architect: HKS Architects
General Contractor: JE Dunn Construction
Scope of Work: Below-grade waterproofing, crystalline waterproofing, cavity wall sheathing joint treatment, air & moisture barrier, joint sealants, slab-on-grade sealants, dampproofing, horizontal paving & site sealants
Project Description: Medical complex with hospital, support services building and central plant

UCO Central Plaza – Edmond, OK
Remedial Waterproofing
Contract Amount: $50,000 (approx.)
Owner: University of Central Oklahoma
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: Cut out and recaulk exterior windows, PTAC units and concrete panel joints
Project Description: Student housing facility

Shell Technology Center – Houston, TX
Roof Replacement
Contract Amount: $950,000 (approx.)
Owner: Hines Interests Limited Partnership
Architect: Kirksey
Consultant: Building Exterior Solutions, LLC
General Contractor: Gilbane
Scope of Work: Remove existing roof system and install SBS modified roofing and sheet metal flashings
Project Description: Oil & gas research complex

G-Con Green Vax Facility – College Station, TX
New Construction Roofing & Waterproofing
Contract Amount: $650,000 (approx.)
Owner: G-Con Manufacturing, LLC
Architect: Beck Architecture
General Contractor: HC Beck, LTD
Scope of Work: TPO roofing system and sheet metal flashing, below-grade waterproofing, interior & exterior control joint sealants, cavity wall vapor barrier, metal through-wall flashing, interior & exterior expansion joints and fire sealant
Project Description: Vaccine manufacturing facility

SPECIALTY CONTRACTING SERVICES:

ROOFING/SHEET METAL
- BUR
- EPDM
- Modified Bitumen
- PVC/TPO Thermoplastic
- Metal standing seam
- Roof related sheet metal
- Gutters/downspouts

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
- Roof & waterproofing surveys
- Custom roof maintenance plans
- Maintenance budgeting assistance
- Service 24 hours/365 days a year
- Free estimates