WINTER 2010 CHAMBERLIN Roofing & Waterproofing NEWSLETTER

Effective Planning Sets Course for Successful Re-Roof at Houston's Intercontinental Airport

An expansive look at the 220,000 sq. ft. Terminal D re-roofing project in progress.

Working at an active international airport terminal can be a juggling act. With flights and travelers coming and going, keeping a productive work schedule can be a challenge for a less experienced contractor. Chamberlin has been working for the Houston Airport System for several decades on various waterproofing and roofing projects and knows what it takes to get the job done.

George Bush Intercontinental Airport Houston (IAH) is the city's largest airport. One of the airport's five terminals, Terminal D has 12 gates servicing passengers departing and arriving on several foreign carriers such as Air France, AeroMexico and British Airways. At the end of 2008, the former 20 year old SBS Modified Bitumen roof system above the terminal and airline gates had reached its service life. It had also sustained damage from Hurricane Ike, which turned small leaks into large ones.

Serving as the general contractor, Clark Construction called upon Chamberlin to re-roof the 220,000 sq. ft. airport terminal.

"Chamberlin was chosen because of their bid, but also because we had a good experience with them in the past at Hobby Airport and at the IAH Federal Inspections Building," said Clark Superintendent Matt Lewis.

(Continued pg. 2...see TERMINAL D)

CONSULTANT'S CORNER:

By: Jerry L. Abendroth RRO, RRC, CDT, CSI
Principal and President,
Building Exterior Solutions, LLC

Roof Uplift Testing: Know the Test Parameters and Use the Information Wisely

Factory Mutual (FM) Global Insurance Company recommends that field uplift testing be conducted for most adhered roofing systems in the hurricane prone regions of the United States and the Caribbean. Although this test procedure simulates the laboratory test, there is much controversy regarding the use of the test in the field and the variables which can affect test results.

(Continued pg. 2...see ROOF UPLIFT TESTING)

INSIDE this issue

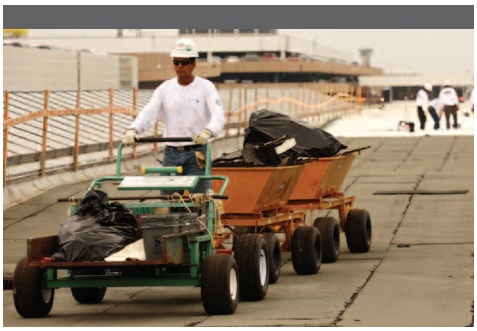
WWW.CHAMBERLINLTD.COM

(TERMINAL D Continued from pg. 1)

The scope of work included tearing off and removing the former roof system and installing a new Fibertite DuPont™ Elvaloy® KEE coated single-ply system along with associated sheet metal coping and counter flashing.

With so many airplanes arriving at and departing from the terminal, residual jet fuel had taken a toll on the previous roof system. Project architect PGAL chose the FiberTite KEE membrane because it holds up to the long term effects of jet fuel and other contaminants. The membrane is also ENERGY STAR rated.

Working on a busy, fully occupied building that is roughly the size of four football fields brings some challenges. Before Chamberlin began the tear off process, the roofing team carefully planned a safe and efficient trash removal procedure and designed a chute engineered to meet the airport's safety protocols. First, Chamberlin built ramps over telecommunication systems, pipes and expansion joints in order to utilize motorized towing vehicles carrying debris to the garbage chute. Behind the vehicle in a train car style were four-wheeled carts hauling the trash.



Fully loaded cart en route to garbage chute.

A 60 ft. tall, free standing garbage chute was engineered to handle 220,000 sq. ft. of demolished roofing material.

Second, a 60 ft. tall, free standing garbage chute was engineered to handle 220,000 sq. ft. of demolished roofing material. A special ramp was also created at the entrance to the chute so the motorized carts, which travelled in excess of one quarter of a mile, could pull up to the chute, dump the materials and go back for more. Additionally, a free standing stair tower was engineered and constructed adjacent to the garbage chute for worker access. Both structures were designed by Chamberlin to withstand hurricane force winds.

Once all procedures and processes were in place, the project schedule was set so airline operations were not interrupted by Chamberlin's work.

"For the most part, our work took place between 4:00 a.m. and 12:00 p.m.," said Chamberlin Senior Project Manager, Bill Lawson. "This helped to eliminate disturbances to travelers and airlines alike, and it kept the project moving ahead on a timely schedule."

Superintendent Yuber Espinal and General Superintendent Jerroul McMellon did a great job coordinating the installation of the roofing system and following through on the plan for safety and trash removal. The project even received a safety award from Clark Construction for achieving six months of work with no lost time accidents or recordable injuries.

Chamberlin worker unloading debris into the garbage chute.

In addition to the IAH Terminal D project, Chamberlin is currently working for the Houston Airport System on the interior and exterior renovation of Terminal C and its garages, Terminal A roof replacement, as well as the exterior renovation of the ticketing building and concourse at Hobby Airport.

(ROOF UPLIFT TESTING Continued from pg. 1)

Test Methods

FM Loss Prevention Data Sheet 1-52 (FM 1-52), "Field Uplift Tests," provides for two methods of testing wind uplift resistance: the negative pressure test and the bonded uplift test. The negative pressure test utilizes a five foot by five foot dome that is placed over the roofing membrane surface. Negative pressure is then applied to the dome starting at an initial pressure of 15 pounds per square foot (psf). The pressure is increased in increments of 7.5 psf with each increment held for one minute until 1.5 times the design test pressure is reached or failure occurs. A deflection bar positioned in the center of the chamber measures upward deflection of the roof membrane. This test is sometimes referred to as the "bubble test." In years past, the test was often conducted using a durable skylight dome. In recent years, test pressures have been increased substantially requiring the use of negative pressure domes constructed of stronger materials.

The FM negative pressure test is based, at least partly, on the American Society for Testing and Material's (ASTM) E907, "Standard Test Method for Field Testing Uplift Resistance of Adhered Membrane Roofing Systems." The two tests are similar however, there are some significant differences. FM recommends that the chamber be placed "between roof supporting beams or joists (where practical), except when testing roofs on pre-cast concrete roof decks, in which case locate the test site over the joints in the pre-cast concrete deck." ASTM E907 does not include placement in their test discussion, but they do indicate that roof surface stiffness may be influenced by the roof deck and framing stiffness.

(Continued pg. 4...see ROOF UPLIFT TESTING)

Chamberlin Receives Three New Project Awards from ABC

Pictured from left to right: John Kafka, General Partner; Miguel Lopez, Roofing Superintendent; Monica Keels, Marketing Manager and Bob Edwards, Roofing Senior Project Manager for the Memorial Hermann Hospital project.

Chamberlin has been honored with three awards from Associated Builders and Contractors (ABC) local Excellence in Construction Awards competition in Houston and North Texas, receiving two Excellence Awards and one Merit.

Chamberlin submitted two projects to the North Texas chapter awards competition. Both projects won Excellence awards. Children's Medical Center Legacy Campus competed in the "Specialty Construction Less than $1 Million" category. Chamberlin was hired by Austin Commercial to perform the waterproofing scope of work on the project. This new project consisted of a four story hospital, a four story Children's Ambulatory Care Pavilion, a central utility plant and an underground tunnel that connects the utility plant to the hospital. When work wrapped up on Children's Medical Center Legacy Campus in the fall of 2008, the new campus was not only watertight but was also ready to provide children a peaceful facility to get the medical attention they need.

Chamberlin also submitted the Texas Women's University (TWU) weatherproofing project into the "Renovation Less than $4 Million" category. TWU in Denton was originally established in 1901. Known as the largest public university for women in the United States, TWU has over 10,000 women enrolled in its undergraduate and graduate schools. Chamberlin was chosen as the general contractor by TWU to perform the exterior restoration of the Multipurpose Classroom and Laboratory building, Classroom and Faculty Office building and the Administration and Conference Tower. As part of this major renovation, Chamberlin focused on the exterior overhaul of the buildings.

Chamberlin also won a Merit Award at the ABC Greater Houston Chapter's competition for emergency roof repair work performed on Memorial Hermann Hospital's Medical Center campus after Hurricane Ike swept through the Houston area in September 2008. The five-building Memorial Hermann campus suffered significant damage to its Spanish tile and flat roofing systems. Over the course of three weeks Chamberlin worked to remove hazardous debris, stabilize existing roof systems and install temporary roofs on the Life Flight helipad, over the emergency room entrance and throughout the entire campus until permanent repairs could be made.

All project entries for the ABC awards competition were judged on a number of requirements including safety, ingenuity and quality. We are proud of these projects and of our recognition for excellence at the ABC competition year after year.

Pictured from left to right, back to front: Bryan Payne, Estimator; Andy Wharton, Project Manager; David Neal, Vice President; Artemio Sanchez, Superintendent for the Children's Medical Center project; Eddie Castillo, Superintendent for the DCCCD project; and Paul Watson, Superintendent for the TWU project.

(ROOF UPLIFT TESTING Continued from pg. 2)

Another notable difference between the FM and ASTM uplift test is that the FM 1-52 test requirements for allowable deflection are more restrictive than ASTM E907. When using FM 1-52 test, the maximum allowable roof surface deflections are one quarter of an inch for pressures to 60 psf and one half of an inch for pressures between 60 psf and 120 psf. Whereas, when using ASTM E907, a one inch deflection is allowable at any test pressure.

The FM 1-52 "Field Uplift Tests" also provides for testing by bonding to the roofing membrane surface to simulate negative pressure. The bonded uplift test utilizes two, two-foot by two-foot pieces of plywood connected to a tripod. The two pieces of plywood are fastened together and attached to the tripod with mechanical fasteners. The plywood is then adhered to the smooth roof surface with steep asphalt, cold adhesive or a material which is compatible with the roof system. After a curing period, the roofing membrane is cut at the perimeter of the plywood. The attached plywood/roof assembly is then attached to a scale/tripod assembly and upward force is applied in increments of 7.5 psf starting at 15 psf and held for one minute at each increment until 1.5 times the design pressure (or failure) is obtained.

Test Variables and Concerns

Major roofing contractor groups, such as the National Roofing Contractors Association (NRCA) and the Midwest Roofing Contractors Association (MRCA) have expressed concerns with the use of field uplift testing and have issued bulletins to their members regarding the use and significance of these types of tests. The NRCA has stated the following concerns utilizing wind uplift testing:

- Deck deflections of the magnitudes of the deflection limits allowed in 1-52 are common for metal roof decks given the high testing loads.
- Both the ASTM and FM test methods can be sensitive to test operators and yield variable results.
- Movement of persons around the test chamber can affect the test.
- Research has not been conducted to validate the field test method.

The NRCA recommends field uplift testing results be kept in proper perspective and FM 1-52, by itself, not be relied on as a quality assurance measure. The NRCA maintains that the best, most reliable means of assessing the quality of a newly installed roof system is through continuous observation of the application by a knowledgeable roofing professional at the time of installation.

Changes to FM 1-52

The most recent version of FM 1-52, issued in April of 2009, includes several significant changes. The most significant change is that the test is currently not recommended for new roof systems which are mechanically attached to certain roof deck types provided the roof fastener spacing is adequate. These roof deck types are steel (minimum 22 gauge), wood, cementitious wood fiber plank, and structural concrete (minimum 2,500 psi).

Negative pressure test or "bubble test."

Inspection of the roof system after test failure.

Another modification provided in the April 2009 FM 1-52 is to increase the allowable deflection for metal decks. For wide rib steel decks where the test pressure exceeds 60 psf, FM now allows an additional one quarter of an inch deflection for each 60 psf increment of testing. If an intermediate or narrow rib deck is used, FM now allows thedeflection to be twice the previous limit up to a maximum of one inch deflection.

In addition, FM recommends that all roof top observers who are not directly involved with the test equipment should not stand directly adjacent to the test area during testing. Other changes to the standard include guidance for those conducting testing on how to interpret the results.

Examples of Field Uplift Testing Versus Actual Performance

During recent hurricane observations and investigations, several testing agencies used wind uplift testing to determine the viability of existing roof systems.

(Continued pg. 5...see ROOF UPLIFT TESTING)

Dallas County Community College District Earns More Recognition for Chamberlin

Pictured from left to right: Bryan Payne, Estimator; Andy Wharton, Project Manager and David Neal, Vice President.

Chamberlin's scope of work on the Dallas County Community College District's office involved the complete restoration of the building's exterior, interior and roof.

Dallas County Community College District (DCCCD) is one of Chamberlin's most decorated projects to date. Not only did it take home a North Texas Associated Builders and Contractors (ABC) Excellence Award last year, but it also won a National ABC Eagle Award. This year DCCCD has gone on to take home three more awards.

DCCCD recently won the International Concrete Repair Institute's (ICRI) Outstanding Concrete Repair Merit Award in the "Historic Structures" category. Project Manager Andy Wharton accepted the award on Chamberlin's behalf at ICRI's Annual Convention in Tempe, Arizona. Winning ICRI projects follow strict guidelines and demonstrate certain qualities including project uniqueness, use of state-of-the-art methods and materials, functionality, value engineering and aesthetics.

DCCCD also took home the *Texas Construction* magazine's Best of 2009 Award. *Texas Construction* magazine hosts an annual awards competition that recognizes commercial construction firms across the state of Texas and Oklahoma. This year, with over 150 nominated projects, Chamberlin won the Best of 2009 Award for Specialty Contracting. Projects were awarded based on safety, innovation, contribution to the community or industry, construction quality, craftsmanship, function and aesthetic quality of design. All entries were sorted by project type and each category had one "Best of" award winner.

In addition, Chamberlin submitted the DCCCD project to AGC's North Texas Summit Awards and won the Outstanding Project award in the "Masonry" category. This was Chamberlin's first time to submit a project in this award competition.

To date, Dallas County Community College District has received five awards. Chamberlin looks forward to cranking out more top-notch projects in the coming years.

(ROOF UPLIFT TESTING Continued from pg. 4)

In one such instance testing was conducted on a 25 to 30 year old roof system which had been mopped directly to lightweight insulating concrete. The roof system withstood the hurricane with little ballast displacement and little water penetration into the building; however, it could not pass the FM 1-52 test. Therefore, while it did not meet the FM 1-52 deflection criteria, it was able to endure a hurricane with minimal damage to the roofing system.

In another example, a 25 year old built-up roof system which had a partial blow-off during a hurricane event was tested to FM 1-90 wind uplift criteria. The roof consisted of a 3-ply built-up system over tapered perilite insulation. All layers had been mopped in steep asphalt. The remaining sections of the roof system passed the FM 1-52 test even after adjacent sections of the roofing system had blown off during the hurricane.

Roof Uplift Testing – Evaluation

As with any testing, field uplift tests must be conducted in a manner which follows the parameters set forth in the test protocol. However, when performing the testing and after the results are obtained, common sense must be used in the selection of the test areas, performance of the testing, and in the interpretation and use of the results. The specifications for new roof systems should include the type of testing, test information, test pressures and any other relevant information so that the contractor can plan for installation of a successful roofing system. Roof monitoring during construction is an important element of a successful roofing installation. However, despite concerns and difficulties, field uplift testing is a viable tool to help determine a roof system's ability to withstand potential wind events.

Mr. Abendroth joined Building Exterior Solutions, LLC in September 2008. Mr. Abendroth has been primarily involved with the evaluation and design of roofing, waterproofing and curtain wall systems. He has also managed consulting services on buildings for the MD Anderson Cancer Center at the Texas Medical Center and managed design services for three re-roofing projects for NASA at the Johnson Space Center, both in Houston. Services included design and design review, mock-up design and testing, and construction administration and observation. He can be reached at 713-467-9840 or jabendroth@buildingexteriorsolutions.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

Also licensed in Arkansas and Louisiana

Devon Energy World Headquarters Parking Garage – Oklahoma City, OK
New Construction Waterproofing
Contract Amount: $1,600,000 (approx.)
Owner: Devon Energy World Headquarters
Architect: Kendall/Heaton Assoc., Inc.
General Contractor: Holder Construction
Scope of Work: Split slab waterproofing, expansion joints, vertical waterproofing, horizontal waterproofing, deck coating, repellents and sealants
Project Description: 10 story parking garage

Discovery Tower – Houston, TX
New Construction Roofing & Waterproofing
Contract Amount: $1,400,000 (approx.)
Owner: Trammell Crow Company
Architect: Gensler Architects
Consultant: Michael Hardin & Associates
General Contractor: Gilbane Building Company
Scope of Work: TPO roofing system and sheet metal, below-grade sheet waterproofing, temporary deck coating, dampproofing, expansion joints, metal flashing, membrane flashing, joint sealants, crystalline waterproofing and epoxy joint filler
Project Description: High rise office building

Texas Christian University Milton Daniel Hall – Fort Worth, TX
Remedial Waterproofing
Contract Amount: $75,000 (approx.)
Owner: Texas Christian University
Architect: KSQ
General Contractor: Beck
Scope of Work: Water repellent, dampproofing, flashing, sheet waterproofing, traffic topping, joint sealants and elastomeric coating
Project Description: Residence hall

Annette Caldwell Simmons Hall – Dallas, TX
New Construction Roofing
Contract Amount: $270,000 (approx.)
Owner: Southern Methodist University
Architect: Hahnfeld Hoffer Stanford
General Contractor: Rogers O'Brien
Scope of Work: Slate and Modified Bitumen roofing systems with copper gutters and downspouts
Project Description: Southern Methodist University School of Education and Human Development

Los Corales Condominiums at The Shores – South Padre Island, TX
New Construction Waterproofing
Contract Amount: $400,000 (approx.)
Owner: Paga Desarollos
Architect: Landry Architecture, LLC
Consultant: Water Management Consultants and Testing, Inc.
General Contractor: SPI Construction II, LLC
Scope of Work: Split slab waterproofing, peel-and-stick flashing and joint sealants
Project Description: Twin 12 story beachfront condominiums

University of Texas MD Anderson Cancer Center Mid Campus Building One – Houston, TX
New Construction Roofing & Waterproofing
Contract Amount: $2,400,000 (approx.)
Owner: University of Texas MD Anderson
Architect: WHR Architects
Consultant: Zero Six Consulting
General Contractor: Vaughn Construction
Scope of Work: APP Modified Bitumen roofing system and sheet metal, below-grade waterproofing, horizontal waterproofing and precast concrete joint sealants
Project Description: Administrative support building

Briscoe Western Art Museum – San Antonio, TX
Remedial Waterproofing
Contract Amount: $200,000 (approx.)
Owner: National Western Art Foundation
Architect: Lake | Flato Architects
Consultant: Wiss, Janney, Elstner Associates, Inc.
General Contractor: Zachry Construction Corporation
Scope of Work: Below-grade waterproofing and masonry restoration
Project Description: Restoration and repurposing of 1930s Carnegie Library

Tarleton State University – Stephenville, TX
New Construction Roofing
Contract Amount: $200,000 (approx.)
Owner: Texas A&M University System
Architect: Randall Scott Architects
General Contractor: Thomas S. Byrne
Scope of Work: Single-ply TPO and standing seam roofing systems and sheet metal
Project Description: Nursing facility

Cleveland County Justice Center – Norman, OK
New Construction Waterproofing
Contract Amount: $200,000 (approx.)
Owner: Cleveland County Justice Authority
Architect: Architects in Partnership, P.C.
General Contractor: Timberlake Construction Co., Inc.
Scope of Work: Joint sealants, security sealants, air barrier, firestoppping and concrete floor sealer
Project Description: 542 bed detention center

Methodist Outpatient Care Center – Houston, TX
New Construction Waterproofing
Contract Amount: $1,300,000 (approx.)
Owner: The Methodist Hospital System
Architect: WHR Architects
Consultant: Broaddus & Associates
General Contractor: Hensel Phelps Construction Company
Scope of Work: Below-grade waterproofing, hot-applied waterproofing, deck coating, precast concrete joint sealants, stone joint sealants, plaster caulking, fountain waterproofing, air & vapor barrier, expansion joints and sealers
Project Description: 1,600,000 sq. ft. outpatient hospital

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