Zero/Six

BEYOND THE EXTERIOR

June 2018

A MESSAGE FROM OUR CEO: CELEBRATING 15 YEARS (SEE PAGE 4)

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WE NOW EMPLOY AROUND 30 FOLKS WITH A WIDE RANGE OF SKILL SETS AND PERFORM WORK ALL OVER THE COUNTRY

> AN UNEXPLAINABLE KNACK FOR LANDING QUALITY PEOPLE & CLIENTS HAS DELIVERED SOME GOOD FORTUNE TO ZERO/SIX OVER THE LAST 15 YEARS

15 YEARS

A MESSAGE FROM OUR CEO

WORDS: MR. BILL COLTZER JR., AIA

Zero/Six was born on March 16, 2003 in my garage in Galveston, Texas. At the time, we had one client (my former employer – I mean like March 15 former) that had hired me on a sub-contract basis to finish up a job with the University of Texas at the MD Anderson Cancer Center. During this time, it was not even called Zero/Six; the plan was to call it ProgramWorx, but that name was shot down by my lawyer uncle. When pushed for a new name, late one night, I proclaimed, "ZERO/SIX!" My uncle said, "What the hell," and then proceeded with the paperwork. We actually had a check made payable to Zero/Six before we had a charter to open a bank account.

When clients (that I had managed) learned of my departure from my previous firm, what I thought would be chastising turned out to be, "Really, now you can work for us direct?" Yes, Ken Byrd, I can. We quickly grew to three employees (counting my dad/estimator/banker) and we raised the sign on our first office within the first few months; yes, the first office was a trailer.

An unexplainable knack for landing quality people and clients has delivered some good fortune to Zero/Six over the last fifteen years. We now employ around 30 folks with a wide range of skill sets, have satellite locations in four cities, and perform work all across the country.

I know it is wrong to love inanimate things so, let's just say, I love the folks that helped me grow Zero/Six and those special folks that are still on the ride today.

Thanks for letting me drive.

PRAIRIE VIEW A&M UNIVERSITY COLLEGE OF NURSING

Established in 1918, the Prairie View A&M University College of Nursing moved to their current location in the medical center in 1983 and became a participating member of 42 institutions supporting the Texas Medical Center's operation. The initial building at this location was demolished and a new state-of-the-art, 12-story building was constructed in 2005. Zero/Six performed an evaluation of the building's exterior envelope in light of water infiltration experienced during Hurricane Harvey. Zero/Six conducted a forensic investigation via rope access to provide a thorough review of the building envelope, utilizing infrared photography and performing diagnostic water testing per AAMA 501.2 at selected exterior transitions and glazing interfaces. The team also reviewed architectural drawings made available by the University to consider underlying conditions.

Owner	Texas A&M University
Client	SSC Services for Education
Architect	Watkins Hamilton Ross
Location	Houston, TX
Type	Forensic
Scope of Work	Exterior Envelope Forensic Assessment, Thermal Imaging, Humidity Survey of Interior Spaces, and Diagnostic Nozzle Water Testing per AAMA 501.2.

HARRIS COUNTY CRIMINAL JUSTICE CENTER

The 21-story Harris County Criminal Justice Center was constructed in 1999 and is the largest of its kind in the United States. The building has been completely shut down due to significant damage from water infiltration during Hurricane Harvey. Through on-site discussions with our client and building personnel, we discovered that water infiltration occurred through penetrations in the basement level, a missing flood gate on level one and various locations of the exterior envelope. Zero/Six performed an extensive evaluation of the building's façade, utilizing rope access equipment and a boom lift to determine the causation of water infiltration and assess the life cycle of envelope related components.

Owner	Harris County
Architect / Client	PGAL
Contractor	Manhattan Construction
Location	Houston, TX
Type	Restoration and Mitigation
Scale	788,000 SF
Scope of Work	Exterior Envelope Forensic Assessment and Diagnostic Nozzle Water Testing per AAMA 501.2

HEDWIG PLACE

Hedwig Place will be a 102,474-square-foot, five-story, Class A medical office building located in Hedwig Village, an affluent, independent municipality of Houston's booming west side. Developed by Stream Realty Partners and AMD Global, Hedwig Place is situated on two acres in the heart of Memorial Villages, three miles from Memorial Hermann Memorial City Medical Center and within minutes of Houston's popular Uptown District. The development broke ground 65 percent preleased with anchor tenants Memorial Plastic Surgery and Texas Ear, Nose and Throat Specialists. Zero/Six's scope of work will encompass a variety of envelope services throughout the design, construction and commissioning phases including, preliminary construction documents, submittal, and RFI reviews, focusing on the weather resistance and constructibility of the exterior envelope. During construction, we will conduct on-site quality control observations at critical envelope component installations.

Owner / Client	Stream Realty Partners (Rendering provided by Stream Realty Partners)
Architect	E4H Environments for Health
Civil	Jones & Carter
Location	Houston, TX
Type	New Construction
Scale	102,474 SF
Status	Q1 2019
Scope of Work	Drawing Review and On-site QA/QC and Reporting.

Photo Info : Lack of adequate slope (minimum ¼" per foot) causing ponding which destroys the membrane

WORDS: MR. JEFF BISHOP, P.E., LEED GREEN ASSOCIATE

LESSONS LEARNED AT RCI : PONDING INSTABILITY

Many interesting and important building envelope issues were discussed in the educational seminars at the recent RCI International Convention and Trade Show in Houston this March. Dr. Stephen L. Patterson, RRC, PE with Roof Technical Services Inc., and Dr. Madan Mehta, PhD, PE with the University of Texas at Arlington inspired us with their presentation on roof drainage design, roof collapses, and the related codes. At Zero/Six Consulting, we regularly work on re-roofing projects, where the issues being discussed in this seminar prove especially relevant. We believe any and all life safety concerns should be studied and simplified as much as possible. A safe, streamlined process for analysis that is understood by all is required to ensure the risk of catastrophic failure is minimized.

Controlling a situation, rather than responding to it, is the key to this process. Ponding on low-slope roofs is a life-safety hazard that can be anticipated and mitigated with proper analysis. An issue that has been observed in the AEC community is the building code doesn't clearly address the roof drainage situation for existing buildings. The different disciplines involved in dealing with roof drainage is another issue. Architects, engineers, pluming consultants, and roofing contractors are all obligated to ensure the structure can handle the worst-case-scenario for rain loads. My opinion, as an engineer, is the engineer takes the lead and becomes

A SAFE, STREAMLINED PROCESS FOR ANALYSIS THAT IS UNDERSTOOD BY ALL IS REQUIRED TO ENSURE THE RISK OF CATASTROPHIC FAILURE IS MINIMIZED

Photo Info : Scupper roofed over creating a birds nest

responsible for the final roof drainage design. The engineer is understandably focused on structural design, but simply getting the rain load from the architect or plumbing consultant does not adequately address the potential issues. The structural engineer should likewise engage with the architect to ensure roof slopes will properly collect water at the primary drains. In the case of a primary drain backup, the overflow design handles water without ponding. Finally, coordination with the plumbing contractor is necessary to ensure the roof drain size and height will be set properly, and the conductors are designed and installed to be fully independent from primary drains to superintend rain to the overflow as required.

ADEQUATE DRAINAGE

The most important factor in preventing ponding on the roof is providing adequate slope to quickly and efficiently get water to the primary and overflow drainage. The newer building codes require one quarter inch per foot of slope and define those areas without adequate slope as "susceptible bays". Susceptible bays include areas where water is impounded - when the secondary drainage system is functional while the primary drainage system is blocked.

Progressive deflection or instability are worst case scenarios preventable with adequate drainage.

Two basic outcomes can occur with flexible roof supports and inadequate slope:

1. as ponding water gains depth and weight, it causes deflection in an area, which means an even greater water thickness will result. This progressive deflection will continue to expand until the ultimate bearing capacity is reached and the roof collapses;

2. if there is adequate stiffness, equilibrium will occur, and the deflection fails to increase and ponding maintains a constant depth while draining, which protects against progressive deflection and instability.

The orientation of joist members must be considered with different roof geometries and drainage options. The depth of water as it collects around the low areas on its way to primary and overflow drainage will increase the rain load in that area. Therefore, it is best to orient joists parallel to the drainage path so the highest rain loads are dispersed across multiple members at the lowest areas. Joist orientation isn't typically considered when designing roof slope and drainage, but if the engineer takes responsibility for coordinating with architects, it is more likely to be incorporated into the design.

OVERFLOW SCUPPERS VS. DRAINS

When designing for secondary (emergency) drainage, otherwise known as overflow drainage, typically the geometry and design of the primary drainage system drives the overflow design.

If cost is a consideration, scuppers are preferred versus overflow drains due to an increase in plumbing costs to discharge the overflow to an end point separate from the primary system. Section 1108 of the International Plumbing Code (IPC) also requires all overflow to be discharged to a location above grade that would be observed by building occupants or maintenance personnel. This is to alert all parties the primary system has backed up or become clogged, and the overflow drain now has to manage the water. With larger areas and bigger drains, it is a common mistake to create a sump for both drains with a hydraulic head that ends up being higher than the overflow collar. This arrangement can cause the overflow to activate during regular rain events without the primary drains being backed up creating staining on the walls. This also defeats the purpose of the visible discharge for the secondary drainage system because it's now unclear if it's activated due to the sump design or a primary system backup.

WHEN DESIGNING FOR SECONDARY (EMERGENCY) DRAINAGE, OTHERWISE KNOWN AS OVERFLOW DRAINAGE, TYPICALLY THE GEOMETRY AND DESIGN OF THE PRIMARY DRAINAGE SYSTEM DRIVES THE OVERFLOW DESIGN


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NEW VS. EXISTING ROOFS

While new buildings provide roof drainage challenges of their own, factoring in proper analysis of rain loads during the design phase will result in roof members designed to carry the anticipated loads. For re-roofing and evaluating existing buildings, this analysis is often overlooked and can quickly become a public safety hazard. Many older buildings were either built without overflow drainage or have inadequate overflow capacity due to code requirements and guidance at the time being unclear.

Rain loads may or may not have been properly accounted for with existing buildings. The guidance for calculating rain loads when sizing roof members has been in ASCE 7 since its beginning in 1988, but it may not have been considered or used properly. An often-overlooked issue with existing building roofs is a false sense of security can result based on how the roof has performed so far. The assumption is - since the roof hasn't collapsed over the past several years of heavy rains, surely the roof structure is adequately designed to hold roof loads. The problem with making this assumption is the roof may not have had issues with any primary drain backups to this point. If the overflow drainage isn't properly designed, all it takes is a "perfect storm" of primary drains collecting excessive debris, clogging or backing up, or having inadequate overflow drainage.

Some older versions of the building code adequately addressed the need for re-roofs to create adequate roof slope and analyze structural stability for rain loads. For example, in 1988, the Uniform

1. Photo Info : Lack of adequate slope (minimum ¼" per foot) causing ponding which destroys the membrane
2. Photo Info : Areas without ¼" per foot slope causing ponding
3. Photo Info : Overflow scupper has been roofed over
4. Photo Info : Lack of adequate slope (minimum ¼" per foot) causing ponding which destroys the membrane

FACTORING IN PROPER ANALYSIS OF RAIN LOADS DURING THE DESIGN PHASE WILL RESULT IN ROOF MEMBRANES DESIGNED TO CARRY THE ANTICIPATED LOAD

Building Code (UBC) required re-roofing to conform to the roof drainage design for new roofs. This includes minimum one-quarter inch per foot slope and guidance for minimum overflow drains and scuppers that will adequately drain the roof in case of primary drain backup. This same 1988 UBC also includes a requirement for an initial inspection from a building official where the official inspects the roof prior to roofing to determine if any evidence of extensive ponding is apparent. The note for this requirement adds that if extensive ponding of water is apparent, an analysis is made of the roof structure and the appropriate corrective measures are undertaken. These may include relocation of roof drains and scuppers, re-sloping the roof, or structural changes..

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Unfortunately, these requirements were relaxed in the most recent building code for existing buildings. In the International Building Code (IBC) and the International Existing Building Code (IEBC) 2015, there is an exception for re-roofs which changes the requirement to "positive roof drainage" rather than the one-quarter inch per foot minimum slope. The issue with this change is positive roof drainage is defined as "the drainage condition in which consideration has been made for all loading deflections of the roof deck, and additional slope has been provided to ensure drainage of roof within 48 hours of precipitation." There are a few problems with this type of imprecise requirement; even if the roof meets this definition, it could still be prone to ponding instability without adequate slope to the drains and overflow.

The new code requirements have also relaxed the prerequisite for overflow drainage to be added to existing buildings. There is an exception in the IBC 2015 (but not the IEBC 2015) for re-roofing that says recovers or re-roofs on existing buildings aren't required to meet the requirement for overflow drains. This is exactly the recipe for catastrophic disaster as it is assuming roof performance will continue as constructed, with or without overflow design. This can be dangerous as it only takes one primary drain to become blocked with debris, without any overflow, to create roof ponding instability due to excessive rain loads. For example, without the primary drain functioning during a rain event; it's possible for 12" of water depth to accumulate in a roof area. Twelve inches of standing water translates into 62.4 psf of load. The roof members may have been designed to

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resist excessive deflection and stress at a 20 psf total live load. This additional load of 3 times more than what the roof members were designed to hold can lead to runaway deflection (deflection causing more ponding depth and rain load) and catastrophic failure.

CURRENT BUILDING CODE

For new construction, the IBC and IPC 2015 handles roof slope, drain leader and conductor sizing, and overflow requirements adequately, but remains vague on rain load calculations found in Section 1611. The roof slope is generally required to be a minimum of one-quarter inch per foot as previously defined. The drain leader and conductor sizing is handled in IPC Section 1106, where tables can be found that provide the maximum flow that can be handled by various sized pipe and gutters. Overflow requirements are discussed in Section 1503.4 of the IBC 2015, where the secondary drains or scuppers are required to comply with IPC Sections 1106 and 1108. These sections all require the secondary roof drainage be designed to prevent the depth of ponding water from exceeding that for which the roof was designed for in the event primary drains allow buildup for any reason.

Rain loads are handled in the ASCE 7-16 Minimum Design Loads for Buildings, chapter 8 and C8. Rain loads are calculated using a process which begins with the rainfall intensity, defined as i. An important difference from the IPC 2015 is commentary

PROVIDING A SYSTEMATIC STUDY OF EXISTING BUILDINGS IS A GREAT IDEA TO RAPIDLY ASSESS MULTIPLE FLAT ROOFS AND PROVIDE AN ASSESSMENT OF THE PONDING INSTABILITY

in ASCE 7-16 Chapter C8, where it suggests using the 15-minute duration/100-year instead of the 1-hour duration storm for roof overflow drain design. This is due to the fact that the 15-minute duration, when converted to inches per hour for i, equates to nearly double the intensity (For Galveston, i = 4.6 inches/hour for 1-hour duration, and i = 8.0 inches/hour for 15-min duration). Anyone familiar with the heavy, short duration storms that frequently occur along the gulf coast in South East Texas can understand why it makes sense to use this higher rainfall rate that can occur within a shorter amount of time.

The next step is to take the tributary area of the overflow drain being analyzed and multiply it by this rainfall intensity with the appropriate empirical factor in Equation C8.3-1, Q = 0.0104Ai. With the flow rate needed to drain this area, the tables in this C8.3 chapter are then used to calculate the hydraulic head for any type of

1. Photo Info : Lack of adequate slope (minimum ¼" per foot) causing ponding which destroys the membrane

2. Photo Info : Roof collapse - SJI Technical Digest 3

overflow scuppers or drains.

Finally, using the calculated static head, dh (the depth above the primary drain to the overflow) and Equation 8.3-1, R = 5.2(ds+dh) the design rain load, R is established, This design rain load R can be combined with other loads to properly design the structural members.

OVERSEAS

In Europe, studies have been carried out that reveal that ponding instability is an issue there as well. In the Netherlands, about 20 flat roofs collapse every year from heavy rain showers causing ponding on roofs. The government there has taken action, with a supplement to the NEN 6702 building code (NPR 6703) to simplify the calculations and make a ponding assessment on flat roofs.

Consulting engineering firms were engaged and all municipal buildings open to the public were assessed. The roofs were inspected and the relevant characteristics were reported on, then if necessary calculations were performed to ensure the roof meets the requirements to properly drain rainwater. For flat roofs assessed, 130 of the 231 roofs didn't comply, and had emergency overflow drains placed to prevent ponding.

Providing a systematic study of existing buildings is a great idea to rapidly assess multiple flat roofs and provide an assessment of the ponding instability. Since it is a life safety issue as well as a huge cost when a roof collapses due to ponding instability, this method could be employed on a state-wide level in America beginning with public buildings as well.

CONCLUSION

The code commentary in IBC 2015 continues to give valuable information on ponding instability in C8.4, which includes references to many other standards and studies for additional direction on rain load analysis.

A great resource is the Structural Joist Institute (SJI) Technical Digest 3, updated in February of 2018. This document summarizes all the different code previsions for ponding and assists with roof design for joist to properly handle the rain loads. SJI has created an in-depth Excel file which can be used to double check calculations for the roof joists as well.

Our hats are off to Dr. Patterson, Dr. Mehta and others who understand and educate others on the vital importance of proper design in regard to roof drainage. Though catastrophic roof failures are rare, the associated consequences on your building or a building you may occupy should force this topic to the forefront of any acceptable building design.

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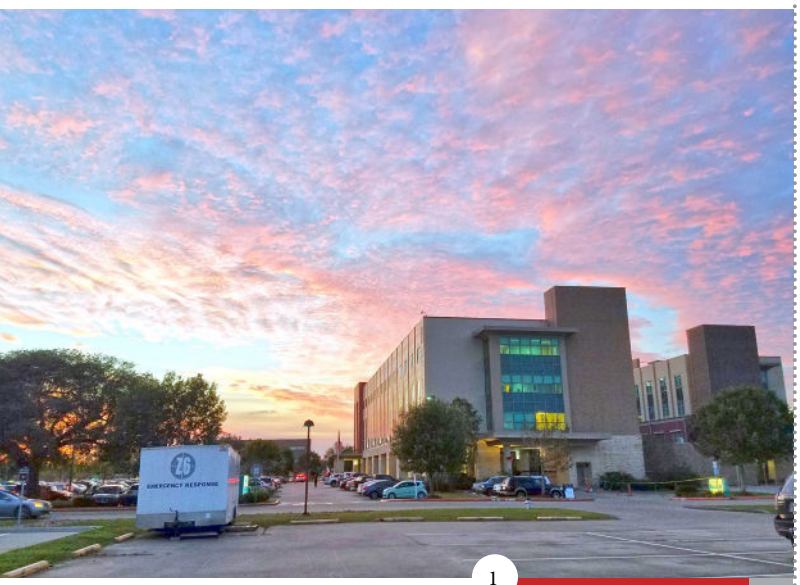
DISASTER RECOVERY

BAPTIST HOSPITALS OF SOUTHEAST TEXAS

WITHIN DAYS OF HURRICANE HARVEY MAKING LANDFALL, ZERO/SIX WAS ON-SITE TO BEGIN EVALUATING 16 BUILDINGS



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Baptist Hospitals of Southeast Texas (BHSET) are community-owned, not-for-profit facilities located in an area known as the golden triangle of East Texas (Beaumont, Port Arthur, and Orange). BHSET facilities include more than 16 separate buildings/campuses that date back to 1957 and contain over 587,000-square-feet of roof area. The 50 inches of rainfall experienced at BHSET facilities during Hurricane Harvey was in excess of even the current day design standards for rainfall. As a result, many of the components of the building envelope at BHSET, particularly the older systems, were overwhelmed by the intense rainfall, causing water infiltration to damage interior finishes, and in some cases, damage the exterior systems themselves (such as the roofs).

Within days of Hurricane Harvey making landfall, Zero/Six was on-site to begin evaluating 16 buildings/infrastructures across all three of BHSET's Beaumont, Orange, and Silsbee campuses. During our post-disaster building assessments, the hospital system was not in operation, having to evacuate almost 200 patients after the local water supply failed because of flooding from the hurricane. The damage was so severe, the Army National Guard was deployed to render aide to the surrounding communities. BHSET provided housing in the hospital for Zero/Six staff so we could effectively and quickly conduct our evaluation and provide immediate corrective action to prevent further damage and increase the lifespan of the facilities. Through visual inspections of each building asset, Zero/Six generated data that assisted in establishing a replacement value of each system, comparing the systems expected lifespan to


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1. Photo Info : Trinity Tower, Beaumont Campus
2. Photo Info : Trinity Tower, Beaumont Campus
3. Photo Info : 810 Medical Office Building, Beaumont Campus
4. Photo Info : Trinity Tower, Beaumont Campus
5. Photo Info : 3570 Southeast Texas Medical Associates, L.L.P Building


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its observed remaining life and estimating the cost to renew the affected system impacted by the hurricane. Zero/Six interviewed key facility managers at BHSET, profiled the building's type, age, and condition and developed a repair action program for each major system. Areas of observation included, but were not limited to: roof leakage, air quality and condition issues, electrical and lighting issues, window glazing, and maintenance of the building. Zero/Six then categorized the buildings to more easily quantify the estimated costs and prioritize repairs. A final assessment report was assembled and produced for submission to the Federal Emergency Management Agency (FEMA) on behalf of BHSET outlining our recommendations for the best path forward in remediation.

> ZERO/SIX INTERVIEWED KEY FACILITY MANAGERS, PROFILED THE TYPE, AGE, AND CONDITION AND DEVELOPED A REPAIR ACTION PROGRAM


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Houston History

The Zero/Six team enjoyed a private tour organized by CSI Houston of the Buffalo Bayou Park Cistern. The Cistern is a former drinking water reservoir built in 1926 for the City of Houston and was used as a 15 million gallon water reservoir until the early 2000s. An irreparable leak was discovered and the reservoir was decommissioned in 2007. The historically and architecturally significant site has been reopened to house temporary art installations.

Easter Eggstravaganza 2018

Hip. Hop. Play. The Zero/Six team enjoyed our Annual Easter Eggstravaganza at the Z6 office on Good Friday. Click here for more photos of the festivities.

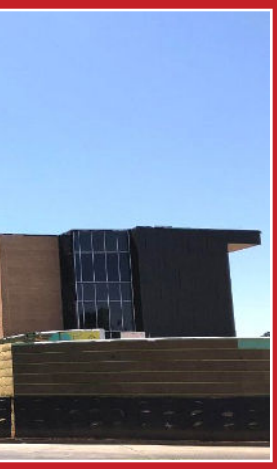
Welcome to the Team

Welcome to the Zero/Six team, Hung Phan! Mr. Phan joined our team this month as a Senior Designer / 3D Specialist and we want to give him a warm welcome! He brings over 25 years of experience with Building Information Modeling, advanced rendering techniques, isometric piping design, and structural design practices. He received a Bachelor of Architecture from the University of Houston.

ZERO/SIX OUT&ABOUT

▲ Science on Display

Z6 Commissioning provided ISO-accredited envelope testing to verify each envelope product, system, and installed components met the appropriate standard for The University of Texas at Arlington's Science and Engineering Innovation Research (SEIR) building. This effort began with pre-functional mock-up testing and then expanded into field testing which included, High Voltage Electronic Leak Detection, Roof Uplift testing, and Water and Air Leakage testing.

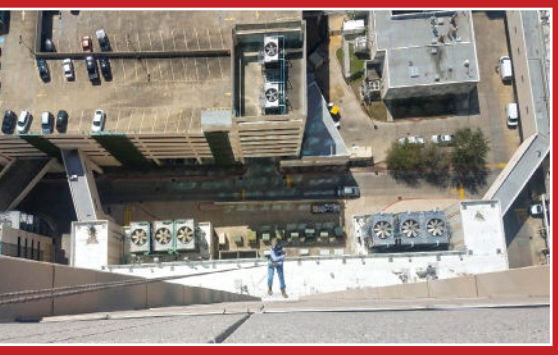


◄ Quality Assurance

The team conducted drawing reviews at three stages, as well as submittal and RFI reviews for UT Tyler's new College of Business and Technology Building. Additionally, Zero/Six is providing QA/QC inspections and overseeing performance testing of fenestrations and roofing systems provided by Z6 Commissioning.

On-site with Zero/Six ►

The Zero/Six team was on a site visit to observe construction at The University of Texas at Dallas's Engineering Building. Zero/Six's scope of work encompasses a variety of envelope services throughout the design, construction and commissioning phases, including review of construction documents at three stages, QA/QC inspections, pre-functional testing on field mock-ups, and performance testing once completed.



◄ Forensic Architecture

Forensic Supervisor Russell Hargett conducted a building envelope inspection via rope access from Levels 1-27 for the Memorial Hermann Tower to satisfy the requirements of the prescribed annual maintenance protocol.

HAVE A LOOK INTO YOUR FUTURE...

JOIN OUR ZERO/SIX TEAM

CURRENT OPPORTUNITIES

BUILDING ENVELOPE CONSULTANTS – THROUGHOUT TEXAS

PRIMARY RESPONSIBILITIES:

- Critical evaluation of building envelope performance.
- Resolving complex building envelope issues, including evaluating existing design.
- Inspect work in progress related to the exterior building envelope. Inspections will require climbing and operation of access equipment (i.e. swing stages) on high rise structures.
- Organizing field data to facilitate analysis and problem solving.
- Management of client services, communicating progress, reporting, technical discussion of findings, recommendations, and project close-out.
- Scheduling and implementation of project needs.
- Attending project meetings, including leading meetings.
- Business development

CANDIDATE MUST HAVE THE FOLLOWING SKILL REQUIREMENTS:

- Strong expertise in the building envelope, including building materials, glazing systems; insulation and air barriers; cladding assemblies; roofing; and waterproofing systems.
- Experience in various building envelope related test methods.
- Knowledge and experience in field quality control and investigation methods.
- Ability to work on-site and to also travel which may include overnight travel.
- Experience managing projects and project teams of varying sizes.
- A mature professional with excellent written and verbal skills.
- Scheduling and implementation of project needs.
- Bachelor degree in Architecture, Engineering, Construction Science or similar degree preferred.
- Minimum 5 years' experience with site investigations, project management and construction monitoring of commercial roofing/building envelope and waterproofing projects.
- Minimum 10 years' experience in the roofing/waterproofing industry.

COMPENSATION: Base salary is commensurate with experience and licensure.

JOB TYPE: Full-time

LEAD / TECHNICAL ARCHITECT – GALVESTON, TX

CANDIDATE MUST HAVE THE FOLLOWING SKILL REQUIREMENTS:

- Five to ten years' experience in the preparation of technical drawings related to the exterior building envelope.
- Construction experience related to the exterior building envelope (not tenant build-out experience).
- Currently licensed in the State of Texas (licensure in other Gulf Coast states is a plus).
- Proficiency in AutoCAD and Microsoft Office Suite applications, including MS Word, Excel, Publisher, and PowerPoint. Must be willing/capable to become proficient in AutoCAD 3D and BIM related software such as REVIT.
- Team player with above average communication skills and a dispute resolution mindset.
- Must be equally comfortable at job site and boardroom settings.
- Physically fit and without fear of heights (appropriate training will be provided).

REQUIRED EDUCATION: Bachelor's or Master's degree

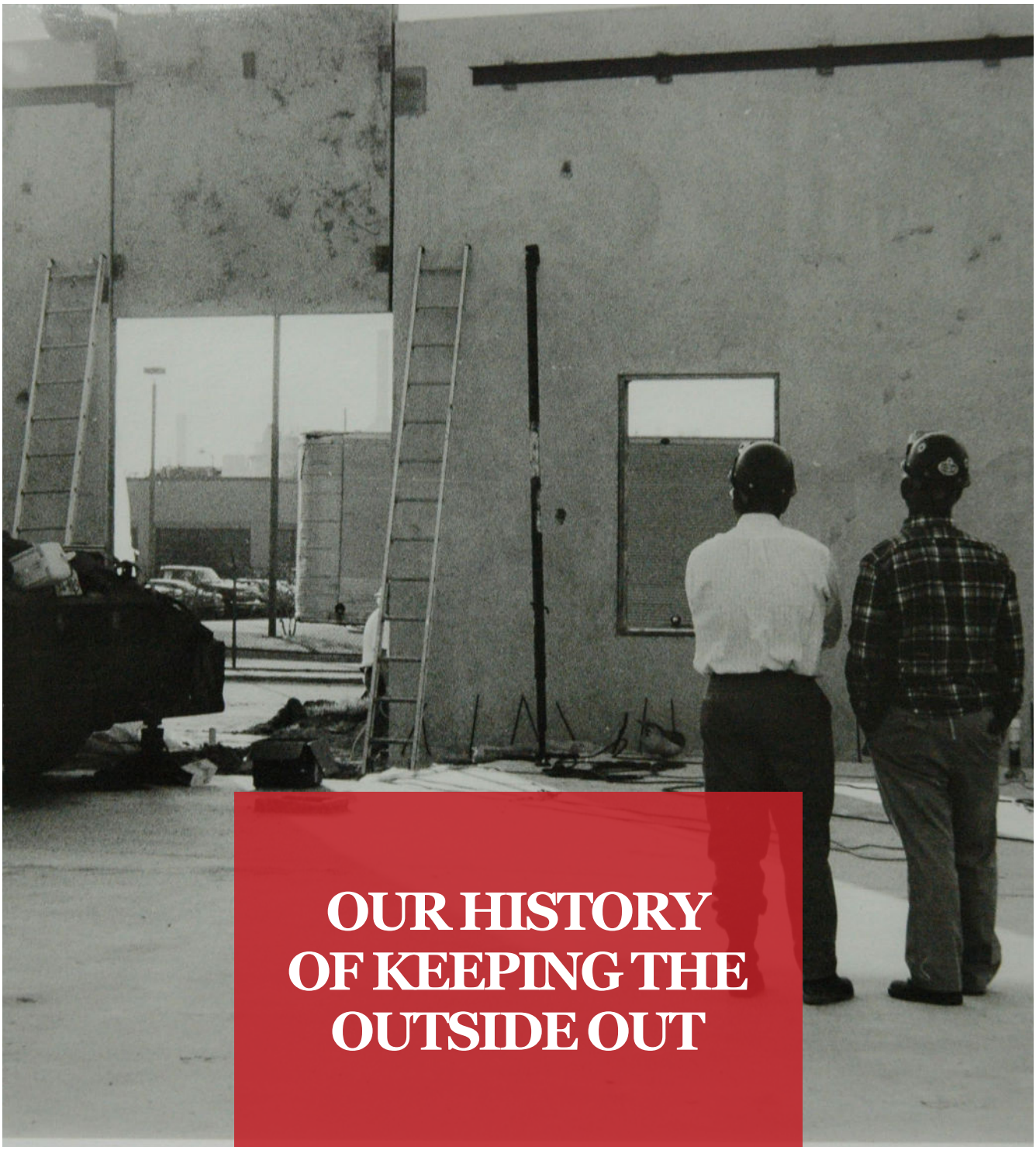
COMPENSATION: Base salary is commensurate with experience and licensure.

JOB TYPE: Full-time

Zero/Six Consulting, LLC is an Equal Opportunity Employer

> OUR CORPORATE CULTURE SUPPORTS CAREER ADVANCEMENT IN AN ENERGETIC ENVIRONMENT WHERE INNOVATION THRIVES

APPLY NOW



OUR HISTORY OF KEEPING THE OUTSIDE OUT

Thank you for reading our newsletter!

For more information, visit www.z6consulting.com!