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SKYLINES@SKYLINERESTORATION.COM

SKYlines

Sidewalk Vault Repairs Prevent Sidewalk Collapse

By Marius Ebner, Project Manager, Superstructures Architects + Engineers
www.Superstructures.com

Sidewalk vaults are portions of the basement or cellar areas extending beyond the building line directly below the sidewalk and sometimes partially below the street level. Mostly found in Manhattan buildings, sidewalk vault spaces were primarily used in the early 1900's to store coal. Access hatches and chutes were commonly used to fill the vaults with the coal for the buildings' boilers. Since then, these areas have been converted and are now commonly used for housing mechanical equipment, such as boilers, tanks, heaters, etc.

Steel beams supporting brick arched structural floors (later replaced with concrete slabs) were used for the sidewalk vault structure. In some cases, mostly in buildings located in lower Manhattan from 14th street to Canal Street, half the sidewalk areas were constructed with a metal frame and 2" diameter holes filled with glass, named "vault lights". These vault lights are glass prisms embedded in the metal panels and are used to illuminate whatever dark basement lies below.

Over time, many vault lights were replaced with a more modern system. A typ-

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Construction Accidents and Injuries Both Declined in 2011 While Construction Permits Increased 7.7 Percent

New York City Mayor Michael R. Bloomberg.

On January 23, 2012, Mayor Michael R. Bloomberg and Buildings Commissioner Robert LiMandri announced an 18 percent decrease in construction-related accidents in New York City for 2011, despite a 7.7 percent increase in the issuance of construction permits citywide. Construction-related injuries also decreased across the City last year – falling from 165 reported accidents in 2010 to 152 in 2011, a reduction of 7.8 percent. In total, there were five construction-related fatalities in 2011, a slight increase from four fatalities in 2010, but a 73 percent decrease when compared to 2008.

In addition to increased enforcement, expanded outreach to construction industry members and greater cooperation by builders throughout the City, the Department of Buildings has implemented more than 25 new construction safety laws since 2008 to enhance public safety and provide businesses and developers with the confidence to invest in the five boroughs, create well paying jobs and promote economic growth.

ENGINEER'S CORNER

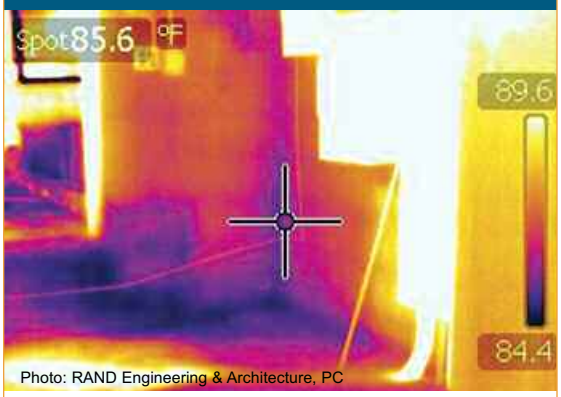

Photo: RAND Engineering & Architecture, PC

The dark purple areas in this infrared photo indicate cooler spots, where water was leaking into an elevator room.

Infrared Eye for Detecting Leaks

By John Monroe, RA
RAND Engineering & Architecture, PC
info@randpc.com

With the many storms and heavy rains this past year, Rand has been extra busy conducting leakage evaluations. As part of our investigations, my coworkers and I have been incorporating infrared technology.

An infrared camera has a sensor that detects temperature differences in the area being photographed and shows them as different colors. Water cools as it evaporates, and the cooler areas appear as purple in the infrared images. Those locations are then visually inspected to confirm they are leaks.

I recently used the infrared camera in a building where leaks had damaged electrical equipment, ceilings, and walls. During a routine investigation of the roof, I saw obvious problems including ponding, a blistering roof membrane, and missing counterflashing. Although the roof defects were likely contributing to the leaks in an elevator room, they didn't appear to be causing the water damage in a bathroom and bedroom several floors below.

Based on the location of the damage, I suspected water might be leaking from behind the elevator shaft. I took several infrared photos of the shaft, and sure enough, the images showed streaky purple areas, which indicated water was running down behind the shaft into the bathroom and bedroom below.

To confirm the purple streaks were actual leaks and to determine their source, I had the contractor

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Skyline Restoration Inc. - 1120 37th AVE, LIC, NY 11101 - T: 718.937.5353 - F: 718.937.5784 - skyline@SkylineRestoration.com - www.skylinerestoration.com - MEMBERS OF:

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The New York Landmarks Conservancy

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ical sidewalk vault construction, from top down, consists of a minimum four-inch thick topping (or wearing) slab, a waterproofing membrane, a structural slab (reinforced concrete or a combination of metal deck and a reinforced concrete slab, whose thickness is determined by the Engineer of Record). Steel beams and columns support the entire structural system spanning between the building line foundation wall and the exterior vault wall at the curb line or below the street.

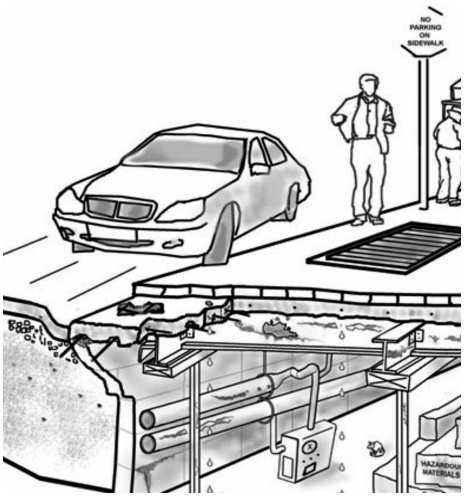
Many original vaulted sidewalks either lack a waterproofing membrane, or it is so damaged that there is no protection of the existing structural slab and the supporting steel beams from the devastating effects of water infiltration. Once the water finds its way into the structure below, it causes the steel beams to rust, the mortar joints in the brick arches to deteriorate, and the concrete slab rebar reinforcement to rust and spall which causes the structural concrete slab structure to crack. All these conditions lead to an unsafe sidewalk for pedestrians which could collapse, if corrective repair is not undertaken.

As soon as a sidewalk vault repair project starts, the Structural Engineer must implement numerous steps as well as comply with a multitude of city agencies issuing permits and/or being affected by the work.

One of the first steps is to conduct a detailed structural survey with physical probing of the existing sidewalk vault condition. This will determine not only the degree but also the extent of deterioration of the various elements of the structural support system. The physical probing will assess which portions of the structural slab, the steel beams and columns can be retained, repaired or replaced. Testing the existing waterproofing membrane for presence of asbestos is one of the first tests that need to be performed, as asbestos presence will significantly increase the cost of the sidewalk vault repair.

A proper structural design must be performed by a Professional Engineer licensed in the state of NY, following all DOB and DOT requirements.

Special attention needs to be given to the waterproofing details at the building line as well as the adjacent properties, as these locations are the main entry points for water infiltration. The waterproofing membrane should be placed below the curb line and also extend on the outside face of the vault wall.



The following design criteria and typical details must be considered during the design of the structural system:

DOT (Department of Transportation)

- Min. 600 psf Live Load for the design of steel beams and concrete slabs.
- Min. 600 psf Live Load for the design of any hatches covering sidewalk openings.
- No rebar reinforcement is allowed in the topping (wearing) slab.
- Follow DOT specifications for the min/max concrete slopes, contraction joint spacing, expansion joint spacing, steel faced curb, pedestrian ramps, etc..

LPC (Landmark Preservation Commission)

- If the building is a landmark, the color of the concrete topping slab must comply with the LPC approved colors.

FDNY (Fire Department of NY)

- Provide protection bollards at each fire-hydrant.

Specific drawings must be prepared and submitted to the following agencies for review and approval:

- NYC DOB (Department of Buildings) – Work Permit.
- NYC DOT (Department of Transportation - Sidewalk Vault Division) – DOT Approval.
- MTA (Metropolitan Transportation Authority) – For any vault structure within 200 linear feet of the subway line.
- LPC (Landmark Preservation Commission) – if the building is a Landmark Building, or is located in a Landmark District, a “Certificate of NO EFFECT” must be obtained.

If any other items are located on the sidewalk, the Owner of those items must be notified for the relocation or removal.

- USPS - Post Office boxes
- NYC Transit Authority – relocation of bus stops
- NYC DOT – removal of parking meters or MUNI Meters
- VERIZON – removal or relocation of any telephones

Con-Edison vaults are fully enclosed within the vault property and are the sole property of Con-Edison. No work is allowed to be performed within their property and in most cases, Con-Edison will repair their own concrete slabs and any structural issues.

Replacing a sidewalk vault is a major undertaking but if designed and repaired properly, it will be watertight for a long time with minimal maintenance.

ENGINEER’S CORNER

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conduct an investigative probe into the bathroom wall on the 14th floor. When we opened up the wall, we saw a crack in the hub on a plumbing riser, which was overflowing with water. The water was traveling from floor to floor through the riser penetrations, ending up at the 11th floor bathroom ceiling, where the damage was evident.

Thanks to the infrared images, I was able to pinpoint the source of the leak more quickly than if I had conducted only a visual survey. Plus, only one investigative probe was needed instead of several, saving the client both time and money.

Even with an infrared camera, suspected leakage areas still need to be visually examined, and investigative probes may also be necessary. Some cooler spots in the infrared images may not be water related—they could be caused by drafts or missing insulation, for example. But even in those cases, the infrared camera helps point out heat and energy losses that should be addressed.

Given how effective the infrared camera has proven to be, Rand plans to incorporate the technology more and more into our building diagnostics services. For more information, visit **www.randpc.com/infrared**.

55 Liberty Street, New York

PROJECT

Owner:
55 LIBERTY OWNERS, CORP.
Andrew Feiwel, Board President
Cori Horn, Board Member
Kerry Weldon, Resident Manager

Property Management:
COOPER SQUARE REALTY INC.
Jennifer Granda
Lisette Maiques

Construction Management:
FS PROJECT MANAGEMENT
Tal Eyal
Rafael Yossifov
Anna Doumkina

Architect/Engineer:
LAWLESS AND MANGIONE, LLP
Basil Taha
Kenneth A. Santelli, RA, AIA, LEED AP
Ayman Zibak, PE

Restoration Contractor:
SKYLINE RESTORATION INC.

Contract:
$2.3M

By Stephan Andreatos, Skyline Restoration Inc.
Stephan@SkylineRestoration.com

Designed by Henry Ives Cobb, Architect, in a neo-gothic style and constructed with a terra-cotta façade in 1909, Liberty Tower is one of the early romantic skyscrapers that changed the skyline of lower Manhattan. A free-standing 33-story building, Liberty Tower at that time was the tallest building in the world in ratio to its relatively small footprint.

The 385-foot structure showcases a slender and elegant profile. Its gothic style of architecture is immediately apparent in its cathedral spires and intricate carvings that include gargoyles, flowers and birds on its upper stories. The smooth milky white glazing on the terracotta lends an ethereal, monolithic attribute when gazing from afar. Upon closer inspection of the stones, however, the interested observer will surely notice the level of detail, quality and craftsmanship that the original artisans of the Atlantic Terracotta company possessed.

In 2011, Skyline Restoration Inc. had the privilege of being awarded the final phase of this historic structure's restoration. With great respect to its architectural significance and to the workmanship and dedication of its past artisans, the project team diligently navigated through this intricate and meticulous restoration, and successfully completed the project on time and within budget.

- Terracotta stone replication and replacement of over 785 stones, including gargoyles and other ornamental figures.
- Repairing, pinning and reglazing of over 1000 individual stones.
- Masonry re-skinning, approximately 30% of the north façade.
- Structural underlying steel reinforcement and replacement.
- Installation of a rooftop rigging system, in order to access the upper floors and copper standing seam roof. Otherwise known as the "Platform in the Sky", hanging scaffolds are suspended from existing beams protruding from the 30th floor. The beam locations could then be accessed by the hanging scaffolds, where workers carefully build a lattice of aluminum beams going around the building. Once this lattice is in place, a platform is spanned across and conventional pipe scaffolding is built to access the upper sections of the building.

Celebrating Black History

In February, the **Landmarks Conservancy** honored Black History Month by celebrating the many contributions of African Americans to New York's rich cultural legacy.

From the **Latimer House Museum** to **Astor Row** to **St. Philips Episcopal Church,** designed by **George Washington Foster, Jr.** and **Vertner Tandy**, among the first African American architects in the United States, the Conservancy highlighted notable buildings designed or built by African Americans and places important to understanding the extraordinary role of African Americans in New York's history.

For this, the Landmarks Conservancy has created a Facebook album with some photos from their archives.

Over the past 40 years, the Conservancy has provided its unique financial and technical assistance to a number of historic sites important to celebrating the African American experience in New York. Some of these are listed below.

THE NEW YORK LANDMARKS CONSERVANCY

Abyssinian Baptist Church – the first African American Baptist congregation in New York.

Apollo Theater – a symbol of the brilliance of American artistic accomplishment.

Astor Row – one of Harlem's most picturesque architectural landmarks.

Hamilton Heights Historic District – consists of 192 rowhouses, apartment buildings and churches built between about 1886 and 1931.

Louis Armstrong House – home of the legendary entertainer from 1943-1971.

Schomburg Center – one of the world's leading research facilities devoted to the preservation of materials on the global African and African diasporan experiences.

Strivers' Row – home to Eubie Blake, W.C. Handy and Bill "Bojangles" Robinson among others.

Stuyvesant Heights Historic District – boasts some of Brooklyn's most handsome and historic brownstones and grand old apartment buildings.

Sugar Hill – home to W.E.B. Du Bois, Adam Clayton Powell, Jr. and Thurgood Marshall.

Weeksville Heritage Center – one of the few remaining sites of pre-Civil War African American communities.

Skyline Restoration in Times Square

Photo: George Constantinou

SL Green Realty Corp. publicly congratulated the team of companies, among them Skyline Restoration Inc., for the implementation of the new LED video displays at 1515 Broadway in New York City, in January 2012.