

# SKYlines

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## Extending the Life of Your Parking Garage

By Anmar Mohammed, Senior Project Manager, LEED AP  
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Parking garage restoration projects are very unique, challenging and crucial to the lifespan of a parking structure. Due to their functional requirements, large areas of parking garages are regularly exposed to elements of deterioration, such as constant moisture infiltration and de-icing salts brought in by automobile traffic. Because these elements can cause severe damage and corrosion to the structural components within, it is critical to perform regular inspections and implement a long-term repair and maintenance program to extend the life of your parking structure.

### SIGNS OF DETERIORATION

The most common signs of a deteriorated garage structure include spalling, scaling and cracking of the concrete and water leakage through cracks and open joints. Typically spalled concrete is the direct result of corroded steel bars since the rusted steel volume is larger than the volume of the original steel, which will force the surrounding concrete to expand and then spall. If, however, the original construction reinforcement bars were placed close to the concrete surface, the steel corrosion can lead to delamination of the concrete slab topside creating potholes and tripping hazards or may even cause large pieces of concrete to fall from the slab underside. Concrete delamination has significant effects on the structural integrity because it reduces the bond between the bars and concrete.

*Continued on Page 2*

## Happy 23<sup>rd</sup> Birthday!



We are grateful to our clients who have entrusted us with their exterior restoration projects since 1989



Photo: RAND Engineering & Architecture, PC

An energy audit includes a survey of the building's major systems and components, such as the electrical meters.

## Energy Audit: Blueprint for Operating Efficiency

By Peter Varsalona, PE, CEM  
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An energy audit analyzes how efficiently a building's systems are performing and identifies ways to reduce overall energy consumption. The audit serves as a blueprint for developing an Energy Action Plan—a list of energy-saving measures and capital improvements for reducing a building's operating costs.

The first part of the energy audit is a review of the building's utility bills—gas, fuel oil, and electricity—over a 12-month period. The review looks at peak usage, valleys, trends, and unusual signs that may indicate operational or usage abnormalities. The information is used to calculate the building's Energy Utilization Index (EUI) in order to compare it with similar buildings.

Next is a survey of the building's major systems, including the building envelope; roof and roof-level components; HVAC; electrical and lighting; and elevator, motors, and pumps.

Based on the survey and utilities analyses, the energy audit firm prepares a report detailing the findings and provides a recommended scope of work for improving energy efficiency with estimates of potential costs and savings.

### 3 Levels of Energy Audits

In a Level 1 energy audit, the survey team walks through the building recording observable sources of energy loss or deficiencies correctable with low or

*Continued on page 4*

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# Extending the Life of Your Parking Garage

Continued from page one

Cracking in the concrete may also occur as a result of shrinkage, movement in the garage structure, or because of loads (weights) that exceed the designed capacity. Concrete cracks facilitate water penetration through the slab, accelerating the corrosion rate and reduce the parking garage durability.

## REPAIR PHASES

1. **Existing Conditions Assessment.** As with all repair projects, prior to construction work commencement, the existing deteriorated conditions must be inspected, evaluated and properly tested by a structural engineer. While crack patterns can be visually observed and marked, the delaminated concrete areas may only be detected by chain-dragging the topside of the slab or tapping it with a hammer and listening for a characteristic hollow sound. Severely delaminated concrete areas should be probed and tested to measure the chlorides content and evaluate the reinforcement rebars conditions.
2. **Design and schedule the repair option.** Based on the survey findings, different types of repair options must be prepared for each of the existing deteriorated conditions. Beside the technical issues, the design of repair details should be based on project budget and the Owner's future plans. The challenging part of this phase is to schedule the repairs

strategically to keep the garage operation running and to allow for partial occupancy during the construction phase.

3. **Construction Phase.** The most common repairs include:

- **Floor Topside Patching:** The delaminated/unsound areas must be outlined and removed. All exposed existing bars are to be cleaned and coated with a protective anti-rust epoxy-coating product, then all demolished areas are to be patched with repair mortar. This type of repair will correct the existing deteriorated areas conditions. However, further damage caused by concrete saturated with chloride next to the newly patched areas could be expected. Therefore, this repair may last less than 5 years unless the garage floors are coated with vehicular deck coating to prevent further penetration of water and salt through the concrete slab.
- **Ceiling and Vertical Patching:** The same techniques and procedures that are used to patch concrete floors can be followed to repair any overhead and vertical spalled areas inside the garage; however, the patching materials are different.
- **Full Depth Repair:** This technique is considered the most economic repair option when the concrete slab is severely deteriorated and thin (5 inches or less). The existing reinforcement bars must be sandblasted and all rust must be

removed then coated with an epoxy coating material. Any bar with more than 20% loss of its section must be supplemented. After the prep work is completed the concrete at the demolished areas shall be poured in forms to match the original slab.

- **Crack Repairs:** The repair options for concrete slab cracks must be determined based on the cause and depth of the crack. The most common technique to repair a crack caused by slab movement is to create a notch approximately 1/2" deep along the crack length and then seal the crack with elastomeric sealant. Structural cracks may be repaired using epoxy injection to bridge the concrete surfaces on both sides of the crack.
- **Vehicular Traffic Bearing Waterproofing Membrane Application:** To prevent any further deterioration of the original slab and to extend the lifespan of the new concrete, a liquid applied sealant or an elastomeric membrane installation is highly recommended once the full garage renovation project is completed. Generally these types of coatings are very thin and will not add any additional loads to the structure but typically will require a continual maintenance program to repair any worn areas.
- **Drainage Problem Repair:** Additional drain installation is the most effective way to resolve any ponding water problems or address improperly pitched slabs. The new drain should be installed at the lowest spots of the slab and must be connected to the existing drainpipes.
- **Expansion Joints Repair:** The sealants at the expansion joints are necessary to accommodate any structure movements and to prevent water infiltration through the joints, therefore it is very important to replace any torn sealants at these joints during a typical garage restoration project.

Every garage structure will require scheduled maintenance and repair over its expected life span. While the initial cost of the repair program is high, it will greatly reduce the need for future repairs. The overall costs of the repair and maintenance program are directly affected by the type and frequency of maintenance performed. Longer intervals between periodic repairs will ultimately result in higher repair costs. This will have a definite impact on the structural integrity and useful life of the parking structure. ■



# 53-65 Hope Street Brooklyn, NY



By Adam Seminara  
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The concrete structure located at 53-65 Hope Street in Brooklyn is a commercial building constructed during the turn of the 20th century and is actually comprised of two buildings built approximately two years apart. It housed several commercial tenants but was then left vacant until purchased by Gershon & Co. with the intention of converting it to a rental building.

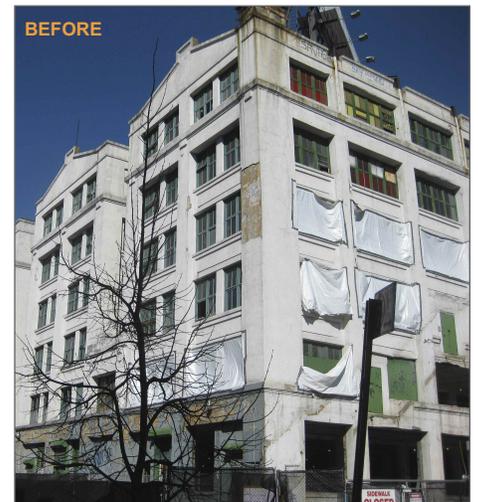
They retained **Triton Construction** as general contractor (who appointed **Steve Sann** to oversee the project) and **Skyline Restoration** (specialists in façade restoration) to perform façade and necessary concrete repairs. Some of the work items included: knee wall and slab replacement, column repairs, exterior and interior concrete repairs, window head and sill replacement and rebar

replacement and repair to name a few. To realize its vision, **Gershon & Co.** hired **Kutnicki Bernstein Architects** and **GACE** for interiors and **Consulting Associates of NY** for exteriors.

Skyline Restoration commenced its phase of the project in February 2011 and adhered to an ambitious and demanding schedule completing the interior portion of the project within a very brief time span as per contract agreement. Skyline Restoration appointed three qualified and vastly experienced supervisors, **Salvatore Pisapia**, **Francisco Velez**, and **Filiberto Ramos** to oversee a daily work force of 90 laborers, all under the direct supervision of project manager **Adam Seminara**.

Additionally, Skyline Restoration has undertaken the task of replacing the entire roof with the provision of a manufacturer's warranty. It is presently in the development stages of a green roof slated to begin in May

2012. We look forward to the end product, a great design for a family building in the heart of Williamsburg, Brooklyn.



## EVENTS

### THE NEW YORK LANDMARKS CONSERVANCY

Sacred Sites Open House  
**May 19-20, 2012**  
[http://www.nylandmarks.org/events/lectures\\_and\\_other\\_events/sacred\\_sites\\_open\\_house\\_may\\_19-20\\_-\\_visitors\\_welcome/](http://www.nylandmarks.org/events/lectures_and_other_events/sacred_sites_open_house_may_19-20_-_visitors_welcome/)

### REBNY

Spring Golf & Tennis Outing  
**May 21, 2012**  
<http://www.calendarwiz.com/calendars/popup.php?op=view&id=48483254&crd=rebnyevents&>

### REBNY

9th Annual Commercial Management Leadership Breakfast  
**May 31, 2012**  
<http://www.calendarwiz.com/calendars/popup.php?op=view&id=48236879&crd=rebnyevents&>

### NYARM

Golf Outing  
**June 4, 2012**  
<http://www.nyarm.com/golfOuting2012.pdf>

### ICRI Metro NY Chapter

Aesthetics in Concrete  
**June 6, 2012**  
<http://www.icri-ny.org/>

### NEW

2012 Equity Leadership Awards Luncheon  
**June 7, 2012**  
<http://new-nyc.org/pages/ninyc/e.html>

### USGBC

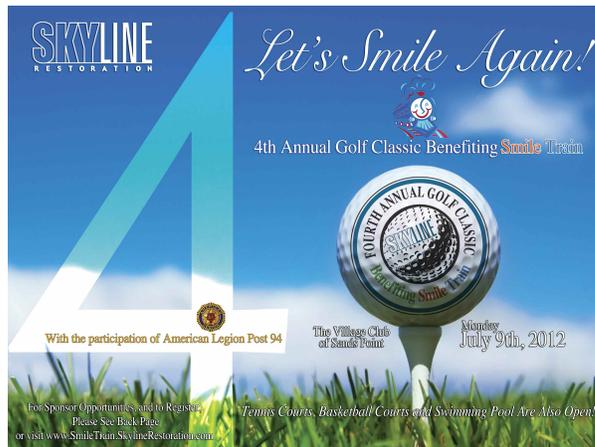
EBie Awards  
**June 28, 2012**  
<http://www.EBies.org/finalists>

### NRCA

Midyear Meetings  
**July 10-14, 2012**  
<http://www.nrca.net/rp/industry/calendar.aspx?show=nrca>

### SAIA

Annual Convention and Exposition  
**July 15-18, 2012**  
<http://convention.saiaonline.org/index.asp>



### Let's Smile Again!

Skyline Restoration's 4th Annual Golf Classic  
 Benefiting Smile Train  
**Monday, July 9th, 2012**

#### The Village Club of Sands Point

For the fourth consecutive year, Skyline Restoration Inc. is having its Annual Golf Classic to Benefit Smile Train, the organization dedicated to helping millions of children in the world who suffer with unrepaired clefts. For details please visit [smiletrain.skylinerestoration.com](http://smiletrain.skylinerestoration.com) or call Eva Hatzaki at 718.937.5353.



### CGI (Concrete Gel Injection) Innovative Below-Grade Waterproofing

George Doukas, Vice President of CGI Northeast Inc., demonstrates how this unique waterproofing system stops water leakage in concrete and other masonry structures, during the Co-op & Condo Expo in NYC, on April 17th. For more information on this effective and economical waterproofing solution, call CGI Northeast at 718.937.2800 or visit [cgiNortheast.com](http://cgiNortheast.com) and watch how CGI works.

## Energy Audit: Blueprint for Operating Efficiency

*Continued from page one*

no-cost repairs and installations, such as replacing incandescent bulbs with compact fluorescent lighting; lowering boiler cycle time and domestic hot water temperature; insulating ductwork, piping, windows, etc.

A Level 2 energy audit is a more detailed building survey with computer-generated energy modeling. Some of the systems and components analyzed are boilers, chillers, piping, pumps, ventilation controls, steam traps, and insulation. A Level 2 Energy Action Plan outlines easily implemented energy-efficient measures as well as adjustments and basic capital improvements to major building systems to optimize their operational performance.

A Level 3 energy audit expands on Level 1 and 2. The Energy Action Plan in Level 3 includes detailed recommendations for major capital improvements, such as heating plant upgrade, roof replacement, re-piping, etc., for the greatest energy savings.

### Which Level for Your Building?

The level of energy audit best suited for your building depends on the size, age, and condition of the property. A Level 1 audit will likely suffice for smaller buildings with basic mechanical systems and recently built buildings fitted with energy-efficient components. Larger buildings with more extensive systems; older buildings with aging heating, electrical, and plumbing systems; and buildings that have not been well maintained are probably better served with a Level 2 or 3 audit.

New York City's Local Law 87/09 requires buildings larger than 50,000 square feet to have a Level 2 energy audit conducted every 10 years. Properties seeking New York State Energy & Development Authority (NYSERDA) funding through the Multifamily Performance Program also require a Level 2 audit. Your engineer or energy consultant can determine which audit level is best for your building. For more information: [www.randpc.com/green/energyaudit](http://www.randpc.com/green/energyaudit)

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