Consolidated Edison Headquarters

2022 ICRI Metro New York Project Awards

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Constructed from 1911 to 1928, Consolidated Edison's (Con Ed) headquarters is located at 4 Irving Place in New York City and is comprised of a series of four buildings. The original 19-story building was designed by the architect Henry Janeway Hardenbergh, a renowned architect of the time who was said to be "master of a new building form – the skyscraper." 4 Irving Place consists of steel and masonry with a limestone and brick exterior that implements aspects of several of architectural styles, including a Beaux-Arts base and Baroque midsection, with a Renaissance Revival and neoclassical decorations at the highest stories. The building has three limestone façades and one brick elevation that fronts the employee parking lot.

The Neoclassical clock tower, standing over 500ft tall, was built as a tribute to soldiers who served in WWI and was designed by the architectural firm of Warren and Wetmore. The top of the clock tower boasts a bronze lantern known as the "tower of light" which was originally planned to dramatically light the structure at night. The building drew much acclaim when it was complete, with the writer William Parker Chase calling it one of the city's most "beautiful and magnificent structures" in his 1932 book New York the Wonder City. In February 2009, the building was designated a New York City Landmark.

An inspection performed in September 2017 under New York City's Local Law 11 façade ordinance identified areas of the masonry building envelope that needed repair. The general contractor was engaged to execute these repairs in November 2018. During the buyout phase of the project, the team presented the client's estimator with open-book production and cost estimates to negotiate fair and equitable unit prices. The project scope of work consisted of stone and brick masonry repairs including patching, pinning, sock anchoring, dutchman repairs, pointing, stone replacement, various cleaning methods, crack repairs, cast iron stabilization, and repairs to steel reinforcement.

Early in the project, the project team identified sections of failed patches along the outer cornice, 19 stories above street level, while conducting a survey from the roof. Emergency rigs were installed to perform safe off repairs. During the removal, the crew discovered that the patches had been feathered and fastened to the parent stone with helical ties. Approximately 50 LF of the cornice edge was replaced with new limestone dutchmen fastened with a stainless streel rod set in epoxy. The EPDM roofing was extended to cover the new cornice edge stone to the outer edge.

Figure 1:Discovered failing patch at cornice edge 19 stories high (left). Failed patches removed during the inspection identified helical ties had been used to fasten the new patches to the parent stone (right).

Figure 2: Cast iron window mullion piece discovered on a setback. This led to a full survey and repair campaign of the entire facade.

In November 2019, a cast iron mullion piece fell onto a setback roof within the construction zone, triggering a full inspection of the ornamental cast iron façade elements located on the north, west, and south elevations. The project team inspected, stabilized, and repaired the cast iron elements to prevent further damage. Furthermore, it was decided that the entire building needed to be surveyed and repaired to create a state of good repair for the building. This decision led to a growth in the original project scope over three and a half times the original project plan, which resulted in a schedule extension of approximately five months, including a three-week job shut down in 2020 for the Covid-19 pandemic.

To perform the repairs, crews utilized various access methods, including suspended scaffolding, mast climbers, system scaffolding, and rope access. Several stone repairs were performed around the façade, including dutchmen ranging from 1-3 SF, limestone patch repairs, crack repairs, and potassium silicate coating. Twenty-six, 50" long by 10" high by 9" deep, limestone lintels were replaced after severe cracking was found due to corrosion of the backup steel reinforcement, including the original dovetail anchors. Additionally, a limestone cornice corner stone was stabilized with the anchoring system after a 6ft fracture appeared within the cornice base stone. A total of three anchors, one 18" long and two 52" long, were installed and grouted in place.

Figure 3: STN 500 stone lintel replacement in progress. Corrosion of the original dovetail anchor contributed to the formation of large cracks within the lintel.

A stair tower, built on needle beams, was constructed nearly 400ft high at the top stages of the clock tower to rebuild the inner corners of the structure. Limestone panels and brick backup were removed to assess the embedded steel columns. Only one section of a column was exhibited significant corrosion and required a welded reinforcement plate. All steel was scraped and painted, anchor ties were welded to the steel, brick backup infilled, and new limestone panels installed.

Figure 4: 6 ft fracture along corner cornice stone.

The east elevation scope was originally generated by the Local Law 11 inspection, which found areas of cracked brick, cracked limestone lintels, and vertical cracks at column lines – most severely at the two east building corners. Once work began on the identified scope, the team discovered that the problems were more severe. The vertical corner cracks in the brick sides of each corner were due to the column rust jacking. This condition was caused primarily by prolonged water entry at the cornice, parapet walls, and roof.

Each corner is comprised of one side as backup with face brick, and the alternate side as backup brick with 4"-8" deep limestone face. The pressure caused by the rusting and expanding steel followed the path of least resistance, in this case the brick side. Cracking at the brick sides of the corners was made worse due to the orientation of the "W" column section, placing the rusting flange ends right at the back of the face brick.

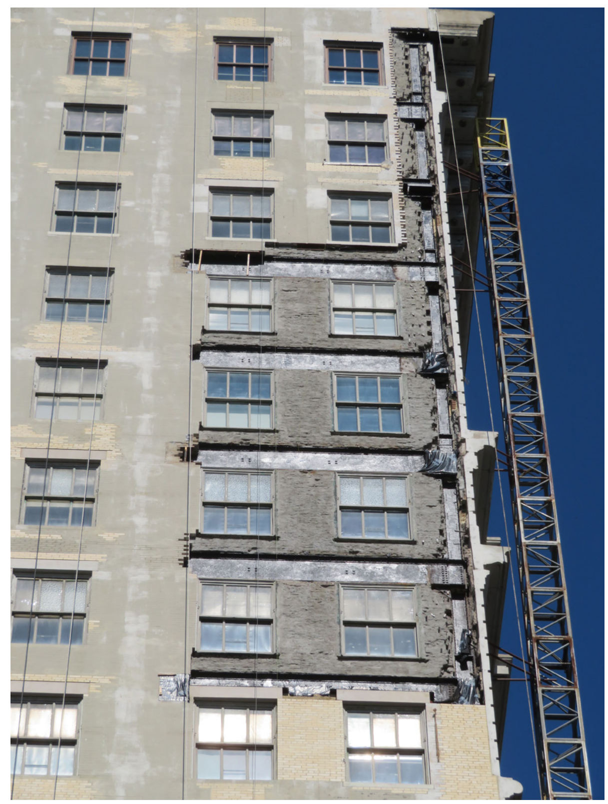

Figure 5: Corner and wall field repairs conducted on both the northeast and southeast corners. Steel repairs, brick replacement, waterproofing, new lintels, new sills were installed.

Some limestone units were removed and reset after inspection, and all existing limestone units were stabilized and re-anchored. Cracked limestone lintels and sills were removed and replaced in kind. Exposed steel was cleaned, in some areas repaired with welded additional steel to reinforce the existing and treated with rust inhibitive coatings, before rebuilding with new materials to match existing.

The brick fields were originally built solid with true brick headers at every sixth course locking in the wythes. No mechanical ties were present. Many of these true header bricks were sheared at the collar joint between the face brick and the backup wall. This initially caused the design team to proceed with full removal of the face brick and replacement with new brick & mechanical ties at these areas. In some cases, the areas could be addressed with retro fit brick anchors. All complete repairs were then coated with an approved potassium silicate breathable coating.

At substantial completion, the building envelope repairs spanned two and a half years. The project was considered a success that was driven by the focus on safety and quality, along with open communication and collaboration between the owner, design team, and general contractor.

Figure 6: 4 Irving Place Neoclassical clock tower

Figure 7: The repairs required to restore the building envelope

Figure 8: Installation of a stone lintel in progress

Figure 9: Column repair in progress