EXTERIOR REHABILITATION OF THE CHANIN BUILDING: A NATIONAL LANDMARK OF THE ART DECO ERA

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INTRODUCTION

Construction of the Chanin Building (Fig. 1) started on January 3, 1928 and was completed on August 8, 1928. The 56-story, 680 ft (207 m) Art Deco building was one of the early jewels constructed in New York City during this era. The base building materials included Belgian marble, bronze frieze panels, limestone, buff brick and terra cotta. The top of the tower was designed with ornate, crenelated terra cotta buttresses. External terra cotta lanterns illuminate the façade at the 52nd floor. At the 54th floor, the arches of the buttress structures have concealed lighting in the vestibules. The ordinary plain corners of the tower are actually five-sided protruding fins. The lower floors of the building have bronze frieze panels depicting the sea and terra cotta depicting animals and leaf themes. The building was officially landmarked on November 14, 1978.

Fig. 1: Overall view of the Chanin Building

Throughout the years, the building's façades and underlying steel framing have been subjected to normal weathering typical for the northeast United States, which includes dramatic changes in temperature, exposure to Atlantic Ocean storms, freeze-thaw cycling, and occasional high wind storms. These elements have had an effect on the stability of the structure and the preservation of this highly ornate structure. Since the inception of Local Law 10 of 1980[1] (now referred to as Local Law 11 of 1998[2], or The Façade Inspection Safety Program [FISP]) requiring periodic inspection of exterior walls and exterior appurtenances of buildings, the building has had several large repair projects in 1991, 2000, and 2004.

RESTORATION PLAN

In addressing the deteriorated conditions of the building's façades, it was important to understand the construction methods, connectivity of the outer façade to the backup masonry (Fig. 2), the connectivity of the backup materials to the building

Fig. 2: View of the 32nd floor northeast fin (corner) with the face brick removed and backup masonry exposed

frame, and the type of flashings, if any, that were used. Prior to the restoration of the building, and during each phase of the project, there was an initial inspection of each repair area to make these determinations. From there, each executed repair would either follow the specified repair or was customized. One of the interesting elements at the building was the use of copper flashing behind the walls and the lack of flashing in other locations which are now traditionally flashed, such as lintels and any steel element that supports the outer masonry of a façade.

The wall flashings occurred at the parapet walls on the inboard side and were designed to continue through to the outboard walls, thus protecting the roof spandrel beams from water intrusion should the terra cotta joinery above fail. The copper was found to stop midway through the walls, thereby allowing the roof spandrels and, in some cases, the corner columns to be subjected to excess water. The result was extensive corrosion which led to steel reinforcement and, in some cases, steel beam and column replacement (Fig. 3 and 4).

Fig. 3: Southwest corner of 32nd floor setback on the west elevation where water penetration from the roof and through the masonry resulted in the column corroding (the column and roof channels were replaced)

Fig. 4: Looking down at the twisted corner column shown in Fig.3 resulting from the loads applied to the severely corroded column

Locations where one might expect to find flashing would have been at the supporting angles at the fin corners from the 26th floor to the 53rd floor and at window lintels. In both cases, there was no evidence of flashing and as the mortar joints began to deteriorate, water penetrating the façade accelerated corrosion of the supporting steel lintels and corner shelf angles and plates that support the corner brick. The result was the continuous replacement of lintels every five years since construction and the continuous cracking of the corner brick until finally the steel was recently replaced in select locations. The building can expect the conditions to repeat themselves until all locations have finally been replaced.

From December 2013 until May 2016, the building underwent a façade restoration that was more comprehensive than past projects. Pre-construction investigation during the façade inspection program indicated substantial corrosion damage of the building framing. The corroded conditions presented a challenge as large areas of the façade had to be disassembled, shored and rebuilt. This included portions of the buttresses from the 49th to the 53rd floors at the corners, the corner brick fins from the 26th floor to the 36th floor, and numerous partial parapets and their respective corners (Fig. 5 and 6).

Fig. 5: View of the west parapet wall of the 32nd floor setback on the west elevation, where there is no lateral reinforcement of the parapet due to the corrosion from water penetration through the parapet masonry with poor original construction and prior roof leaks before the roof was replaced in 2007

Fig. 6: View of 2nd pier from the east on the south elevation at the 52nd floor with severe and repeated cracking of the terra cotta and repair mortar

Fig. 7: Demolished, prepared and waterproofed corner from the 50th to the 53rd floor at the southeast corner of the tower

Fig. 8: View of the east elevation with the southeast corner completed and the southwest corner not started

CHALLENGES

This project had many unique challenges to overcome in order to complete the desired repairs (Fig. 7). It began with the variance in backup wall materials. Brick behind terra cotta and terra cotta speed block behind brick. Then, the problem of whether or not the backup masonry was secured to the structure or whether additional reinforcement would be required. In many locations, particularly the fin corners, the speed block was not secured to the structure, there was missing and broken block, and there was missing mortar. Those items were addressed; then came the task of connecting face brick to the speed block without breaking the block. That, too, was uniquely addressed resulting in all building elements being secured to the building frame and to each other. Plates needed to be added to beams to independently provide load support for the outer wythe of masonry between floors (sections). Last came the incorporation of vertical expansion joints and camouflaging them into the façade to keep the original landmarked appearance.

At the 53rd and 54th floors, the buttresses originated and rose up to approximately the 56th floor level. The resulting arches on those two floors presented challenges in both inspecting and executing the repairs. The 53rd floor has only one access point on the west elevation and one has to crawl under each of the 28 buttress arches to inspect the façades. In fact, there is existing lighting on the copings of each opening that no longer works due to the poor access. Approximately 10 of the arches had deteriorated steel angles that support the sidewalls of the arches and the interior brick had to be rebuilt.

The 54th floor arches are much larger and provide a canopied walkway around the entire top of the building. On this floor, the replacement of many arches was required due to the extensive deterioration of the supporting side-by-side angles that held the hung terra cotta sections. Each archway is comprised of two arches with a recessed cement stucco ceiling containing light fixtures. Access to the upper portions of the buttress arch sections is very poor and many decades passed when maintenance of mortar joints was not performed. As a result, the intermediate steel angles supporting the terra cotta were corroding. Some terra cotta was removed and the steel treated. New terra cotta replaced the severely damaged sections. Other areas have been repaired and pointed to preserve the remaining structure. The importance of proper selection and implementation of concrete mortars for brick and terra cotta installation, as well as pointing, cannot be overstated.

CONCLUSION

The restoration of this building included the replacement of terra cotta with terra cotta approved by the Landmarks Preservation Commission. Past attempts to repair the building with alternative, and less costly, materials resulted in premature fading and uneven aging. The recent repair project (Fig. 8) required a tremendous team effort on the part of the management company, the restoration contractor and the building envelope architect.

REFERENCES

1. Local Law 10 of 1980, Building Code of The City of New York, February 21, 1980.

2. Local Law 11 of 1998, Building Code of The City of New York, March 13, 1998.

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