Case Study: Historic Intent and the Renovation of Eduardo Catalano's U.S. Embassy in Buenos Aires

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Abstract. The Argentine-born architect, Eduardo Catalano (1917 – 2010), operated out of Cambridge, Massachusetts, from 1956 through 1977 and was entrenched in the academic discourse which defined a certain type of brutalist modernism characterized by exposed concrete and overt structural expression. His 1972 design for the U.S. embassy in Buenos Aires drew on his principle to design flexible and long-lasting buildings that would endure, and not based on "individual whims".[1] After 50 years of continuous operation his thesis on longevity is being tested with a new renovation driven by the need to replace aged mechanical and electrical systems intertwined throughout a fully occupied embassy building.

This paper will first explore the context of Catalano's Cambridge-based practice, to better understand the rationale for the design of the Buenos Aires Embassy. The building's existing structural logic will be discussed and used to define the physical framework for the renovation designed by Krueck Sexton Partners in 2024. Catalano's concept for designing a building that would endure and avoid obsolescence was formed around the principle of designing for "constants", the permanent needs of the building, and understanding and deliberately avoiding over-designing for "variables", or those functions or components which are subject to change. By studying the structure and systems, the renovation design found opportunities for planning layout, systems design, and materials in careful dialog with the building and to allow for 50 more years of use.

1. CATALANO'S (AND MY) CAMBRIDGE

Every morning during my first year in graduate school I bicycled down Cambridge Avenue seeing the Cambridge Rindge and Latin High School campus. It was hard to miss because it was one hundred meters from my destination, and the building formed an unusual marriage of contrasting styles. I only learned this year that the addition was designed by Eduardo Catalano, the architect who originally designed the U.S. embassy in Buenos Aires, which Krueck Sexton Partners was tasked with renovating as a selective improvements project for Bureau of Overseas Building Operations (which manages U.S. governmental diplomatic and consular property outside of the country). The Catalano building marked the formal merger of the

Latin school with the Rindge (trade) school. As the third oldest high school in the United States established in 1648 by the Harvard College president, it was a significant commission for Catalano. What is striking about the addition is that the brutalist building sat both independent and conjoined to a 1932 limestone-clad structure. Its trapezoidal, glazed connector bridge created a prominent gateway to the campus and the adjacent public library and park, effectively marrying multiple stylistic periods through deliberately connected yet separated structures.[2] At the time, I had not seen a brutalist building that left preceding buildings intact and minimally disturbed while making the contrasting styles profoundly apparent. The school was one of Catalano's last commissions prior to retirement from teaching in 1977.

1.1. Learning and Teaching

Catalano moved from Argentina to pursue post-graduate studies at the University of Pennsylvania and Harvard University in Cambridge, Massachusetts – earning degrees from each in 1944 and 1945 respectively. While at Harvard he studied with the modernist masters Walter Gropius and Marcel Breuer.[3] Gropius was well known as the founder of the Bauhaus and would later be one of the first architects to work with the U.S. Government's Architectural Advisory Board (AAG), to design the U.S. embassy in Athens.

Catalano moved back to Argentina briefly, only to make his way back to academia in 1950, to teach at the Architectural Association (AA) in London. One year later, he was appointed professor at the architecture school at North Carolina State College (now North Carolina University, which now houses his archive of work), and within 5 years became head of the program. During his tenure, the design for his own residence known as the Raleigh House, was well published and named "House of the Decade", by House and Home Magazine, because of its massive 28m long hyperbolic paraboloid, post-stressed roof shell described as "potato chip" in shape.[3, 4]

1.2. A Small World, a Smaller Cambridge

Catalano returned to Cambridge in 1956, at the invitation of Pietro Belluschi, Dean of the School of Architecture at the Massachusetts Institute of Technology in Cambridge. Catalano's Raleigh House demonstrated his ideas on creating architecture that would avoid redundancy by moving away from "skin and

bones" architecture to a type of structural logic where the shell would serve as both façade and structure – as he demonstrated with this own house.[4] In Cambridge, Catalano was surrounded by like-minded contemporaries such as Walter Gropius, Josep Lluis Sert, Paul Rudolph, Marcel Breuer, and others exploring similar ideas through exposed concrete structures where skin and bone are one.[5,6]

No contemporary architect of the time was more influential than the Swiss-French architect Le Corbusier, who came to Cambridge in 1959 for early meetings to discuss the Carpenter Center for Visual Arts on the Harvard Campus – his only building in North America. There is not a clear record of whether Catalano and Corbusier met. But Catalano was certainly familiar with Corbusier's concrete details. Corbusier's continuous, horizontal "ribbon" window appear in many of Catalano's municipal-scale buildings including the U.S. embassy in Buenos Aires. Corbusier's only other project in the western Hemisphere, Casa Curutchet, was in La Plata, Argentina. While Corbusier never went to La Plata, his local collaborator, Argentinean architect Amancio Williams, acted as his eyes and ears during the houses construction. Williams would visit Harvard at Gropius's invitation in 1951 and 1955, just missing Catalano's Cambridge return.

With two major graduate schools and internationally practicing architects coming and going, the small town of Cambridge was a hub of global architectural discourse, where Catalano was deeply entrenched.

1.3. A Porteño-American Architect

Catalano was born in Buenos Aires –a Porteño as the citizens of the port city refer to themselves. In hindsight, the decision to hire Catalano to design the U.S. embassy seems almost predestined. He was an able Architect working on ever-more complex projects such as the Stratton Student Center (1962) at MIT (which is currently being renovated and slated to open later this year). But Pietro Belluschi, who earlier recruited Catalano to teach at MIT, was part of the U.S. Government's Architectural Advisory Board (AAG), and this group was charged with "setting a new direction towards integrating cultural sensitivity and design excellence in the construction of U.S. embassies abroad".[7] Hiring a Buenos Aires born architect skilled in working with complex U.S. government projects was not only logical under the AAG's clear directive but a diplomatic win.

2. U.S. EMBASSY, BUENOS AIRES

While Argentina and the United States officially established diplomatic relationships in 1823, a U.S. embassy did not exist until 1915. An embassy contains mostly office space. Work at embassies has evolved similarly to that in the corporate world, with comparable requirements for open versus closed office space, conference and meeting space, computer and networking infrastructure, and amenities such as staff cafeterias and fitness centers. Embassy staff have conventional office schedules, and most staff are locals who are long-term hires who work in the embassy buildings for years. Just like in the corporate business office, the reliance on paper output, and the amount of required individual work-space has changed, making the modernization of embassies an ever-evolving process. The primary difference between an embassy and a typical office are rigorous security protocols to keep embassy staff safe. Most embassy buildings of the 1960's and 1970's were intentionally designed to be culturally contextual (although not necessarily by style) driven by President Kennedy's 1962 Ad Hoc Committee on Federal Architecture to "ensure that such architecture continued to represent American ideals—from dignity, stability and vigor to embodying the finest architecture of its time."[8]

2.1. Site and Location

The site for the U.S. embassy in Buenos Aires, was originally part of the "Tres de Febrero" Parks and directly north of the La Rural Exposition center. The southwest quadrant of the park was ceded to the United States in 1963 by the Argentine government, which created a triangular site whose apex pointed north toward the network of urban parks that make up the 400 hectare Palermo Woods. At the time of the land acquisition, the Palermo neighborhood was already urbanistically dense, and with the proximity to the historic U.S. Ambassador's residence at the Park's northwest corner, the centrally located site was a boon for supporting the diplomatic mission. The building faces the park and its ceremonial, brick-paved entry piazza became an extension of the landscape.

2.2. Structural Framework

From the exterior, the embassy building forms a heroic cantilevered form whose floor plates increase in footprint as the building ascends (top-left, **Fig. 1**). The sides are flanked by exposed concrete fin-walls

to conceal the sectional changes and emphasizing the frontality of the building (top-right, **Fig. 1**). The structural framework supporting the cantilever incorporates a series of deep, one-way beams to minimize the number of columns in the office interior (bottom-left, **Fig. 1**). In the original design the interior structural expression was exposed only at the three building entries, and the remaining one-way spans were concealed from view above ceiling tiles. The building's central core is composed of elevators, restrooms, and the main mechanical riser located to the rear of the building. This rear zone incorporates a tighter column spacing to eliminate beams allowing for the primary duct branches to run east and west from the core to the offices (bottom-right, **Fig. 1**).

Catalano studied planning concepts to address his concern over the long term use of large buildings, stating that "even today, when cultural, social, and economic forces lead to the rehabilitation of existing buildings, the new ones are being designed as inflexible as those of the past."[9] The structure of the embassy embodies Catalano's concept of buildings becoming "infrastructures", allowing for "societies time to master change".[10] He developed a planning principle where the building would emphasize "constants" based on performance needs and allowing for "adaptability of use" and sought to eliminate or reduce "variables" such as custom construction that would only be used once and diminish function. [10]

2.3. Mechanical Realities

The structural principle was well developed for the architectural layouts, but the mechanical systems were much less flexible than Catalano's planning principles would suggest. The main mechanical room is within the sub-basement housing both air-handling units and the building's main electrical gear. A secondary mechanical penthouse located at the top of the building housed units serving upper floor levels. While the bifurcated (bottom and top) mechanical rooms were seemingly logical in their zoning, the actual installed network of ducts was not clearly defined, and the duct distribution entangled across floors. This distribution would impact any future system upgrades. A significant quirk of the original mechanical system is the air intake strategy. The building incorporated three discrete air snorkels (a term the renovation architect and engineering team coined) to describe the approximately four-meter-tall concrete, triangular-peaked towers located behind the building which allowed

for make-up air into the building (his once-mentor Gropius employed similar details for his 1966 JFK Building in Boston). The snorkels were a clever way to allow for fresh-air into the building, and since the back alley included parking spaces – by raising the air entry above the car level avoid having vehicle exhaust polluting the building. The snorkels however, incorporated a circuitous path into the building, directing air through tunnels under the alley and into the sub-basement.

3. REDEVELOPING AN OCCUPIED BUILDING

The renovation scope was defined after a years-long building and functional-program assessment by the U.S. Government aided by a large team of subject-matter-experts led by Krueck Sexton Partners.[11] The primary driver for the extent of work is driven by critical electro-mechanical systems updates tempered by budgetary constraints precluding a full renovation. The original air-handling and electrical equipment had reached the end of their service life, requiring a holistic replacement of the patchwork improvements and repairs common for a building with fifty years of continuous use. Because of externally-dictated logistical requirements, the building occupants could not be moved out of the building requiring a phased renovation. Since the building would be continually occupied during construction, the original mechanical and electrical systems could only be removed once new systems were in place and operational.

3.1. Mechanical Systems as Drivers

The sub-basement mechanical units require replacement but cannot be removed until new systems are installed (since the building will remain in use, equipment must continue to serve occupants). The phasing is to be performed incrementally from top to bottom, where in the final phase the lower-level mechanical equipment can be decommissioned. To accommodate this incremental replacement, a new penthouse houses replacement equipment.

Although the existing roof had been cluttered with a mix of small additions from earlier work, the client and design team were concerned with introducing another mass to the roof structure, and how such a structure would read from the street. The design team considered two strategies to reduce the impact of the penthouse on the building – controlling setback distances and a screening element to conceal the mass. The only viable location for the penthouse is

east of the original penthouse. However, a new rectangular structure would compete with the original symmetrical massing, and the existing structural grid had eliminated a structural column making one of the bearing points over an existing beam (instead of over a column). The project structural engineer, Thornton Tomasetti, evaluated the existing beam, which although deep in profile, was highly efficient meaning it could not carry additional load. This observation was true of many of the brutalist features on the building which were both highly efficient but with little redundancy to allow for modification.
The design team settled on the idea of creating a triangular-plan structure, which rationally connected-the-dots of structure down to existing columns (Refer to **Fig. 2**). A form generated by need and constraints, in line with Catalano's intent. The triangle reduced the visual mass from the street level, obviating the need for a screen. The form referenced the original air-snorkels and created an intentional and legible differentiation between the new and original massing.

3.2. Selective Improvements

Although the building is iconic from the exterior, most of the interior spaces were disconnected from the strong logic of Catalano's structure. The combination of the existing continuous ribbon windows which do not allow a lot of daylight into the building and the low (2.16m) ceiling height makes the space dark and feel compressed. The replacement of the electro-mechanical systems was an opportunity to reconsider how the building's infrastructure could be utilized not only for conveying services, but to take advantage of the volume of space for its occupants. The building mechanical engineer (WSP) proposed a distribution of overhead fan-coil units (FCU) to replace the original centralized Air-Handling Units (AHU's) allowing for more flexibility in the construction and affording an opportunity to reduce the number and volumetric density of ducts.
A conventional AHU system requires moving huge volumes of air from centralized units to the occupants, whereas fan-coils utilize chilled water distribution bringing relatively small cold and hot water pipes to distributed units which condition smaller volumes of air. The FCU system is not typical for OBO, but because of the reduced duct quantity creates flexibility.
With the large ducts out of the way, dropped ceilings could be

selectively eliminated to open the volume and express the linear, concrete beams to occupants and fulfilling Catalano's vision of eliminating the distinction between skin and bones (Refer to **Fig. 3**).

3.3. Another 50 Years of Occupancy

Many of the significant brutalist buildings built in Cambridge during Catalano's life have gone through major renovations in the last decade – including Sert's Science Center and Holyoke Center at Harvard. Catalano's MIT Stratton Center is currently undergoing renovation with expected opening fall of 2024. His high school building was painted stark white during its 2011 renovation, removing its hallmark tactility. The Embassy was also painted by an earlier facilities manager - a beige color homogenizing the concrete mottling that once made the building part of its environment. Building mechanical system service life ranges from 25 to 50 years making the need for upgrades inevitable. An industry wide focus on building performance improvements along with building technology trending toward higher efficiency, means that renovations often require a reconsideration of their systems' original strategy. But if we believe Catalano's thesis on "constants" and "variables" these changes are not only expected but hoped for, in order to avoid creating "frozen buildings, without flexibility for growth and change".[1]

4. NOTES AND QUOTATIONS

1 Eduardo Catalano, "Excerpts from a lecture given at the School of Architecture" University of Kentucky, 1968 quoted in Catalano, Eduardo; Gubitosi, Camillo; Izzo, Alberto: Eduardo Catalano: buildings and projects (Rome, Italy, Officina Edizioni 1978), 25.

2 SAH Archipedia, "CAMBRIDGE RINDGE AND LATIN HIGH SCHOOL,", Accessed April 02, 2024, https://sah-archipedia.org/buildings/MA-01-CS23.

3 NC State University Libraries, "Eduardo Catalano Papers 1940-2017", Accessed April 02, 2024, https://www.lib.ncsu.edu/findingaids/mc00625

4 "Most Talked About House of the Year", *House and Home*, Volume VIII, no. 2 (August 1955), 94-101.

5 Catalano was certainly aware of his work as Rudolph actively designed major buildings in and around Boston including the Government Center Complex, and the Jewett Arts Center at Wesleyan.

6 Breuer and Catalano collaborated on a small project in Argentina, circa 1947. "Parador Ariston", *Nuestra Arquitectura,* no. 225 (April, 1948), 110-116.

7 Salcedo, Jorge, “OBO And Its Cultural Heritage Mission”, (Submitted for Docomomo Publication, pending), page 3, 2024

8 Council of American Ambassadors, “Constructive Diplomacy: The US Department of State's Overseas Building Program” Accessed April 02, 2024, https://www.americanambassadors.org/publications/ambassadors-review/spring-2011/constructive-diplomacy-the-us-department-of-state-s-overseas-building-program

9 Eduardo Catalano, “Excerpts from a lecture given at the School of Architecture” University of Kentucky, 1968 quoted in Catalano, Eduardo; Gubitosi, Camillo; Izzo, Alberto: Eduardo Catalano: buildings and projects (Rome, Italy, Officina Edizioni 1978), 20.

10 Eduardo; Gubitosi, Camillo; Izzo, Alberto: Eduardo Catalano: buildings and projects (Rome, Italy, Officina Edizioni 1978), 22.

11 The embassy project included a large team including: OBO team Claire Bedat, Cindy Chow, Curtis Clay, Lisa Kim, Douglas Noumbissi. A/E team leader, architect Krueck Sexton Partners with team members Michael Johnson, Jason Roberts (Project Manager), Gabe Vidal-Hallet, Juan M. Villafañe (Partner in Charge), Sarah Weiss; structural engineer Thornton Tomasetti with Timothy Mekaru, Nate Sosin; MEP engineer by WSP with Lisa-Marie Golja Tekovic (MEP Team Leader), Richard Siwek, Keith French; IT by Wiley Wilson with Jared McCoig. Local Architect BCG, Maria Paula Baez and Eduardo Carena.

5. BIOGRAPHY

Juan M. Villafañe is a practicing architect and partner at Krueck Sexton Partners in Chicago. His career began as a custom metal fabricator, fostering a technical rigor grounded in making. This background informs his work which expresses craft to create tactile spaces. Juan is an active member of the Urban Land Institute where he currently co-chairs ULI Chicago’s Public Policy committee. His experience working on architectural projects in Singapore, Buenos Aires, and Sri Lanka informs his approach to find the specificity of place.

6. IMAGE CAPTIONS

Figure 1. U.S. Embassy Building, Buenos Aires originally designed by Eduardo Catalano, Argentina, 2024, Diagram of Building, Structure, Mechanical Systems (Krueck Sexton Partners)

Figure 2. U.S. Embassy Building Roof Plan, Buenos Aires, Argentina, 2024, Diagram of New Mechanical Penthouse and Existing Columns (Krueck Sexton Partners)

Figure 3. US Embassy Building, Buenos Aires, Argentina, 2024, Rendering of Interior Renovation showing exposed beams. (Krueck Sexton Partners, prepared by Filippo Bolognese