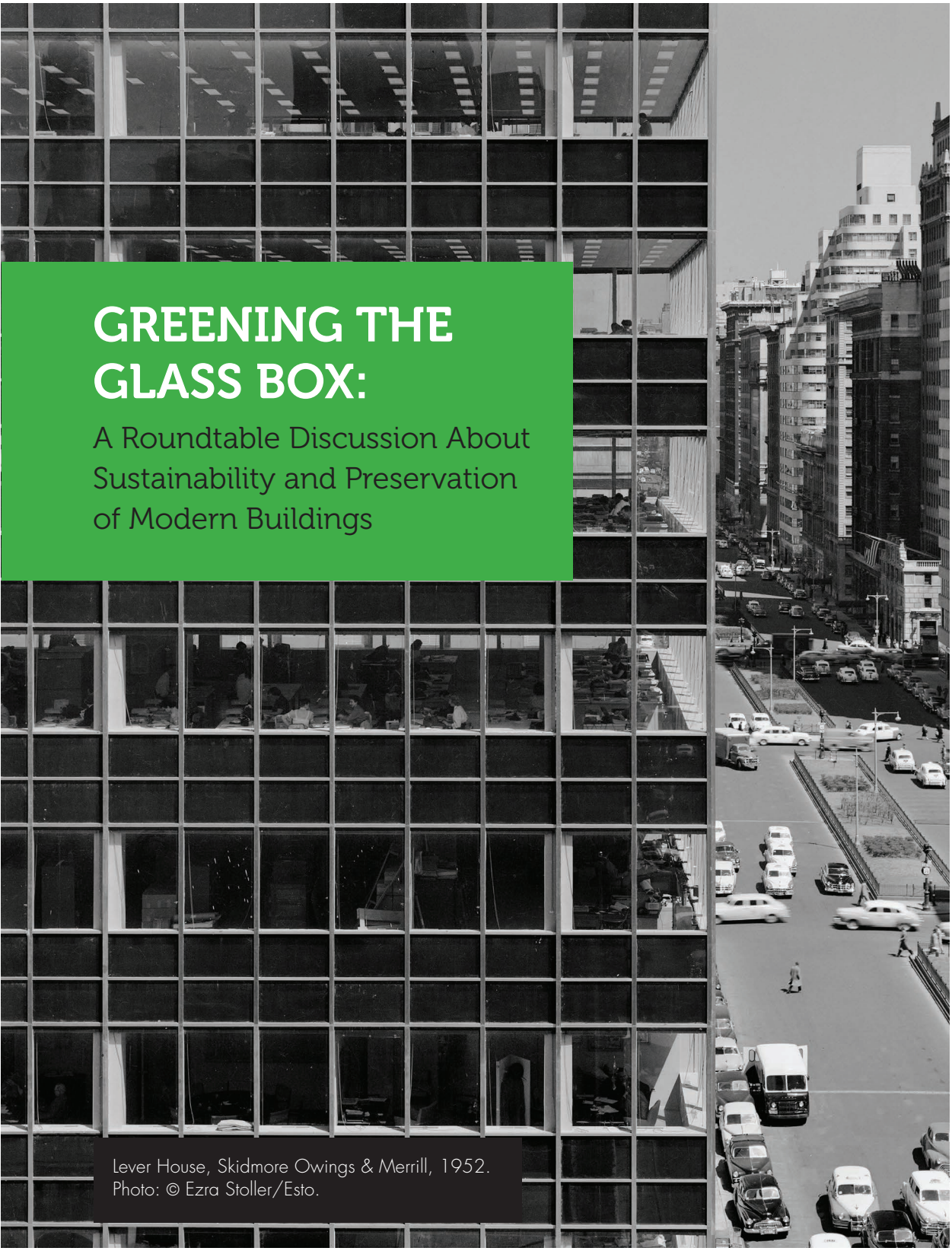
GREENING THE GLASS BOX:

A Roundtable Discussion About Sustainability and Preservation of Modern Buildings



Lever House, Skidmore Owings & Merrill, 1952.
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MANY BUILDINGS THAT HAVE COME TO DEFINE POSTWAR MODERNISM IN AMERICAN CITIES, particularly in New York, were originally experimental in nature, given the unprecedented use of aluminum and glass curtain walls. Over the past decade these buildings are being evaluated for their environmental performance and the value of their sites, some of which are underbuilt according to current zoning. Former New York City Mayor Michael Bloomberg's now defeated proposal to rezone East Midtown Manhattan and encourage the development of larger office towers recharged an important discussion about how to restore these buildings in order to maintain their aesthetic and address development pressures while enhancing their sustainability both economically and environmentally.

In 2004, DOCOMOMO NY/Tri-State conducted a survey of Midtown Manhattan that identified over 200 buildings dating to the postwar period, many of which can be classified as Modern vernacular in contrast to the more celebrated examples of Modernism, such as Lever House and the Seagram Building. Over the years, some of these vernacular buildings have been re-clad while others remain untouched, awaiting repair or perhaps replacement by new, taller buildings. A number of these structures are suitable for today's office market and can be included among the Class-A office buildings coveted by real estate professionals. Many in the historic preservation community believe that these buildings should be preserved and upgraded with more efficient mechanical systems and better performing curtain walls while retaining their Modern movement aesthetic.

Recognizing the need for a greater public understanding of the issues around preserving Modern buildings, DOCOMOMO NY/Tri-State, with support from the Municipal Art Society, convened a roundtable discussion, "Greening the Glass Box" on October 15, 2013. Organized by the authors of this article, discussion topics focused on preservation issues specific to Modern curtain-wall buildings, best practices for restoring them, and how to safeguard the most significant examples of this building type. The panelists included four renowned New York-based architects specializing in building envelope design and historic preservation: Gordon Smith of Gordon H. Smith Corporation, Robert Heintges of Heintges & Associates, Israel Berger of Vidaris, and Pamela Jerome of WASA/Studio A. This discussion coincided with the Association for Preservation Technology's annual conference being held in New York, so many APT attendees were in the audience.

PRESERVATION ISSUES

To kick off the panel, the organizers outlined some of the more urgent concerns affecting the "glass box." These include a lack of appreciation for the Modern aesthetic in an aggressive real estate market and the replacement of the façades with ones that are unsympathetic to the original in terms of proportion, rhythm, and detailing. Also outlined

United Nations Secretariat, 1952, team of architects led by Wallace K. Harrison. Curtain wall replacement in progress, March 2011. Photo: Angel Ayón

was the overall energy performance of these buildings, most of which have single-glazed assemblies that are prone to air and water leakage, and are serviced by poorly performing HVAC equipment, fixtures, and distribution systems.

It was noted that many of these buildings were designed under New York City's 1938 building code, which prescribed lower lateral loads (only 20 lbs per square foot for buildings taller than 100 feet) and did not account for suction. The insufficient wind load capacity raises new safety concerns, particularly given the extreme weather events brought by climate change. Other issues cited include low ceiling heights and deep floor plates, which afford limited day lighting. However, it was also pointed out that the buildings' embodied energy makes them worth preserving. With few studies on the subject, the architecture community is challenged to identify and promote best practices to renovate historic buildings to high performance standards.

Lever House, 1952, Skidmore, Owings & Merrill, after 2002 curtain wall restoration by Gordon H. Smith Corporation, with SOM as architectural consultants; design criteria established with New York City Landmarks Preservation Commission. Photo: Jesse David Harris, courtesy RFR Realty.

REPLACEMENT VERSUS REHABILITATION

In response to these concerns, Pamela Jerome noted that these ubiquitous single-glazed curtain walls are becoming "an endangered species," and their repetitive design should not prevent us from considering them representative of the architecture of that period, even when they no longer look brand new. She advocated for "discreet interventions to prolong their service life," focusing on eradicating air and water leaks and promoting energy savings, including installation of remedial anchors and silicone joint sealers.

Robert Heintges preferred a more circumspect approach. He cautioned against considering these early curtain walls "too precious," because their machine-made components and industry-produced materials are less "special" than their handmade counterparts of earlier periods. In an overview of his firm's project for the curtain wall replacement at the UN Secretariat, which was originally designed in the 1950s to be insulating glass, he mentioned that "years of forensic investigation" determined it was impossible to preserve the original curtain-wall assembly, which had deteriorated within its first three years of service. Hence, he recommended what he called a "faithful replication" approach for interventions on early curtain walls, one where the original design intent is reinstated in a contemporary high-performance curtain-wall system with sight lines, materials, and finishes as similar to the original as possible.

Gordon Smith noted that he "was around in those days" when curtain walls were first being constructed. Aluminum was cheaper then (roughly $0.30 to $0.35 per pound in comparison to over $2.00 per pound today), so increased building loads were addressed by providing thicker or larger, and therefore stiffer, frame extrusions. He recalled that "mill-finish aluminum was in vogue in those days and anodizing was just coming into play." Smith sided with Heintges's call for "faithful replication" adding that he favors replacement that reinstates

East Midtown Manhattan from Park Avenue, 2013, where high-rise modern buildings replaced most existing structures during the postwar decades. Photo: Nina Rappaport

the original appearance, though not all materials or performance

STRUCTURAL CAPACITY, SAFETY, AND OTHER TECHNICAL ISSUES

Israel Berger highlighted what he called "some realities of life" regarding serious safety issues concerning buildings of the 1960s and 1970s. He explained that some were built with "the bare minimum invested in the core and shell." This, he continued, has led to hazardous conditions that building envelope professionals must address today. For instance, the original windows of many of these curtain walls were made with weak operable sashes assembled with primitive hardware that had not been designed to handle lateral loads. As a result, many of these windows have been anchored shut to prevent the sashes from falling out. To correct these conditions, professionals are bound by code-mandated safety and energy conservation requirements that, to a large extent, dictate the design of the replacement assemblies.

The structural inadequacy of many early curtain walls was noted with regards to wind loads mandated by current building codes. And, in some buildings, the existing original aluminum mullions cannot support the weight of heavier double-glazed replacement window assemblies. This leaves no other option than continuing to repair the original curtain walls—with their inherent limited performance and safety—or replacing the original façades.

It was mentioned that certain improvements to the thermal performance of early glass curtain-wall assemblies—the installation of joint sealers,

Union Carbide Building (renamed JPMorgan Chase Tower), 1960, by SOM. Existing curtain wall facade from Park Avenue, 2014. Photo: Angel Ayón

remedial anchors, and concealed insulation on the inboard side of metal spandrel panels—are achievable, whereas other improvements, such as the addition of insulation to the inboard side of stone spandrels, will most likely lead to accelerated freeze-thaw deterioration.

This conflict between preservation and environmental performance goals needs to be considered on a case-by-case basis. Smith cautioned that prior to improving a building from this period, it should be determined whether it is of landmark quality or if it belongs to the more generic type of commercial buildings. The engineering on the Union Carbide Building at 270 Park Avenue (Skidmore, Owings & Merrill, 1960) "was a monster," he recalled. "The mockups built to perfect the [curtain] wall were humongous, grossly overdesigned,"…it was built like a monument. He added, "then you take the Emery Roth buildings. That they are still there is amazing in many cases. Those are the ones that you can consider for selective replacement," to retain the original appearance.

Jerome added that "many owners don't appreciate the aesthetic and so what ends up happening is a complete redesign." For her, it is a matter of determining whether we value these buildings today, and if so, how much. That's why she recommends against upgrading them with a new look, which in her opinion happens too often in renovation projects.

ADDITIONAL RESEARCH

Panelists emphasized the need for additional research on technical solutions to address the environmental challenges posed by early single-glazed curtain-wall assemblies while retaining as much of their historic fabric and aesthetic as possible. In addition to high-performance replacement window systems (provided that the existing original mullions can support them), ideas suggested include: interior storm windows, shading devices, remedial glare/UV protection films, and even supplemental interior glazing adhered on-site to the original single-glazed units with desiccated tapes. Other research topics include finding ways to promote the manufacture of aluminum finishes that match the brush stainless steel that was often used in the original curtain walls. Cathodic protection of aluminum or bronze curtain walls, where these materials are used somewhat unconventionally, was another proposed study. Greater collaboration between architects and building material manufacturers would likely yield innovations that make these solutions more affordable, efficient, and sustainable.

PROFESSIONAL BEST PRACTICES

To conclude, Jerome suggested looking at these buildings on a case-by-case basis according to a value-based approach. Sometimes reproduction is necessary where the original façade has significantly corroded and is at risk of collapsing. Other times, discreet interventions can prolong the service life of these buildings. She also stressed that cultural significance should be assessed in terms of "the inventiveness of the technology" that these build-

ings represent. Other factors may have to be equally considered, including the owner's budget, the projected return on investment from the proposed improvements, and the individual and contextual significance of the original curtain-wall fabric. The panelists agreed that performance requirements should not be considered alone, but in conjunction with preservation philosophy precepts informed by other economic, environmental, and safety issues.

Heintges added that at least for significant buildings like the United Nations Secretariat, the heightened consciousness of both preservation and sustainability should be balanced by an understanding of the original design intent. If the original cannot be retained, then replicating it with a façade that will last another 50 or 100 years while conforming to contemporary building codes is something to be considered.

Union Carbide Building. The existing curtain wall facade as seen from the entrance plaza, 2013. Photo: Nina Rappaport.

Smith worried that many building owners in New York cannot afford, at least in the short term, pursuing the approaches discussed during the roundtable discussion. Emphasizing a need to establish a balance between the competing interests of building profitability and preservation, Berger recommended that DOCOMOMO NY/Tri-State continue its advocacy efforts "to raise the flag and alert the real estate community and the public at large against senseless and reckless destruction of significant parts of our architectural heritage." He acknowledges that we may not be able to save it all, but from a technical standpoint, there is no shortage of knowledge about how to intervene. What we are lacking, he thinks, are policy debates and in-depth reflections on the feasibility of these interventions, as well as on the expectations of owners and tenants regarding noise control, thermal comfort, daylighting, wellness, and cost.

The discussion triggered a continued evaluation of curtain-wall replacement versus rehabilitation, and more thoughts on how preservation professionals, whichever side of the debate they are on, have a responsibility to convey to owners and the public the cultural significance of these buildings. The architectural character that these glass curtain-wall buildings imbue, and the way that they have shaped the urban context of many American cities, is of cultural and aesthetic value. Upgrading them with a different design might be enticing in terms of real estate redevelopment, but it comes at the cost of their innate modernity, inventiveness, and aura. This is a loss we can't afford.

—ANGEL AYÓN AND NINA RAPPAPORT