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Challenges of Replacing the Historic Glass Facades at the United Nations Headquarters

Robert A. Heintges, FAIA, Founding Principal, Heintges

January 10, 2018

CONTINUING EDUCATION AIA

United Nations Headquarters

Client – United Nations Capital Master Plan

Architect (Facades) – Heintges

Facade Consultant – Heintges

Architect (Interiors) + Structural Engineer – HLW

Construction Manager – Skanska

Mechanical Engineer – Syska Hennessy Group

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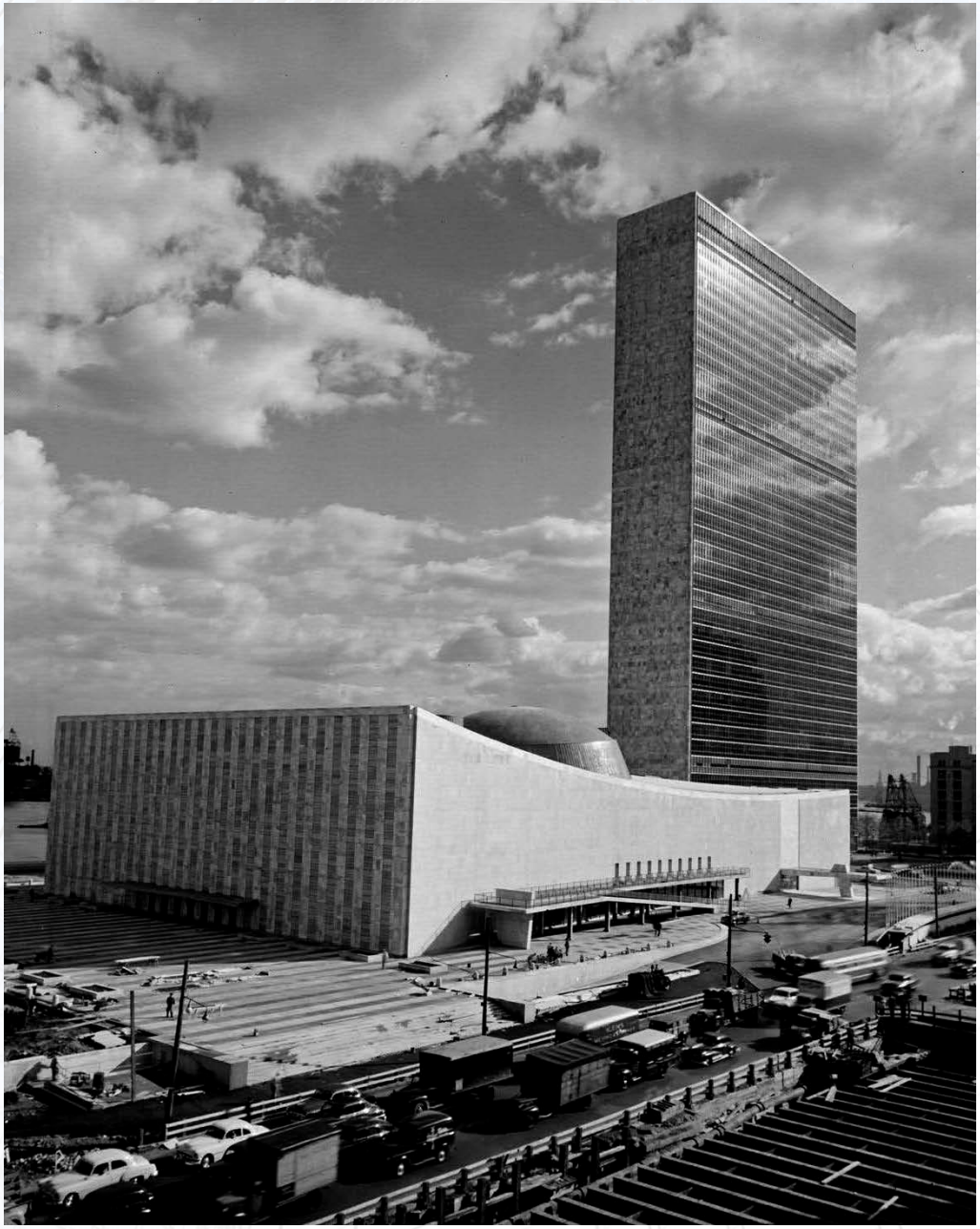

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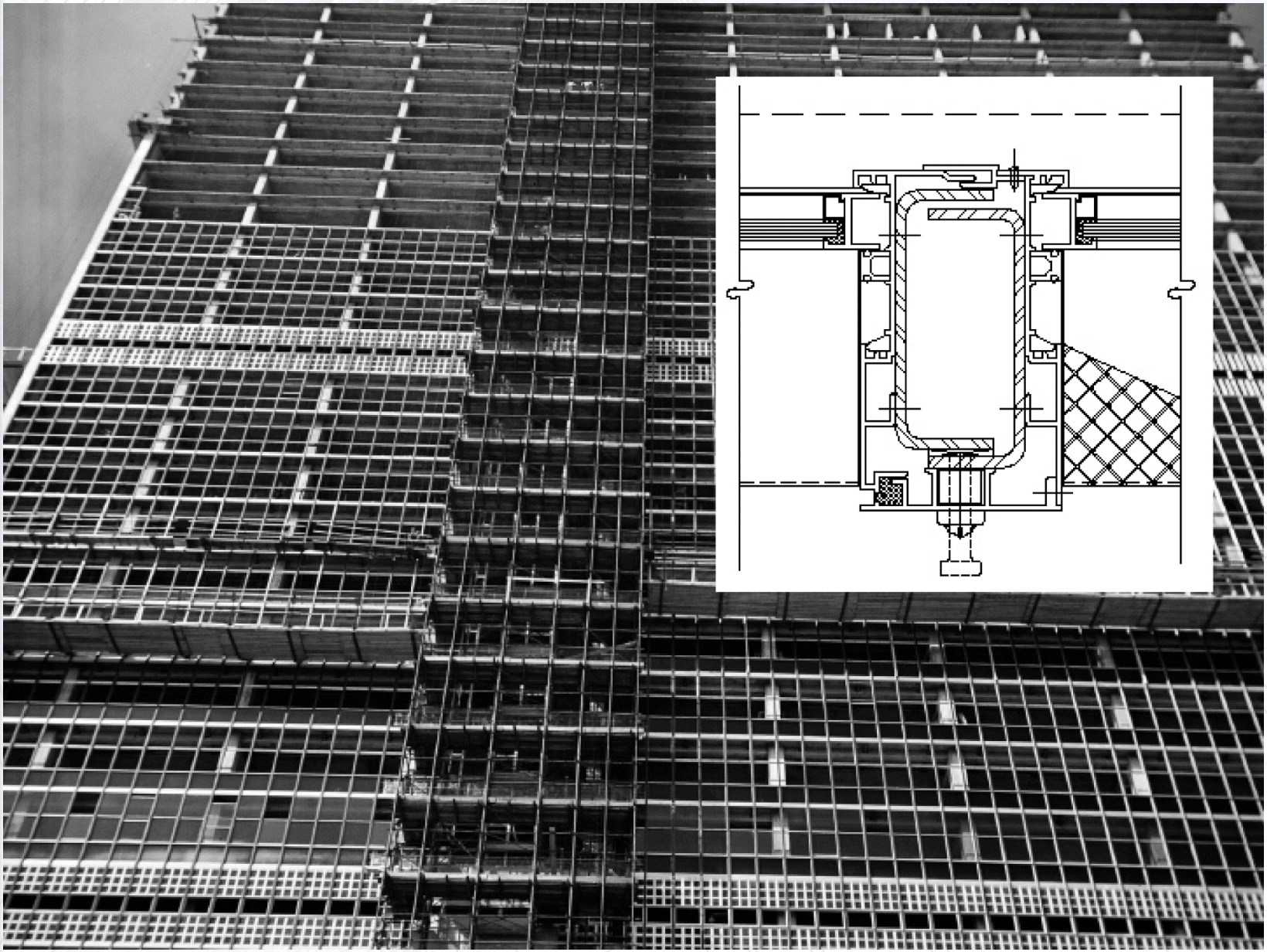

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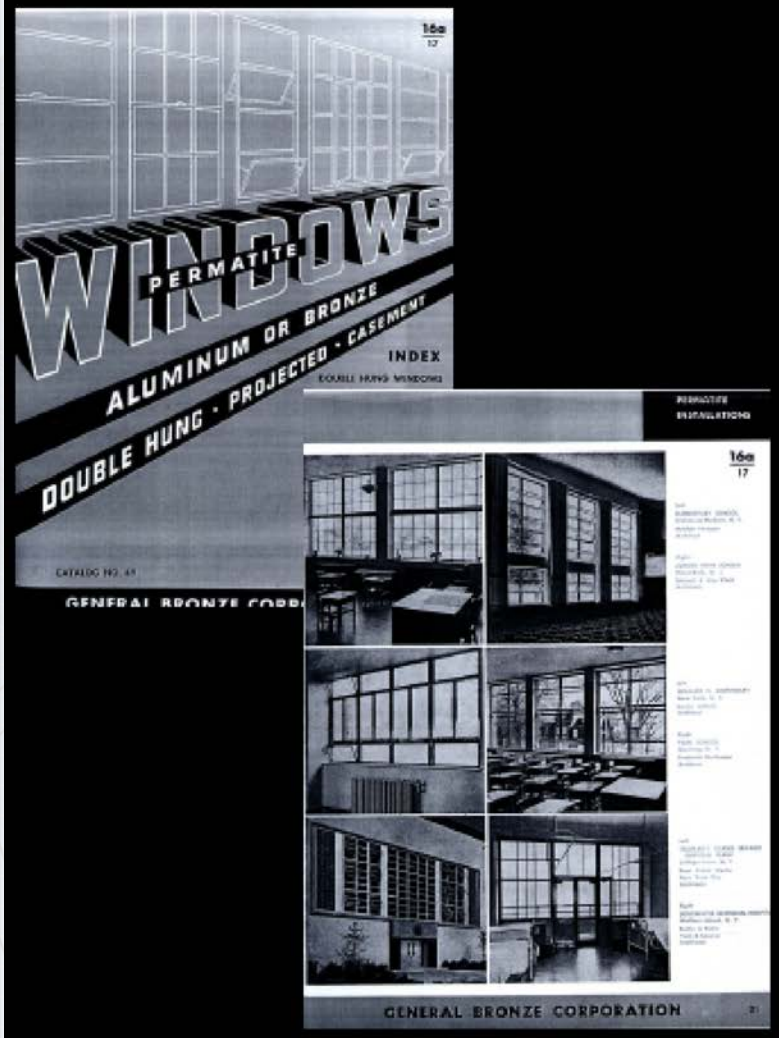

GENERAL BRONZE 1949 CATALOG

GENERAL BRONZE 1950 CATALOG

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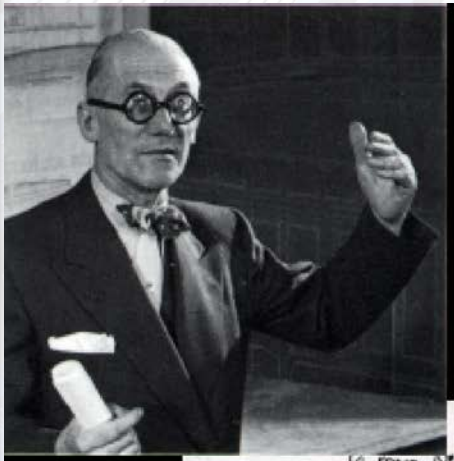
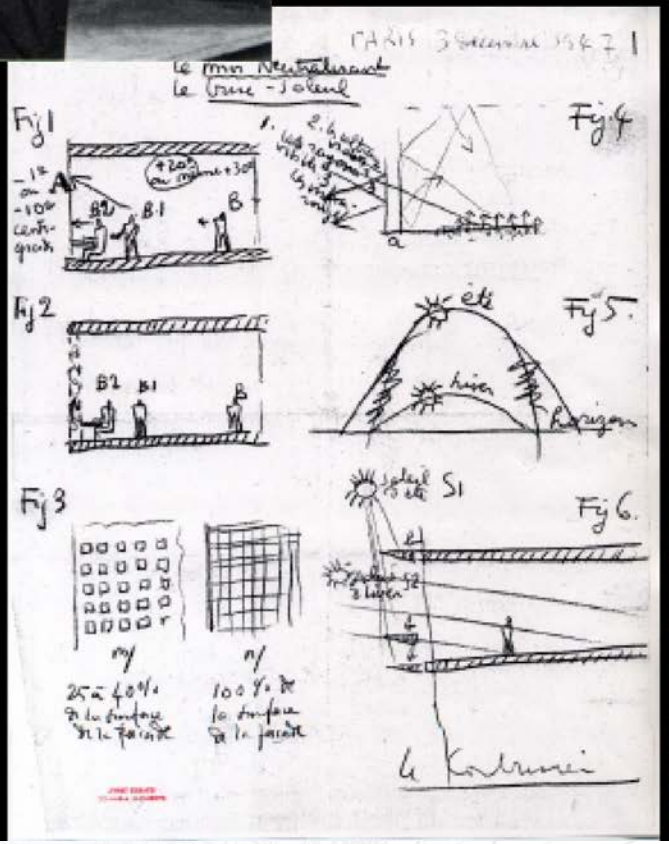
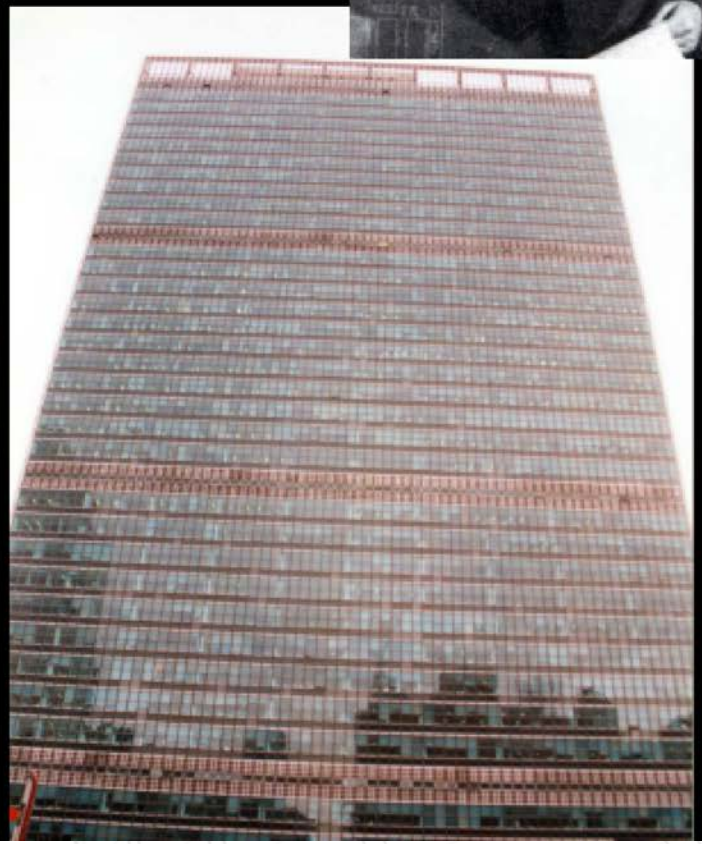






1954 CATALOG

1955 CATALOG

1956 CATALOG

SHADOWS CHASED BY U.N. ARCHITECTS
New York Times (1857-Current file); Nov 19, 1946; ProQuest Historical Newspapers: The New York Times
pg. 18

SHADOWS CHASED BY U. N. ARCHITECTS

Planners Build a Mock-Up Facade of the Secretariat Building on East Side

United Nations site planners spent some time yesterday, chasing shadows.

Using what architects described as a mock-up, they studied the effect of daylight upon the design and materials contemplated for the projected thirty-nine-story Secretariat Building in East midtown Manhattan.

The mock-up, actually a full-scale model, represents a facade showing roughly how the windows will look. It stands four stories high on the flat roof of the Manhattan Building, in East Forty-second Street, and is supported against inclement weather by pipe-scaffolding. Pale blue translucent glass features the spandrel, that portion of the building between the head of the window of one floor and the window sill of the floor above.

"We're checking shadows and lines, then observing how it looks from two to three hundred yards," Deputy Planning Director Max Abramovitz explained. "We may tear it down in time and redesign the detail."

While a glass spandrel is not original or unique, he pointed out, it has not been employed on so large a scale. Rockefeller Center buildings feature stone spandrels, while others have been built of aluminum. There is no certainty that in the United Nations structure glass will predominate, he said.

"Generally," he continued, "architects use a mock-up to study portions of things, then we refine it before we build it. We examine the subtleties of some of the lines, of the wood, the plaster and the glass. Our designers will give the matter further attention, perhaps for a couple of months."

The present mock-up; about fifty feet high and eighteen feet wide, was completed late Wednesday, according to Glenn Bennett, executive officer of the planning division. Supervising its erection were Wallace K. Harrison, planning director, and James Dawson, coordinator of construction.

THE SECRETARIAT'S ORIENTATION

—why architects sited the building as they did, and how this affected its mechanical features

If all architectural criticism directed against the UN Secretariat, most vehement is that opposed to a great glass wall facing the west- sun. Out-of-towners who have lived through one of New York's ally hot summers are torn with pity for unsuspecting foreigners ho, in years to come, may roast behind a thin protection of glass d venetian blinds.

The cudgel against the present design was originally taken up by Corbusier who protested to Warren Austin: "My strong belief that it is senseless to build in New York, where the climate is rrible in summer, large glass areas which are not equipped with 'brise-soleil.' I say this is dangerous, very seriously dangerous."

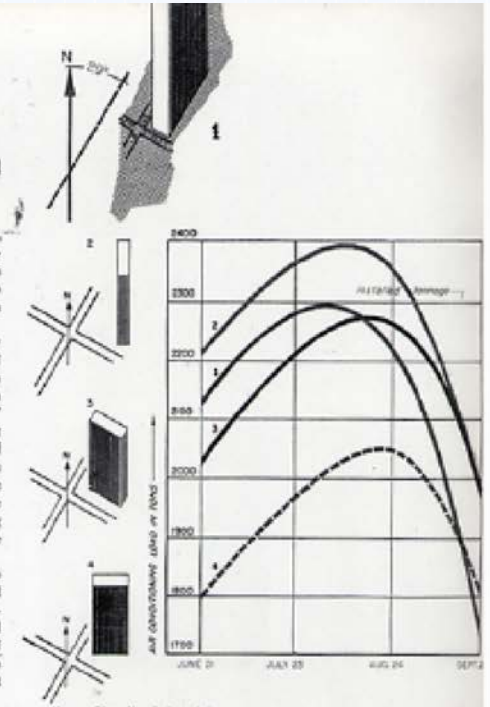
A few American architects have been equally critical of the great lass facade and the building's orientation. "Air conditioning and netian blinds are pitted against the powerful sun," said one. "Some ther answer could have been found for the west wall and the rrible sun," sums up many opinions. Critics point out that while e western sun is a summer fireball, simply turning the existing wign 90° would put a blank wall to the west and glass walls to the rth and south—an ideal combination.

The censors would have an unassailable position except for two sons: 1) the efficiency of modern air conditioning which could ake an inside office in hell quite comfortable, and 2) the little ap- reciated fact that Manhattan island does not lie due north and uth. New York's so-called north-south avenues run 29° east of rth. So the Secretariat's much-lamented west wall actually faces ore nearly northwest than west—and receives much less sun heat an might be imagined.

The orientation study above, made for the UN Planning Office by gineers Syska & Hennessy, clearly shows the difference between e orientation which exists (case No. 1) and what the air con- itioning load might be if the building were turned 90° (as in case o. 3) or if its glass walls faced true east and west (as in case o. 2), or north and south (case No. 4).

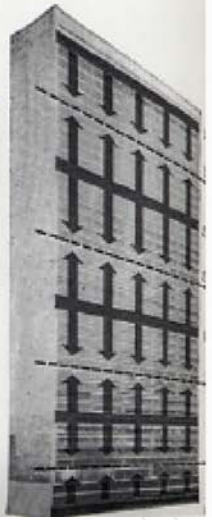
If the glass walls were parallel with 42nd Street (rather than st Avenue), one wall would face approximately southwest and roughout the summer season would lap up almost as much sun as now the case. By August 1, the present northwest wall has the fol- wing sun load (BTU'S per hour per square foot of unshaded glass) compared with a theoretical southwest wall which the building uld have if it were parallel with 42nd Street, according to the 1950 HVE Guide.

Time	Northwest Wall	Southwest Wall
8 a.m.	14	14
9 a.m.	15	15
10 a.m.	16	16
11 a.m.	18	22
12 noon	16	62
1 p.m.	16	110
2 p.m.	30	144
3 p.m.	76	156
4 p.m.	122	147
5 p.m.	141	118
6 p.m.	106	62
7 p.m.	28	6



Above: Plan No. 1 is existing orientation. Curves show air conditioning load for each of four possible sitings.

Secretariat has four pipe galleries plus added equipment in basement, each supplying floors as shown at right. Building-wide rows of louvers at each mechanical floor are used for fresh and exhaust air. Photo above shows part of a mechanical floor, which permits concentration of most heating, air conditioning, electrical, telephone and other such equipment.



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GLAZING & SHADING ANALYSIS

GLAZING & SHADING	AIR CONDITIONING INITIAL COST	AIR CONDITIONING OPERATING COST
(⅛") COMMON GLASS	$828,000	$5,930
" " & ROLLER SHADE	680,000	2,860
" " & INSIDE VEN'TN. BLINDS	567,000	4,030
" " & OUTSIDE " "	516,000	1,480
" " & POOL SHADE	928,000	1,600
(⅛") HEAT ABSORBING GLASS	940,000	4,520
" " " & ROLLER SHADE	504,000	1,330
" " " & INSIDE VEN'TN. BLINDS	488,000	2,240
" " " & OUTSIDE " "	315,000	1,480
(⅛", ¼", ⅛") THERMOPANE	760,000	5,330
" & ROLLER SHADE	452,000	2,240
" & INSIDE VEN'TN. BLINDS	583,000	3,780
" & OUTSIDE " "	315,000	1,480
(⅛", ¼", ⅛") HEAT ABSORBING THERMOPANE	906,000	5,140
" " " & ROLLER SHADE	416,000	2,370
" " " & INSIDE VEN'TN. BLINDS	447,000	2,660
" " " & OUTSIDE " "	782,000	1,180
GLASS BLOCK	478,000	2,790
EXTERIOR LOUVRES		
" " HORIZONTAL - FIXED		
" " " & VERTICAL - FIXED		
" " VERTICAL - FIXED & HORIZONTAL - MOVABLE		
FIXED INTERIOR LOUVRES		
VENETIAN BLINDS - GLASS ENCLOSED		
INTEGRAL VENETIAN BLINDS & GLASS		

ORIENTATION

ANALYSIS UNIT

Figure No. 4-AC

ORIENTATION AS AFFECTING AIR CONDITIONING

ORIENTATION	TONS GROSS	TONS SUN	APPARENT INITIAL COST GROSS	APPARENT INITIAL COST SUN	APPARENT OPERATION POWER ONLY GROSS	APPARENT OPERATION POWER ONLY SUN
①	2220	805	$1,695,000	$604,000	$15,000	$4,030
②	2130	745	$1,645,000	$557,000	$14,680	$3,720
③	2290	858	$1,718,000	$674,000	$15,300	$4,480
④	1830	620	$1,370,000	$465,000	$12,200	$3,320

INITIAL COST COMPARISON

ORIENTATION	SUN	GROSS
①	$604,000	$1,695,000
②	① LESS $47,000	① LESS $50,000
③	① PLUS $70,000	① PLUS $23,000
④	① LESS $159,000	① LESS $325,000

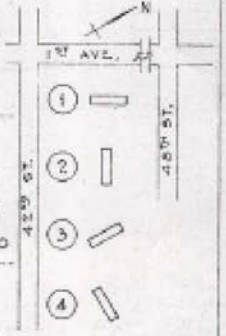
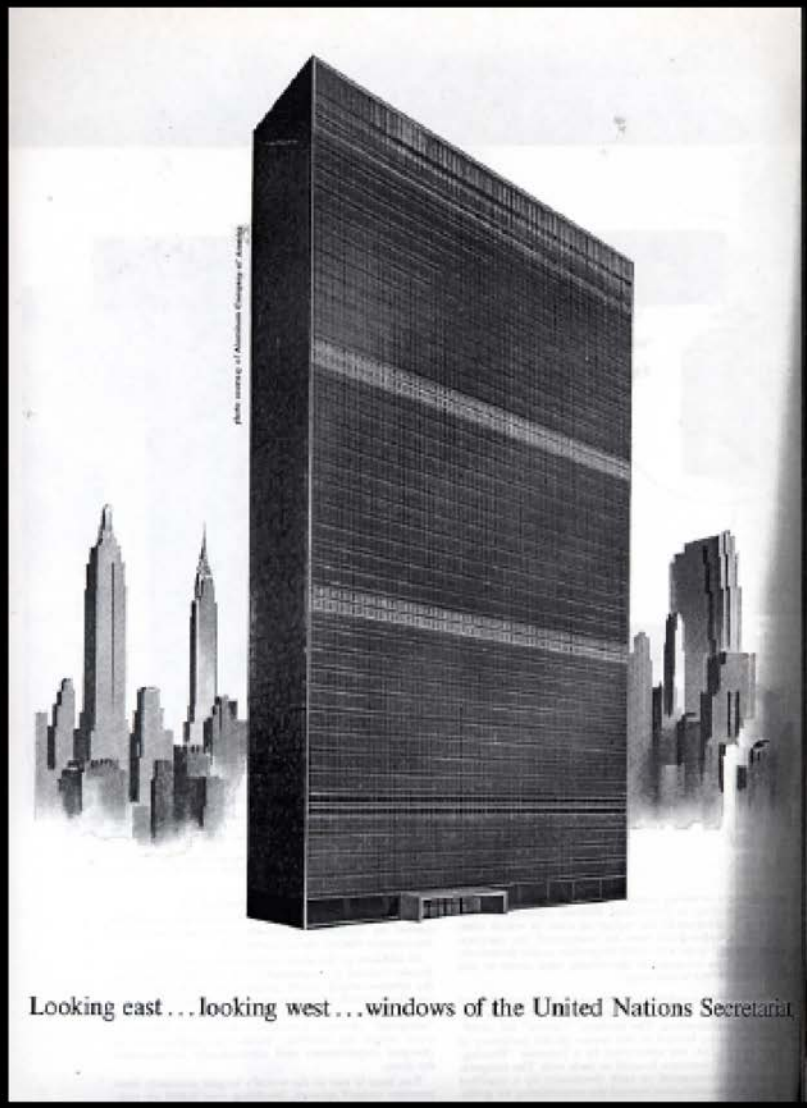


Figure No. 3-AC

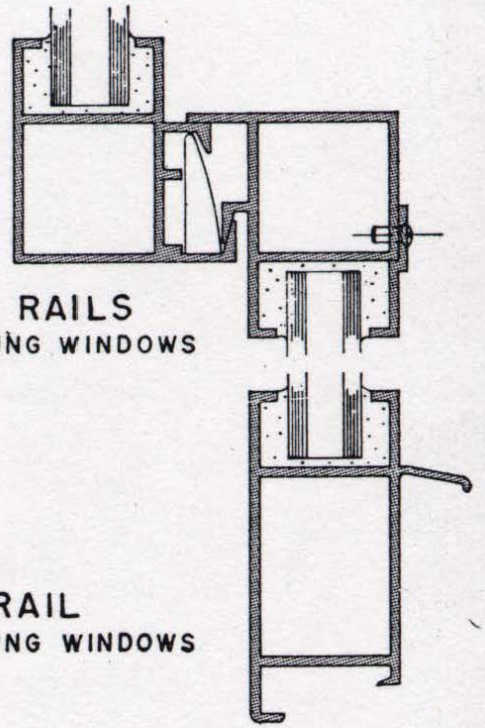


Looking east . . . looking west . . . windows of the United Nations Secretariat numbering 4739, are fitted with venetian blinds

. . . manufactured with LEVOLOR enclosed metal heads and bottom bars

"See, it's *Thermopane* ...you'd never have to fuss with storm windows!"

Thermopane



MEETING RAILS
OF DOUBLE HUNG WINDOWS

SILL RAIL
OF DOUBLE HUNG WINDOWS

NOTE:
THIS SASH MEMBER
MAY BE USED FOR SASH
2'-0" X 5"-0" MAXIMUM.

Par. 20-06 (Cont'd.)

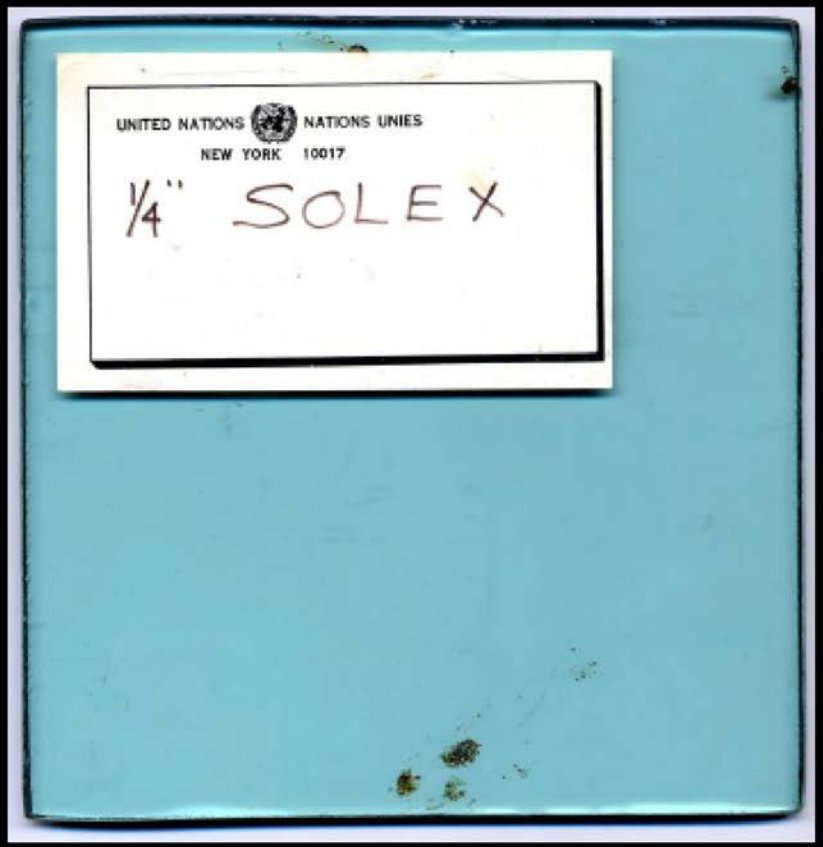
(b) Heat-Absorbing Glass: (See Alternate 20-a). All heat-absorbing glass shall be polished plate glass, 7/32 to 1/4 inch thick, of a cool "light bluish" or light "greenish" color, of special chemical composition that will absorb a high percentage of the infra-red rays of the sun and effect a net reduction of the solar heat projected through the glass. Visible light transmission shall not be reduced more than 30 percentum. In general, heat-absorbing glass shall be the equivalent in kind, quality, function and characteristics, but ~~is~~ not restricted to "Solex", as made by the Pittsburgh Plate Glass Company, or "L-O-F Heat-Absorbing Glass", as made by the Libbey-Owens-Ford Glass Company.

(c) Spandrel Glass Panels: Of clear crystal sheet glass, 7/32 to 1/4 inch thick, upon which a selected ceramic color is fused at high temperature on the back of each sheet, each sheet being then fired at a temperature not less than 1190 degrees F. and tempered by reducing the temperature sharply within established periods of time. Color fused on back shall be permanent, non-fading, uniform throughout in texture and coverage, free from blisters or pin holes, and acid-resistant and not subject to deterioration in any form as a result of constant exposure to variable changes of light, heat or cold. A slight "bowing" of each sheet is admissible, but in no event shall same exceed 1/8 inch in the longest dimension of each sheet. Full-size samples of this material to be submitted for approval to the Director prior to initiation of coloring process.

(d) Polished Plate Glass: Polished plate glass shall be Type "A," glazing quality, nominal thickness 1/4 inch.

(e) Wire Glass: Wire glass shall be Type "E", Welded Wire, Square Mesh, 1/4 inch thick, clear, polished two sides.

FRAGMENT FROM BUILDING SPANDREL GLASS
CORNING (ASG) AKLO ®



UN ARCHIVAL SAMPLE OF VISION GLASS
PPG SOLEX ®

June 11, 2007

April 17, 1951

West Facade (1998, no film)

East Facade (2001, film)

West Facade (2004, film added)

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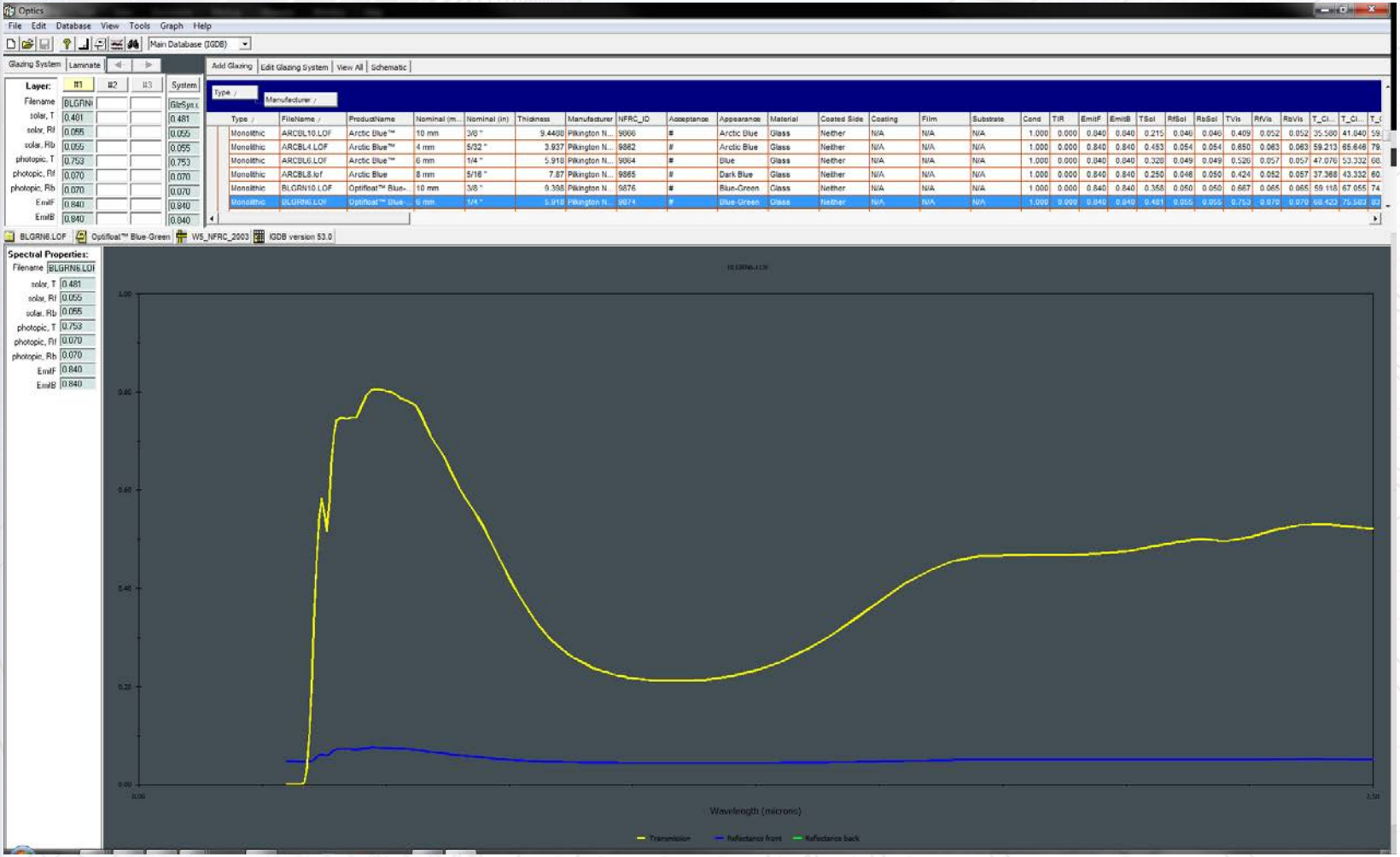

2:30pm

6:30 pm


1966
2007
2015


ORIGINAL VISION GLASS
"EXISTING" VISION GLASS
G-7
G-8
10

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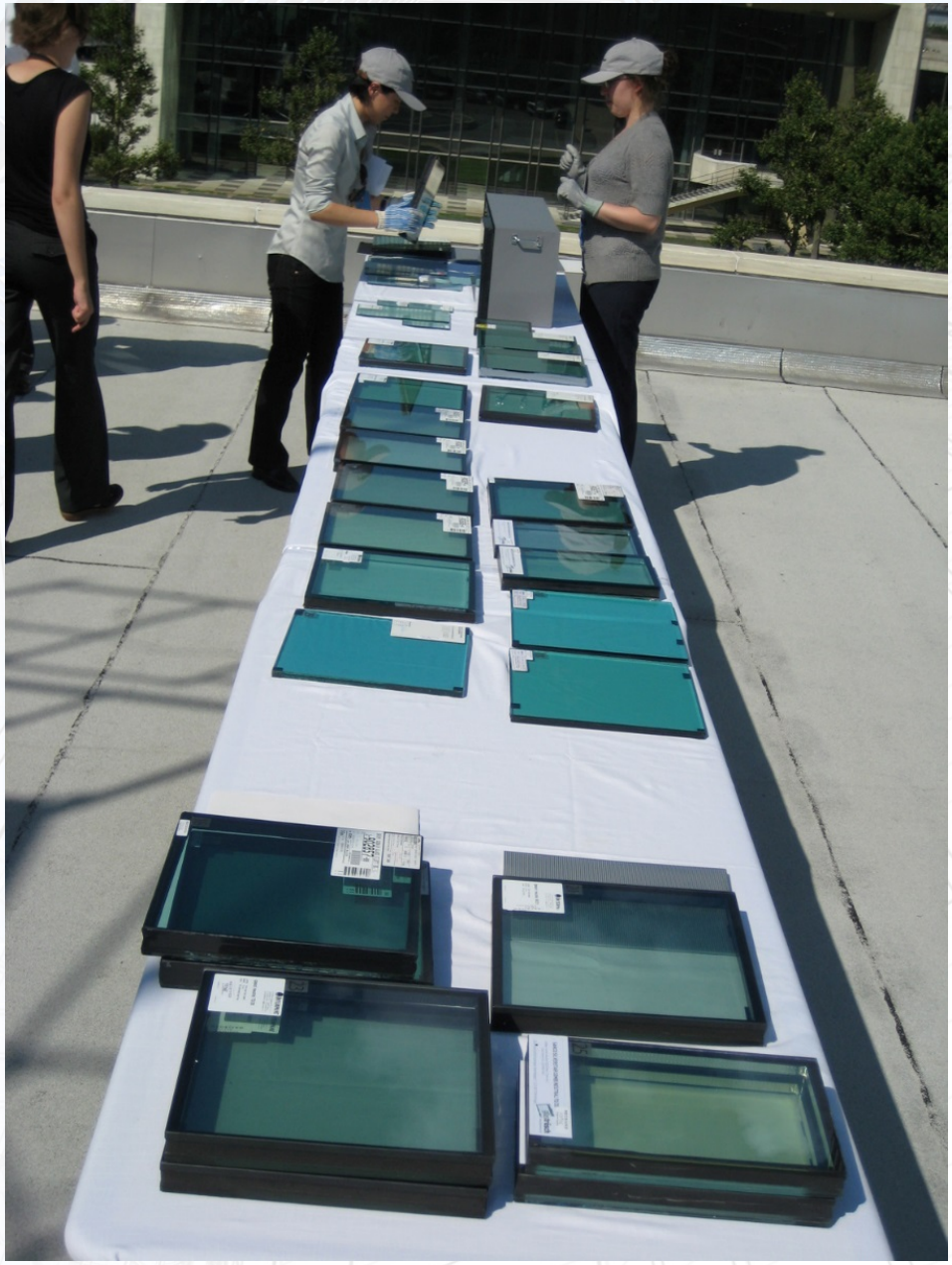

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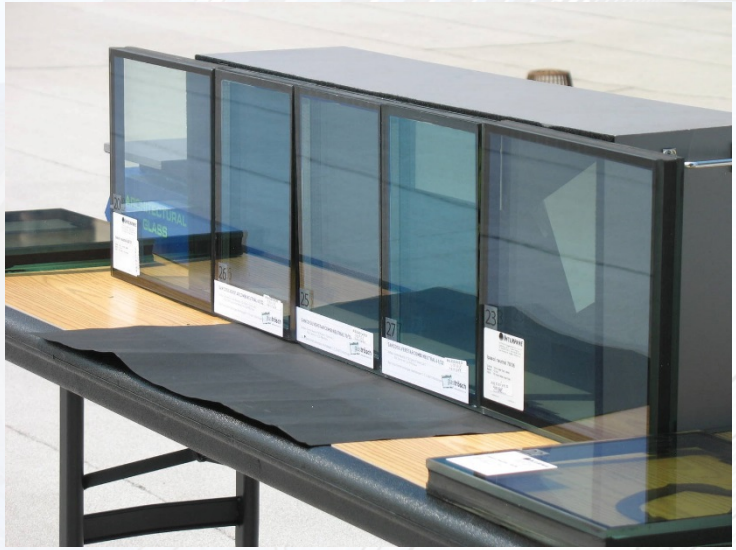

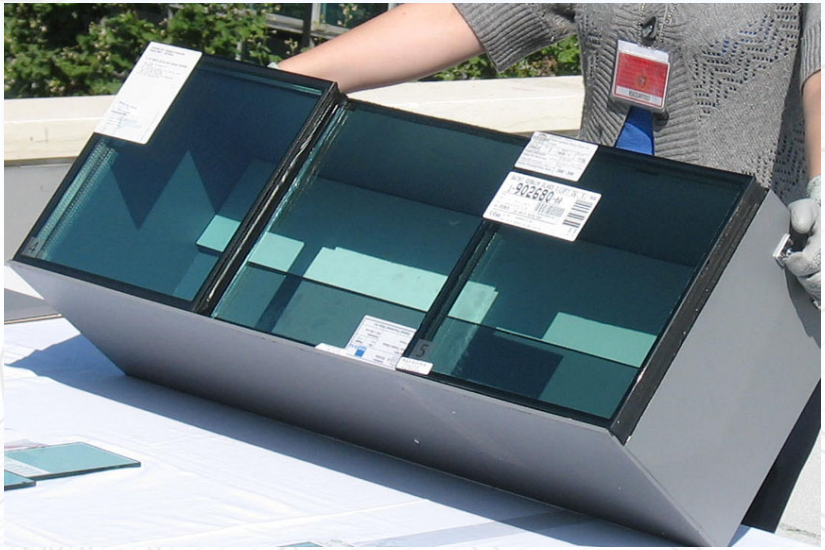

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Photograph by Whitney Boykin