façade renovation/transformation: building 26

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2 Approaches:

Selective:
Substitution of elements, glass panels, spandrel panels etc.

Transformative:
2\textsuperscript{nd} layer on façade, for fixed shades, more clear glass area.
1) What is the effect of changing window size and location, or glass type?

2) Is there a conflict between daylighting and glare protection in the current scheme?

3) Are there any materials which may help protect from direct sun and daylight simultaneously?

4) How would a multi-leaf façade change the feel of the interior space?

5) Would it help or hurt daylighting overall?
ECOTECT MODEL

6 m

Ceil
Refl. = 70%

Wall
Refl. = 20%

6 m
Spandrel or translucent glass in the upper panel

Solex or clear glass in the middle panels

Spandrel in the lower panel
Definition of existing Solex glass in radiance:

void glass SOLEX_8_glass
0 0
0 0 3 0.656 0.835 0.756

void BRTDfunc SOLEX_8_front
10
0.063 0.076 0.073
0.602 0.766 0.693
0 0 0
.
0 9 0 0 0 0 0 0 0 0 0

void BRTDfunc SOLEX_8_back
10
0.064 0.076 0.074
0.602 0.766 0.693
0 0 0
.
0 9 0 0 0 0 0 0 0 0 0
Direct Light

- Solex glass in the middle panels with spandrel in the upper panel
- Clear glass in the middle panels with spandrel in the upper panel
- Translucent glass in the upper panel with clear glass in the middle panels
Diffuse Light

- Solex glass in the middle panels with spandrel in the upper panel
- Clear glass in the middle panels with spandrel in the upper panel
- Translucent glass in the upper panel with clear glass in the middle panels
Dynamic Simulation w/ Daysim

DA:
Existing Solex Glass

DF:
Existing Solex Glass

LEED 50%
DA: Clear Glass

DF: Clear Glass

LEED
void prism2 26_LCP
11 f1 dx1 dy1 dz1 f2 dx2 dy2 dz2 lcp0.cal -rz 90
0
2 0.5 1.5

Phillip Greenup 3/9/98

{ Fresnel calculations of transmission and reflection }
cos_i=abs(Rdot);
cos_t=sqrt(A2*A2-1+cos_i*cos_i);
rte=(cos_i-cos_t)/(cos_i+cos_t);
rtm=(A2*A2*cos_i-cos_t)/(A2*A2*cos_i+cos_t);
R=(rte*rte+rtm*rtm)/2;
T=1-R;

{ Fractions deflected and undeflected }
tan_rp=abs(Dz)/(sqrt(A2*A2-1+Dx*Dx));
m=floor(tan_rp/A1);
fd0=(tan_rp/A1)^(-1)^m+2*floor((m+1)/2)^(-1)^m+1;
fu0=1-fd0;
f0=fd0*T*T;
fu=fu0*T*T;

{ Selection of two strongest components }
N1=if(fu-fd,if(fu-R,1,3),if(fd-R,2,3));
N2=if(fu-fd,if(fu-R,if(fd-R,2,3),1),if(fd-R,if(fu-R,1,3),2));
f1=select(N1,fu,fd,R);
dx1=select(N1,Dx,Dx,-Dx);
dy1=Dy;
dz1=select(N1,Dz,-Dz,Dz);

f2=select(N2,fu,fd,R);
dx2=select(N2,Dx,Dx,-Dx);
dy2=Dy;
dz2=select(N2,Dz,-Dz,Dz);
DA: LCP Glass

DF: LCP Glass

50%

LEED
Dynamic Simulation w/ Daysim

DA:
Existing Solex Glass

DF:
Existing Solex Glass

LEED
50%
January- Single Facade- West

March- Single- East
OBJECT ATTRIBUTES
Avg Daily Total (Wh/m²)
Units: Range: 0.0 - 4000.0 Units
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