Methods of Facade Retrofit for Commercial Buildings

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Functions of a Curtain Wall?

Outer “skin” of the building.

1. Regulate the interior environment
2. Resist wind loads and other exterior forces
3. Architectural
Regulate the Environment
Methods of Facade Retrofit
Methods of Facade Retrofit

Before

After
Architectural
Why do Curtain Walls Fail?

- Design Details
- Construction Details
- Finite Lifespan of Components
- Extreme Weather Events
Methods of Facade Retrofit
Why are Retrofits Important?

- Building stock is aging
- Opportunities to upgrade and modernize the building’s appearance
- Energy efficiency
- Risk Management
Planning the Retrofit

1. Comprehensive assessment
2. Architectural design & renderings
3. Engineering design
4. Mockups & testing
5. Implementation
400 UNIVERSITY CURTAIN WALL RETROFIT

1. Constructed 1969
2. 25 floors, 380,000 GSF
3. 12 typical, 4 corner drops
Methods of Facade Retrofit
Methods of Facade Retrofit

1. Single, interior glazed vision units
2. Unitized system
3. Installed prior to precast
4. Spandrel areas designed to be drained / vented
5. Face sealed post construction
6. Window film on interior

Tower
Methods of Facade Retrofit
Methods of Facade Retrofit

Why Retrofit?

1. Tenant retention & attraction
2. Aesthetic upgrade
3. Solve air and water penetration issues
4. Reduce energy demand
Option 1. Retrofit

- Remove glazing stop and install new IGUs from interior
- Overclad spandrels OR
- Removal spandrels, retrofit backpans, install new spandrel panels
Option 2. Overclad, QAL / BVDA Report, Mar-2012

- Skimming adapter to existing frame
- Rework backpans
- 2012 (BVDA) recommendation
- Scoped site investigation

Section Detail Capped at Sill of Vision Unit
Option 3. Reclad

- Full removal and replacement with new
- 2005 recommendation
Mockups, Dec-2012

1. 4 types of IGU, spandrel glass, snap cap

Final Selection
IGUs: Bronze HS, Clear Solarban 60 (3) Temp
Spandrels: Signal Grey
Caps: Champagne
Preliminary Design - Post Tender, 12-Mar-2013

- Interior pre-finished aluminum cover attached to existing frame c/w adhesive tape.
- Horizontal joint at top/bottom rail.
- Existing galvanized steel back pan to be re-sealed with new semi-rigid insulation c/w stick pins.
- Aluminum spandrel glass support.
### Thermal Analysis #02: 10-Jun-2013

**Figure 2**
2” Deep Back Section - Sill of Vision Area

<table>
<thead>
<tr>
<th></th>
<th>2” Deep Back Section</th>
<th>3” Deep Back Section</th>
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</thead>
<tbody>
<tr>
<td>Minimum interior surface temperature</td>
<td>6.7°C</td>
<td>8.1°C</td>
</tr>
<tr>
<td>Maximum interior relative humidity without formation of condensation</td>
<td>31%</td>
<td>35%</td>
</tr>
<tr>
<td>U-Value (Btu/h-ft²-F)</td>
<td>0.2623</td>
<td>0.2615</td>
</tr>
<tr>
<td>Impact on budget</td>
<td>2 %</td>
<td>5%</td>
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</tbody>
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On-Site Mockup: 27-Jul-2013
Lab Testing, Aug-2013
Mobilization: Aug-2013
Full Scale Construction: 27-Sep-2013
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Why Overclad?

1. Site conditions
2. Minimize tenant disruption
3. Customizable
4. Budget
The Occupied Building Challenge

- Potential for extreme disruption to tenants
- Respect for tenanted spaces
- Life Safety
- Sequencing and Coordination
- Communication
CITY CENTRE PLACE, EDMONTON

C3 POLYMERIC
curtain wall retrofits

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COBOURG COURTHOUSE / SUNLIFE ATRIUM

C3 POLYMERIC
curtain wall retrofits

Methods of Facade Retrofit
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Execution

- Budget
- Schedule
- Tailor plan to meet project specific requirements
- Adapting to unforeseen conditions
- Cooperative and proactive approach