Building Envelope Enclosures That Work, What Owners Want!

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Board of Directors on BIMForum

#BIMForumED
Level Of Development (LOD)
Cold Formed Metal Framing (CFMF) BIM
Exterior Cladding Systems – Most Common Leakage & QC Issues

- **Veneer Systems**
  - Brick Masonry
  - Cultured Stone
  - Metal Panels

- **Barrier Systems**
  - Exposed Steel Framing
  - Exterior Insulation and Finish System (EIFS)

- **Glazed Systems**
  - Curtain Walls
  - Ribbon Windows
  - Punched Openings
  - Storefronts
Veneer Cladding Systems – Masonry Flashing

1. Base Flashing Detail
2. Self-adhering flashing membrane w/ end dams at terminations
3. Must use primer
4. Prefer metal drip flashing at front edge and termination bar at top edge
5. Apply mastic along top edge
6. Top edge should extend above top of mortar net
Veneer Cladding Systems – Masonry Flashing

1. Lintel Flashing Detail
2. Similar to base flashing
3. Prefer sheet metal box end dam with membrane flashing liner.
4. End dam front edge must be encapsulated in sealant joint
Veneer Cladding Systems – Masonry Flashing

1. Missing End Dams

2. Will not usually be visible in finished construction

3. Missing end dams at shelf angles that abut window jambs will allow water infiltration to the interior
Veneer Cladding Systems – Masonry Flashing

• End Dams at Brick Returns

• Requires special consideration to direct water to exterior

• End dams must be installed prior to brick and adjacent framing
Veneer Cladding Systems – Masonry Flashing

• End Dams at Brick Returns

• Requires special consideration to direct water to exterior

• End dams must be installed prior to brick and adjacent framing
Veneer Cladding Systems – Masonry Flashing

1. Framing Anchors at Head

2. Confirm that anchor fasteners will not penetrate flashing

3. Requires coordination between glazing and masonry subcontractors
Veneer Cladding Systems – Masonry Flashing

• Framing Anchors at Head

• *Shop drawings for condition shown actually showed fasteners penetrating into brick cavity*

• Requires coordination between glazing and masonry subcontractors
VIRTUAL MOCKUPS

Images: IKERD & McCarthy, Dallas City Performance Hall
Virtual Mockup

Images: IKERD & McCarthy, Dallas City Performance Hall
Veneer Cladding Systems – ACM Panels

- Typical Configuration
- Panels overlap bottom to top, and at end joints
- Virtually impossible to remove a panel after installation
Veneer Cladding Systems – ACM Panels

• Typical Configuration

• Many field-formed joints

• Panel edges are gasketed at reveal extrusions, **but reveal joinery is not sealed**
Barrier Cladding Systems – Exposed Steel Framing

• Typical Configuration

• *Beam end connections and window-to-steel interfaces are not usually detailed properly for water-tightness*
Barrier Cladding Systems – Exposed Steel Framing
Barrier Cladding Systems – Exposed Steel Framing

- Typical Configuration

- Beam end connections and window-to-steel interfaces are not usually detailed properly for water-tightness
Barrier Cladding Systems – Exposed Steel Framing

1. Typical Configuration

2. Beam end connections and window-to-steel interfaces are not usually detailed properly for water-tightness
Glazed Systems – Perimeter Joints
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1. Improper Sealant Placement

2. Qualifications, coordination, and supervision become questionable when the caulker seals the temporary glass retainers
Glazed Systems – Pressure Bar Curtain Wall and Joinery

1. Horizontal Metal Panel Details

2. Details are not usually adequately developed and coordinated with other systems

3. Are often a source of leakage
Glazed Systems – Pressure Bar Curtain Wall and Joinery

1. Horizontal Metal Panel Details

2. End conditions are not well-defined when mullions do not capture ends of panels
Glazed Systems – Pressure Bar Curtain Wall and Joinery
Glazed Systems – Arched and Sloped Framing Members

1. Special Drainage Design is Required

   1. Weep holes along length of arch are ineffective, all drainage will occur at ends
   2. Weep holes along length of sloped members are ineffective, all drainage will occur at bottom end
Incomplete Work –

A clear sign that the completed work is not being checked
Incomplete Work

A clear sign that the completed work is not being checked.
Exterior Cladding Systems – The Realities

Subcontractor Installation Crews:

1. **Company owner** may not know how to do the work properly
2. **Jobsite foreman** may not know how to do the work properly
3. The jobsite foreman probably **has not read** the plans, and has no idea how his system interfaces with others
4. The installation crew is often comprised of **day laborers who do not know** how to do the work properly
5. The installation **crew changes every week or two**
6. The jobsite foreman probably **does not check** the completed work
7. **Needs to be inspected on a weekly basis by GC or a third party**
Exterior Cladding Systems – The Realities

1. The computer is not going to build the building for you……

2. You are responsible for the construction of the building……

3. Much of your subcontractor labor doesn’t care about their work, and their supervisors probably aren’t checking their work……

4. Your people need to know how the building should be built, and have to check to make sure that it is being built correctly.
Jobsite Mock-Ups
STEP 01

- BASE COLD FORMED METAL STUDS
STEP 02

- SHEATHING IN ROUGH OPENING.
- SHEATHING EACH SIDE OF METAL STUDS
STEP 03

• WATER PROOFING (STO GOLD) APPLIED TO OUTSIDE SHEATHING LAYER
STEP 04

• WATER PROOFING APPLIED AROUND ROUGH OPENING (STO GOLD MESH W/ FIBER REINFORCING)
STEP 6

- SILL PAN SEAL
STEP 7

- SILL PAN INSTALLED
STEP 8

- SEAL AROUND END DAM
STEP 9

• WINDOW INSTALLED
STEP 10

• DRY LINE SEAL
STEP 11

• EPS INSULATION
STEP 12

- BASE COAT
STEP 13

- FINISH COAT
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<tr>
<th>301</th>
<th>Element modeling to include:</th>
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<tr>
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<td>• Floor system with base specified locations and</td>
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<td>orientation.</td>
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<td>• Request non-graphical information associated with</td>
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<td>metal element to include:</td>
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<tr>
<td></td>
<td>• Member size, wall, and material with detailing</td>
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<tr>
<td></td>
<td>geometry.</td>
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<td></td>
<td>• Required tolerances for tolerances</td>
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<td>• Deflection criteria</td>
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<tr>
<th>300</th>
<th>Element modeling to include:</th>
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<tbody>
<tr>
<td></td>
<td>• Members located at base interface with wall edges</td>
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<td>(in)</td>
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<td></td>
<td>• Anchors, material or opening through wall</td>
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<td>• Any require that avoid finish combination with other</td>
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<tr>
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<td>materials such as fire retardant</td>
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<tr>
<td></td>
<td>• Lighting, electrical &amp; mechanical</td>
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<td></td>
<td>• Fixtures,</td>
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<td>• Finishes</td>
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<td>• Base trim &amp; finish treatments</td>
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**IKERD.com**
LOD 350
Where have we been, Where are we going?

2007

2008

2011

2017
The Fork in the Road….

• Where are you in implementation?

• How do you envision moving forward?

• In-House vs. Contracted Modeling?

• Coordination with architect and subs?

• Are you seeing BIM use in exterior cladding system design?

• How does it really translate to work being completed by subcontractor field labor?
Visit:

CD-bim.com/events/

8-9am PT

Wednesday, April 19, 2017 LOD Model

Wednesday, May 10, 2017

Wednesday, June 7, 2017

Wednesday, July 12, 2017

Wednesday, August 2, 2017

Wednesday, September 6, 2017

Wednesday, October 11, 2017

Wednesday, December 6, 2017
Speaker’s Contact Information

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