A REVIT PLUG-IN FOR MASONRY

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MENU

Masonry in a BIM World

• BIM and LOD
• BIM and Masonry
• BIM-M
• Masonry IQ

Talking Points

• Conversing with Architects, Engineers, and Contractors
WHAT IS BIM

It’s a New Process – Building Information Modelling

★ Consistent 3D thinking, collaboration, and coordination.

It’s a New Deliverable – Building Information Model

★ Element Based, Data Rich, Intelligent, 3D Models.
Elements and Data

- Elements not Linework
- Intelligent Connectivity
- Accurate Data
- Data can be transferred to other users/other programs
Level of Development (LOD)
MASONRY LOD
LOD – LEVEL OF DEVELOPMENT
3D CONTENT NOT CONSTRUCTION DOCUMENT CONTENT

BIM-M - CTC Office Building
LOD 350 CMU Backup Walls – Base Details
BIM AND
MASONRY
### MASONRY WALLS IN REVIT

![Edit Assembly window](image)

**Family:** Brick Wall  
**Type:** Generic - 8’
**Total thickness:** 0’ 8”  
**Resistance (R):** 0.00000 (1-ft²⁻¹°F BTU)  
**Thermal Mass:** 0.00000 BTU/°F

<table>
<thead>
<tr>
<th>Layer Function</th>
<th>Material</th>
<th>Thickness</th>
<th>Wraps</th>
<th>Structural Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Core Boundary</td>
<td>Layers Above Wrap</td>
<td>0’ 0”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Structure [1]</td>
<td>&lt;By Category&gt;</td>
<td>0’ 8”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Core Boundary</td>
<td>Layers Below Wrap</td>
<td>0’ 0”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Default Wrapping**

- **At Insert:**
  - **Do not wrap**
- **At End:**
  - **None**

**Modify Vertical Structure** (Section Preview only)

- **Modify**
- **Merge Regions**
- **Sweeps**
- **Assign Layers**
- **Split Region**
- **Reveal**

**View:** Floor Plan | Modify [ ]

**Preview >>**
### Wall System Layers

**Family:** Basic Wall  
**Type:** Exterior - Brick on CMU  
**Total thickness:** 1"  
**Resistance (R):** 51.637 (h·°F)/Btu  
**Thermal Mass:** 28.6462 BTU/°F

<table>
<thead>
<tr>
<th>Layer</th>
<th>Function</th>
<th>Material</th>
<th>Thickness</th>
<th>Wraps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Finish 1 [4]</td>
<td>Brick, Common</td>
<td>0&quot; 3 5/8&quot;</td>
<td><img src="checkmark" alt="" /></td>
</tr>
<tr>
<td>2</td>
<td>Thermal/Air Layer [2]</td>
<td>Air</td>
<td>0&quot; 3&quot;</td>
<td><img src="checkmark" alt="" /></td>
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<tr>
<td>3</td>
<td>Thermal/Air Layer [3]</td>
<td>Rigid insulation</td>
<td>0&quot; 3&quot;</td>
<td><img src="checkmark" alt="" /></td>
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<tr>
<td>4</td>
<td>Membrane Layer</td>
<td>Damp-proofing</td>
<td>0&quot; 0&quot;</td>
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<tr>
<td>5</td>
<td>Core Boundary</td>
<td>Layers Above Wrap</td>
<td>0&quot; 0&quot;</td>
<td><img src="checkmark" alt="" /></td>
</tr>
<tr>
<td>6</td>
<td>Structure [1]</td>
<td>Concrete Masonry Units</td>
<td>0&quot; 7 5/8&quot;</td>
<td><img src="checkmark" alt="" /></td>
</tr>
<tr>
<td>7</td>
<td>Core Boundary</td>
<td>Layers Below Wrap</td>
<td>0&quot; 0&quot;</td>
<td><img src="checkmark" alt="" /></td>
</tr>
<tr>
<td>8</td>
<td>Substrate [2]</td>
<td>Metal Furring</td>
<td>0&quot; 1 15/8&quot;</td>
<td><img src="checkmark" alt="" /></td>
</tr>
<tr>
<td>9</td>
<td>Finish 2 [6]</td>
<td>Concrete Wall Board</td>
<td>0&quot; 5/8&quot;</td>
<td><img src="checkmark" alt="" /></td>
</tr>
</tbody>
</table>

**Default Wrapping**

- **At Inserts:** None
- **At Ends:** Do not wrap

**Modify Vertical Structure (Section Preview only)**

- Modify
- Merge Regions
- Sweeps
- Assign Layers
- Split Region
- Reveal

**View Options:**

- Floor Plan: Modify by
- Preview
Material ??

- Name: Masonry - Concrete Masonry Units
- Description: Concrete
- Class: Concrete

BIM-M
Building Information Modeling for Masonry
Properties

Material Browser - Concrete Masonry Units

- **Concrete**
  - **Concrete, Cast-in-Place gray**
  - **Concrete, Lightweight - 4 ksi**
  - **Concrete, Normal Weight - 3 ksi**
  - **Concrete, Normal Weight - 4 ksi**

**Concrete Masonry Units**

- **Concrete - Cast-in-Place Concrete**
- **Concrete - Precast Concrete - 35 MPa**
- **Concrete (2)**

**Information**
- **Basic Thermal**
  - Thermal Expansion Coefficient: 0.00001 in/°F

**Mechanical**
- **Behavior**: Isotropic
- **Young's Modulus**: 3,372.13 ksi
- **Poisson's Ratio**: 0.17
- **Shear Modulus**: 1,445.16 ksi
- **Density**: 150.28 lb/cu ft

**Concrete**
- **Concrete Compression**: 2.50 ksi
- **Shear Strength Modification**: 1.00
- **Yield Strength**: 0.35 ksi
- **Tensile Strength**: 0.35 ksi
Lightgage Plug-In
Quickly Build Complex Wood Frames

Now complying with the latest energy efficient & green building methods in use today, MWF Pro Wood is the ultimate Revit® add-on for wood builders. Capable of framing virtually any project from single family homes to large scale multi-family structures, MWF Pro Wood allows its users to create custom framing to define all aspects of wall, floor and roof framing.

Precise framing data for all layers of a wall can be implemented to automate everything from structural framing, furring, clapboard and sheathing. The software can then automatically apply the framing throughout the Revit® model, while differentiating wall types, openings and penetrations throughout your Revit® project. With 3D framing complete, the project’s 2D panel drawings, cut lists, bill of materials and optional CNC output are a click away.
Masonry Modelling Limitations

- Difficult to model masonry with correct modularity – coursing/bonding patterns
- Graphics are limited
- Data is inaccurate
- Difficult to model bond beams and reinforcing

Tools for modelling masonry are falling behind other materials like steel, cold-formed, and wood.
COLLABORATION OF MASONRY SOCIETIES

International Masonry Institute

International Union of Bricklayers and Allied Craftworkers

MCAA

THE MASONRY SOCIETY

THE BRICK INDUSTRY ASSOCIATION

WESTERN STATES CLAY PRODUCTS ASSOCIATION

NATIONAL CONCRETE MASONRY ASSOCIATION

Building Information Modeling for Masonry
BEFORE YOU CAN HAVE BETTER TOOLS.... YOU NEED TO HAVE A DATABASE

CTC has entered data for the top 20 Generic models for both Clay and Concrete.
Finally a smart masonry tool inside Revit®.

Be more productive with masonry inside Revit®.
Masonry IQ is an Autodesk® Revit® plugin that supports masonry products and allows the user to create masonry specific wall types. A wide variety of custom bond patterns can be generated through the user interface which includes a 3D viewer to visualize patterns and bonding at corners. These patterns are analyzed and mapped to walls accounting for proper layout and bonding at corners and openings. Non-modular layouts will be flagged and proper field cuts are represented in elevation. Wall sections are automatically generated showing proper coursing and bond beam locations. Bond beams also generate sweeps for coordination.

Three different corner joins (mechanical bond, miter and squared off) are supported and adjusted for proper layout. Single and multi wythe walls are supported. Control Joints and other masonry properties are supported. Material schemas using materials from participating manufacturers allow for rendering of masonry elevations that represent the actual pattern and range indicated.
Study Modularity
More info coming soon...

Properly Bonded Corners
More info coming soon...

See Cuts at Openings
More info coming soon...

Custom Masonry Patterns
More info coming soon...

Generate Sweeps
More info coming soon...

Draw Masonry Sections
More info coming soon...
• Accurate coursing and bonding based on MUD data
• Complex mixtures of materials and bonding patterns
• Accurate coursing at corners
• Bond beams
• Placement of CJS based on NCMA TEK
• Cells accurately shown in plan
• Openings placed in coursing/bonding
• Renderings based on suppliers in your area
• Rebar detailing
FUTURE - Direct Design Plug In
MASONRY SUBCONTRACTORS

GET A SEAT AT THIS TABLE!

OR GET LEFT BEHIND.

STEEL  PLUMBING  ???  ELECTRICAL  HVAC

MasonryIQ
BIM-M Web site
www.BimforMasonry.org

BIM for Masonry
BIM is an acronym that stands for an object, or “Building information model” and also a process for creating and using that object, “building information modeling”. The BIM model provides a digital representation of the building, so that the modeling and analysis tools used by architects, engineers, constructors, managers and owners can read from and write to the same information source.

BIM is expanding quickly within the construction industry worldwide. However, the masonry industry is not well represented. Therefore, there is a need to develop BIM tools for masonry to maintain market share. With that intent, an initiative was formed in 2012 specifically to advance BIM for masonry.

The National Building Information Modeling for Masonry Initiative (BIM-M) is identifying barriers to and strategies for the full implementation of masonry materials and systems into BIM software for the design and construction industries.

Our commitment to BIM-M is an indication of the professionalism and dedication of