

# Building Technology III

## New York City College of Technology

Course Day 16  
*Revit Day 08 (Project Day 5)*

### *The New Academic Building – Masonry Wall Construction : GYM*



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<http://professorpaulking.wordpress.com/>  
<http://students.autodesk.com/>

# New Masonry Wall : Brick on CMU

## Project Day 04

- GYM  
Brick on CMU
  - Duplicate
  - Edit Structure
  - Assembly View
- Select existing masonry wall
- Edit Type > Duplicate

- Split Region
- Assign Material
- Assign Wall Type

- Add Reveals
- Add Sweeps
- Overview 1 2

## Windows

- 96 x 144
- Insert & Align
- Copy & Mirror

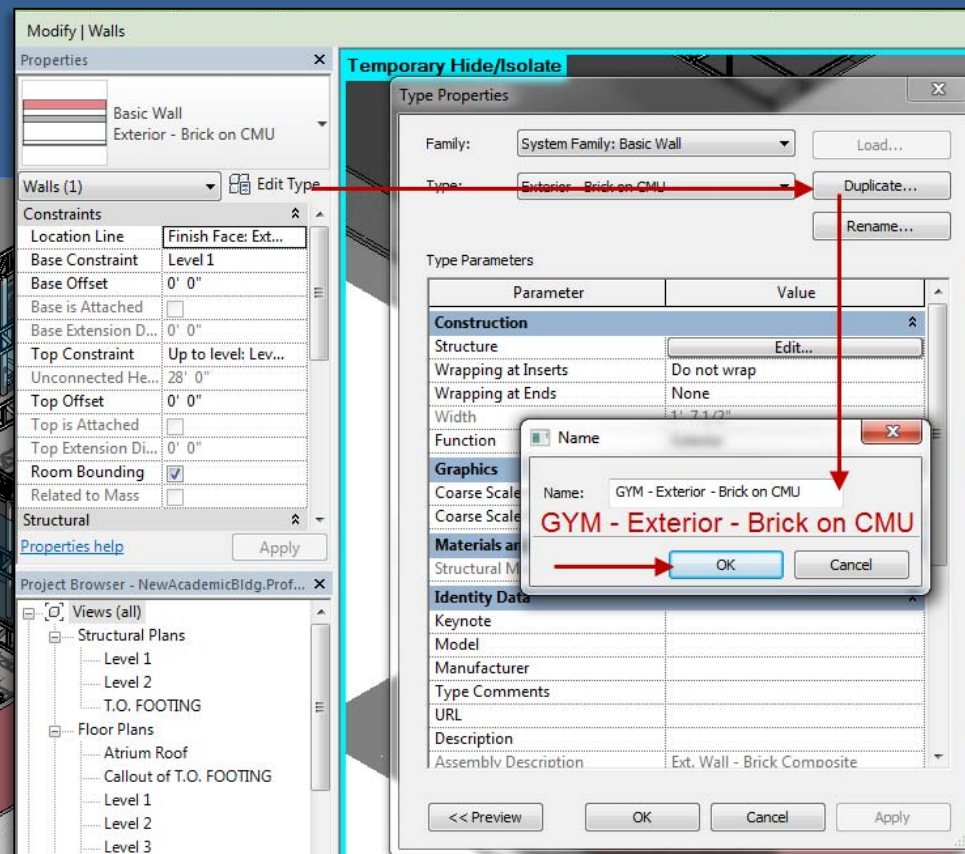
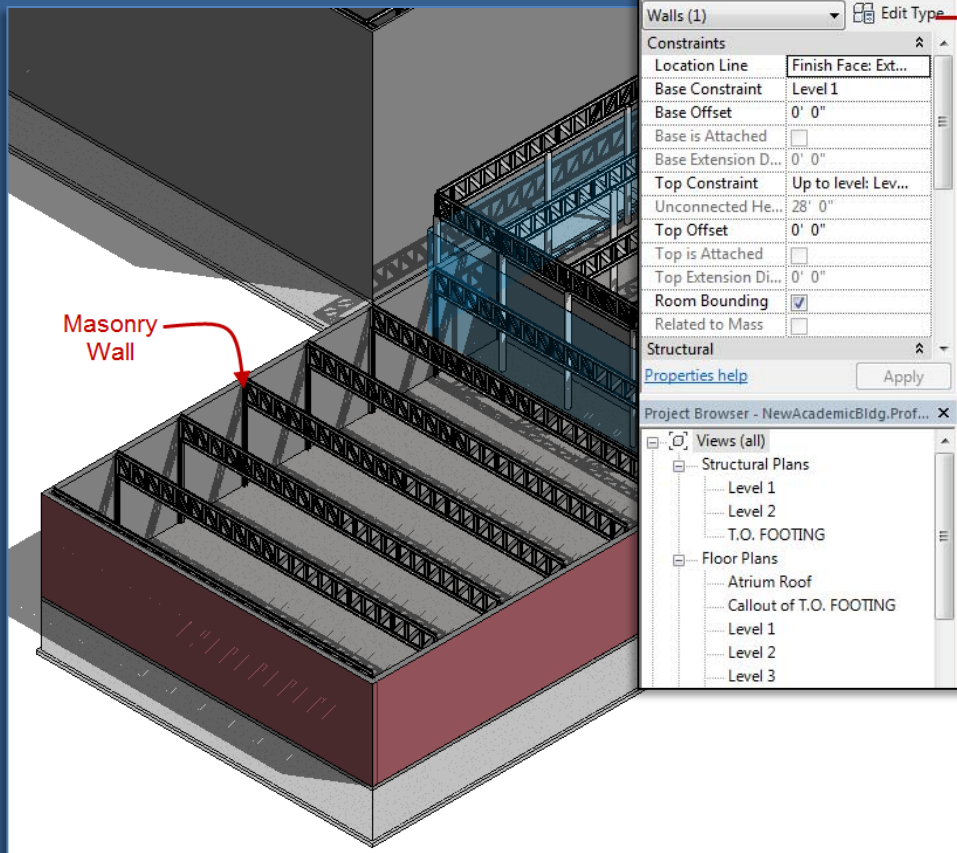
## GYM Overview

- Autocad  
Coursing Study
  - Layers & Units
  - Wall Section

- Elevation
- Section

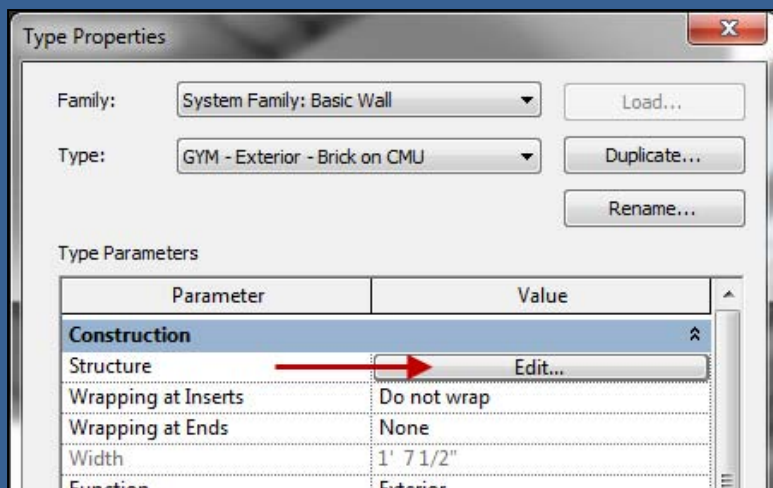
- Steps 1 2 3 4 5  
6 7 8 9 10

## Wrap-Up

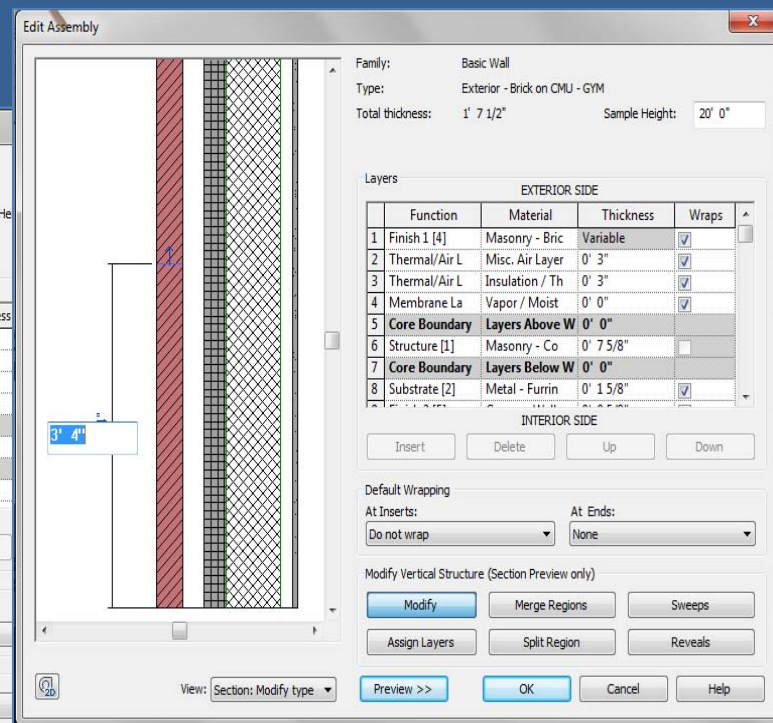


- Name the new wall  
GYM: Exterior – Brick on CMU

# New Masonry Wall : Brick on CMU



- Structure > Edit
- Preview Bottom (lower left corner)
- View: Section Modify Type Attributes



- Zoom in close to the bottom of the wall





## Project Day 04

### GYM Brick on CMU

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- 96 x 144
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### GYM Overview

### Autocad Coursing Study

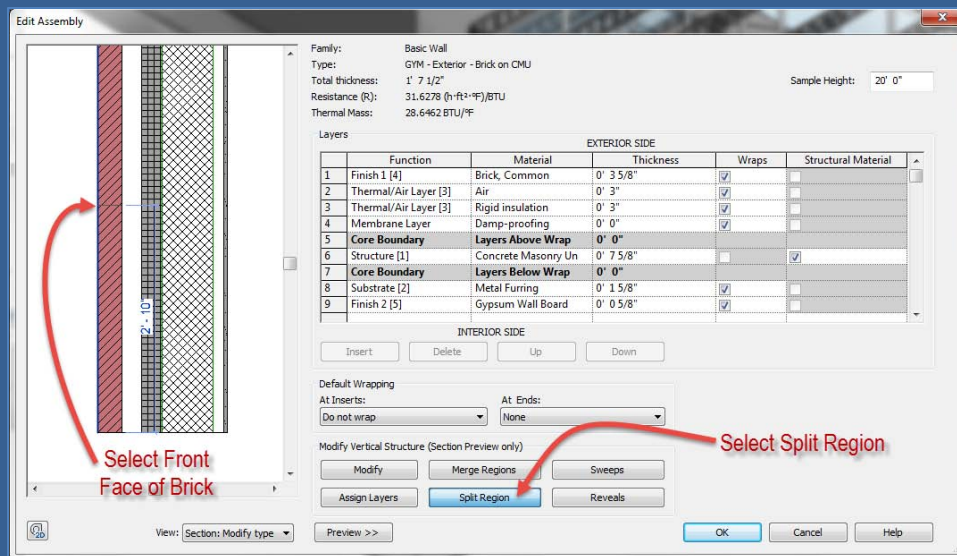
- Layers & Units
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- Section

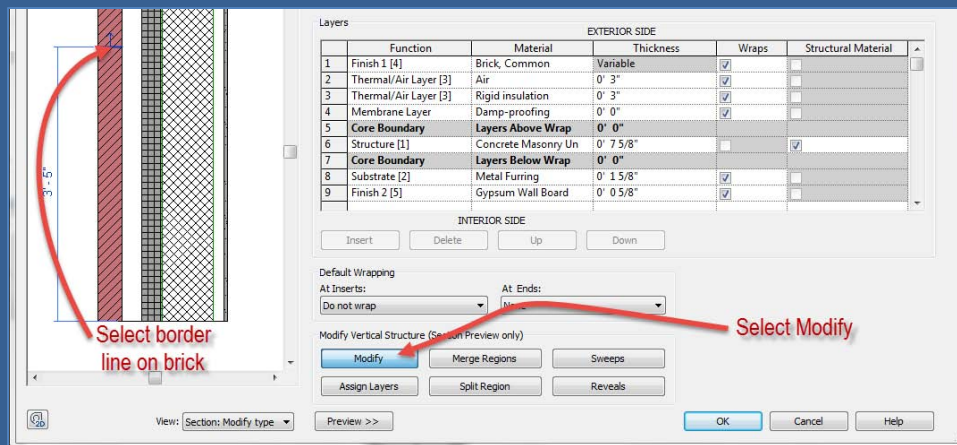
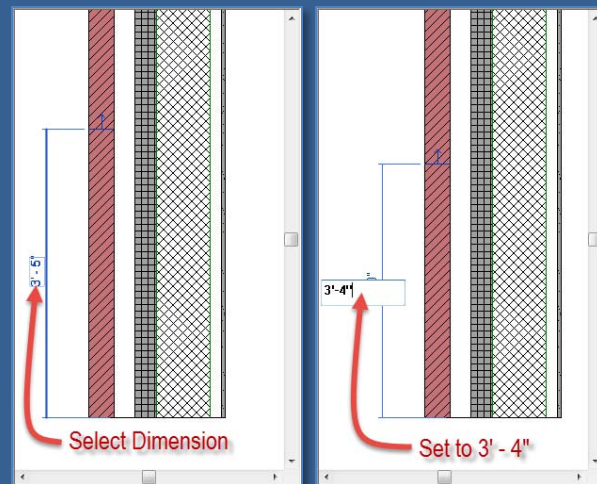
- Steps 1 2 3 4 5  
6 7 8 9 10

### Wrap-Up

# Add Precast or Stone Base : Split Region



- Split Region
- Select Front Face of Brick
- Select Dimension
- Set Value to 3'-4" (brick coursing)





# Add Precast or Stone Base : Assign Material

## Project Day 04

### GYM

#### Brick on CMU

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### GYM Overview

### Autocad

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- Steps 1 2 3 4 5  
6 7 8 9 10

### Wrap-Up

Layers

Function	Material	Thickness
1 Finish 1 [4]	Brick, Common	Variable
2 Thermal/Air Layer [3]	Air	0' 3"
3 Thermal/Air Layer [3]	Rigid insulation	0' 3"
4 Membrane Layer	Damp-proofing	0' 0"
5 Core Boundary	Layers Above Wrap	0' 0"
6 Structure [1]	Concrete Masonry Un	0' 7 5/8"
7 Core Boundary	Layers Below Wrap	0' 0"
8 Substrate [2]	Metal Furring	0' 1 5/8"
9 Finish 2 [5]	Gypsum Wall Board	0' 0 5/8"

EXTERIOR SIDE

INTERIOR SIDE

Insert Delete Up Down

Highlight first layer

Insert to add new layer

Layers

Function	Material	Thickness
1 Structure [1]	<By Structure>	
2 Finish 1 [4]	Brick, Common	Variable
3 Thermal/Air Layer [3]	Air	0' 3"
4 Thermal/Air Layer [3]	Rigid insulation	0' 3"
5 Membrane Layer	Damp-proofing	0' 0"

EXTERIOR SIDE

INTERIOR SIDE

New first layer

Layers

Function	Material	Thickness
1 Finish 1 [4]	<By Category>	
2 Finish 1 [4]	Brick, Common	Variable
3 Thermal/Air Layer [3]	Air	0' 3"
4 Thermal/Air Layer [3]	Rigid insulation	0' 3"
5 Membrane Layer	Damp-proofing	0' 0"
6 Core Boundary	Layers Above Wrap	0' 0"
7 Structure [1]	Concrete Masonry Un	0' 7 5/8"
8 Core Boundary	Layers Below Wrap	0' 0"
9 Substrate [2]	Metal Furring	0' 1 5/8"
10 Finish 2 [5]	Gypsum Wall Board	0' 0 5/8"

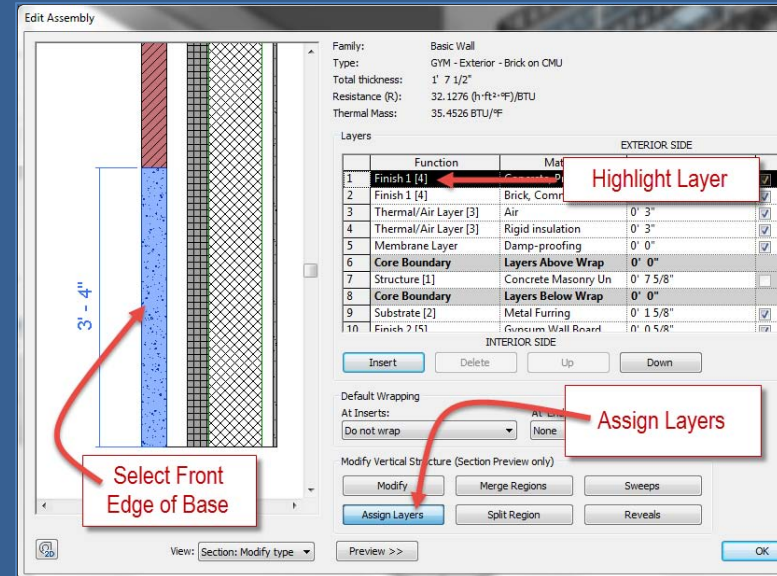
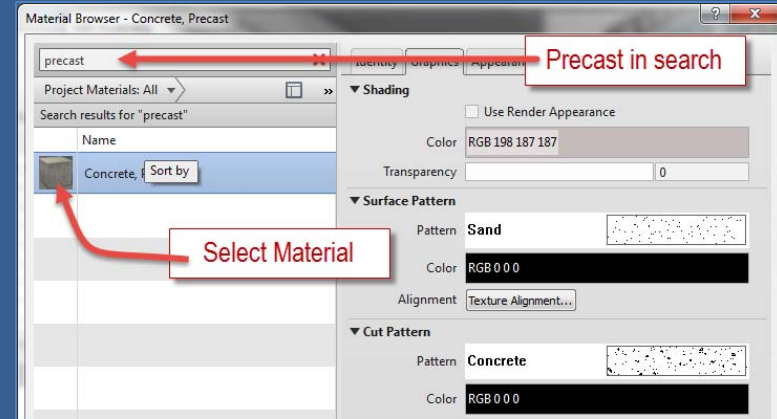
EXTERIOR SIDE

INTERIOR SIDE

Insert Delete Up Down

Select Material ...

Function to Finish 1 [4]



Highlight Layer

Assign Layers

Select Front Edge of Base

- Select First Layer > Insert New Layer
- Function to Finish 1 [4]
- Assign Material > Precast
- Assign Layers

Project Day 04

GYM

Brick on CMU

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- Assembly View

- Split Region
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- Assign Wall Type

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- Add Sweeps
- Overview 1 2

Windows

- 96 x 144
- Insert & Align
- Copy & Mirror

GYM Overview

Autocad  
Coursing Study

- Layers & Units
- Wall Section

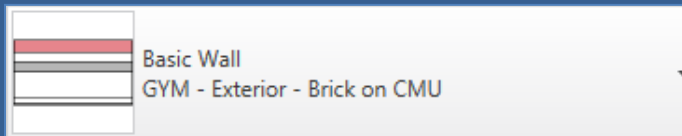
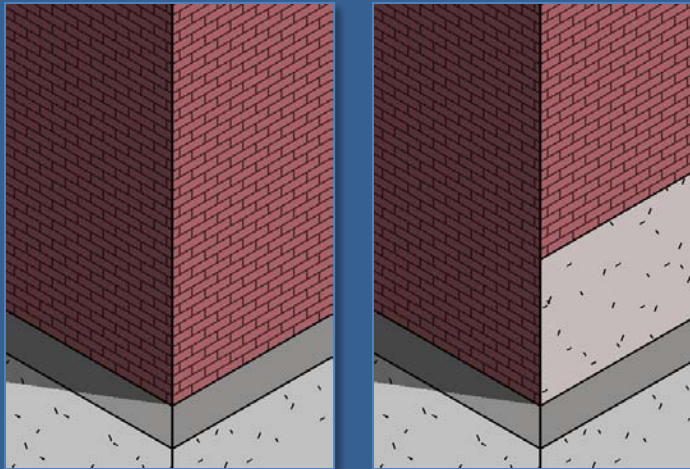
- Elevation
- Section

- Steps 1 2 3 4 5  
6 7 8 9 10

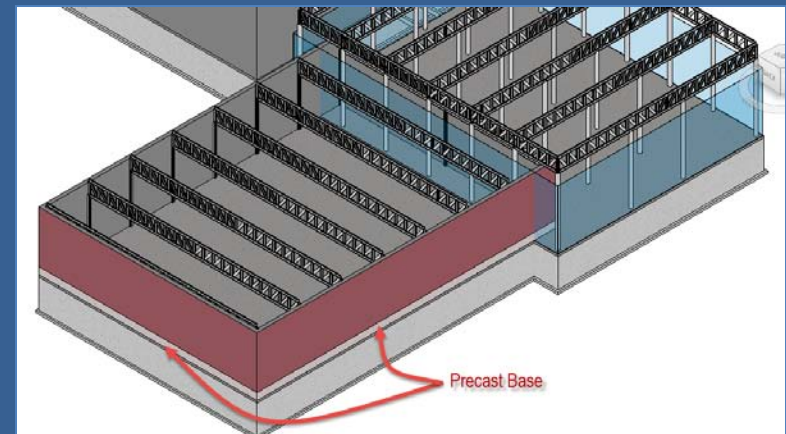
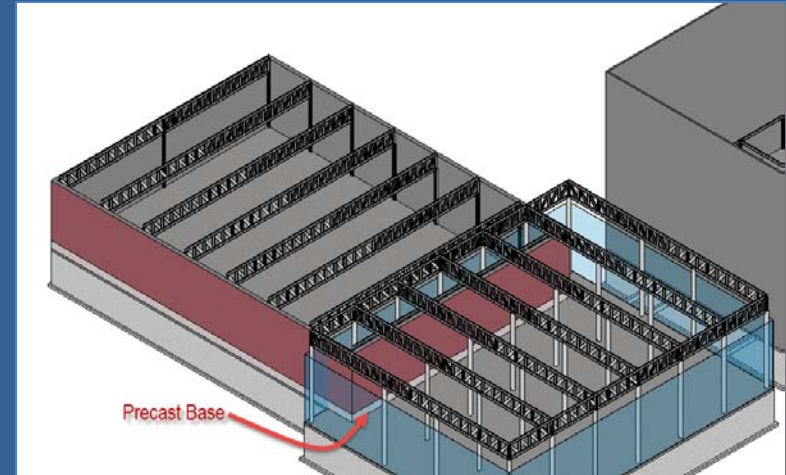
Wrap-Up

# Add Precast or Stone Base : Assign Wall Type

- Selected wall displays with precast base



- Select all 4 masonry walls and assign the to the new type
- GYM – Exterior – Brick on CMU





# Masonry Wall : Add Reveals

## Project Day 04

### GYM

#### Brick on CMU

- Duplicate
- Edit Structure
- Assembly View

- Split Region
- Assign Material
- Assign Wall Type

- Add Reveals
- Add Sweeps
- Overview 1 2

### Windows

- 96 x 144
- Insert & Align
- Copy & Mirror

### GYM Overview

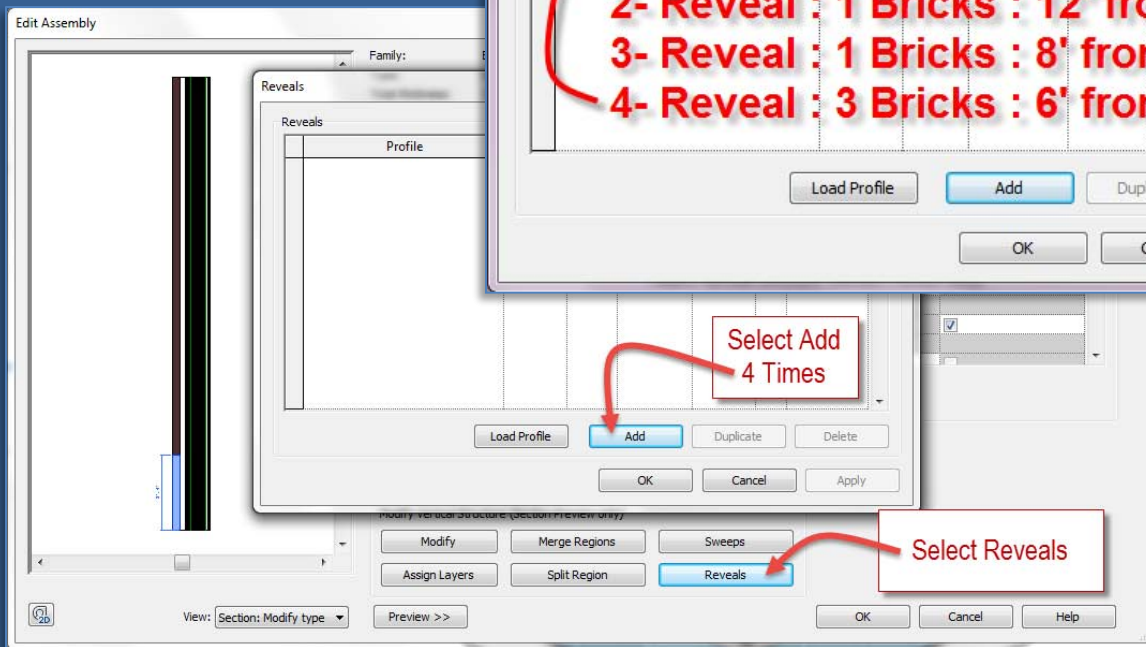
- Autocad
- Coursing Study
- Layers & Units
- Wall Section

- Elevation
- Section

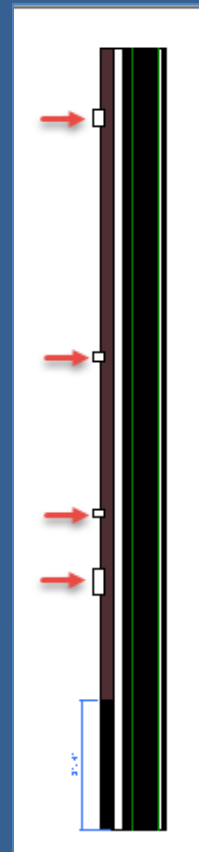
- Steps 1 2 3 4 5  
6 7 8 9 10

### Wrap-Up

- What is a reveal?
- A reveal is a negative shape – it is subtracted from the wall
- Add 4 reveals as shown



- Options:
- Profile
- Distance
- From (Base/Top)





# Masonry Wall : Add Sweeps

## Project Day 04

### GYM

#### Brick on CMU

- Duplicate
- Edit Structure
- Assembly View

- Split Region
- Assign Material
- Assign Wall Type

- Add Reveals
- Add Sweeps
- Overview 1 2

### Windows

- 96 x 144
- Insert & Align
- Copy & Mirror

### GYM Overview

#### Autocad

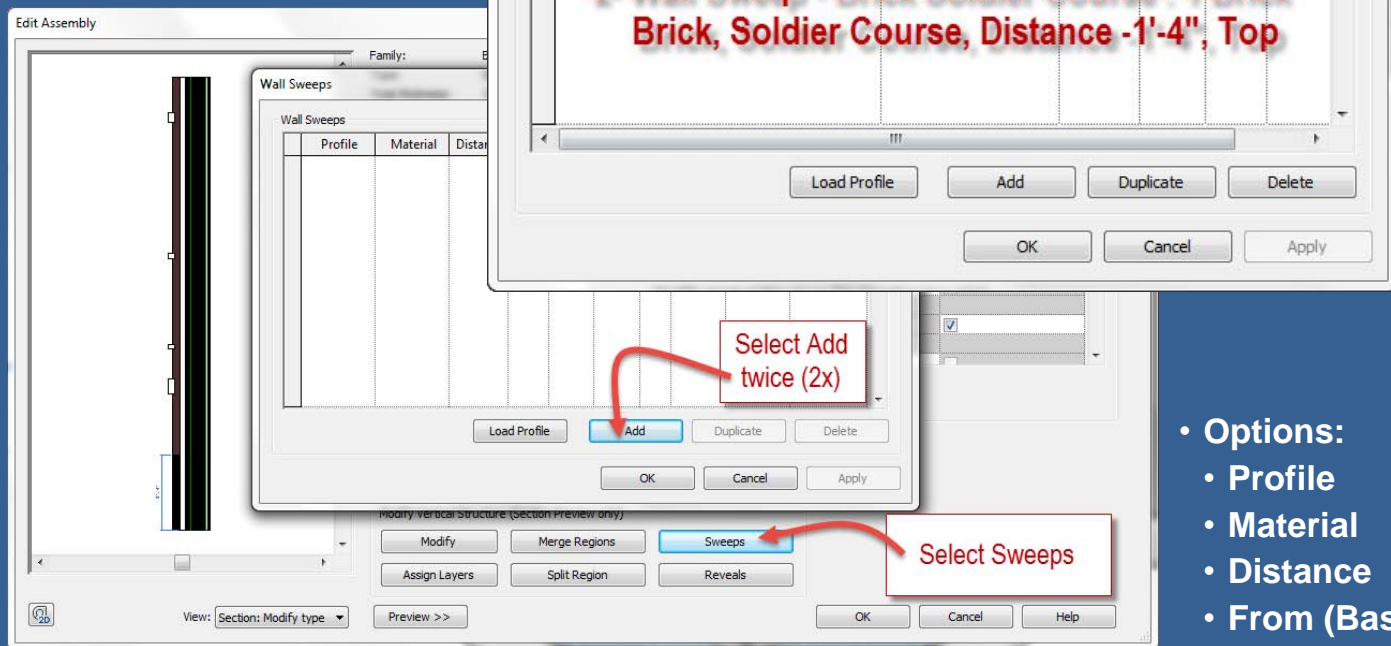
- Coursing Study
- Layers & Units
- Wall Section

- Elevation
- Section

- Steps 1 2 3 4 5  
6 7 8 9 10

### Wrap-Up

- What is a sweep?
- A sweep is a positive shape – it is added to the wall
- Add 2 sweeps as shown



- Options:
  - Profile
  - Material
  - Distance
  - From (Base/Top)
  - Offset

# Masonry Wall : With Reveals and Sweeps

## Project Day 04

### GYM

#### Brick on CMU

- Duplicate
- Edit Structure
- Assembly View

- Split Region
- Assign Material
- Assign Wall Type

- Add Reveals
- Add Sweeps
- Overview 1 2

### Windows

- 96 x 144
- Insert & Align
- Copy & Mirror

### GYM Overview

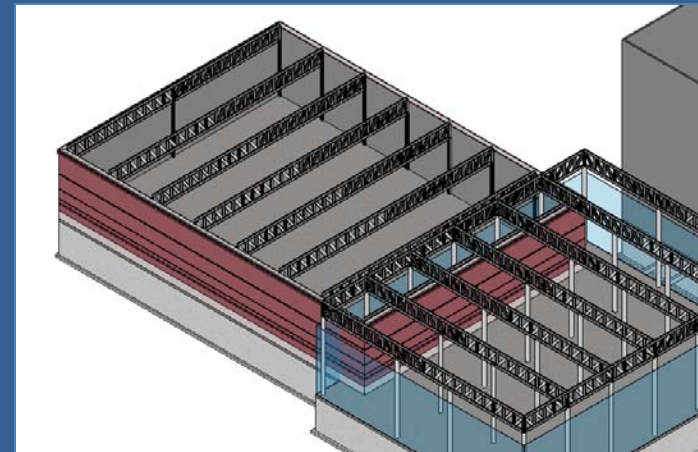
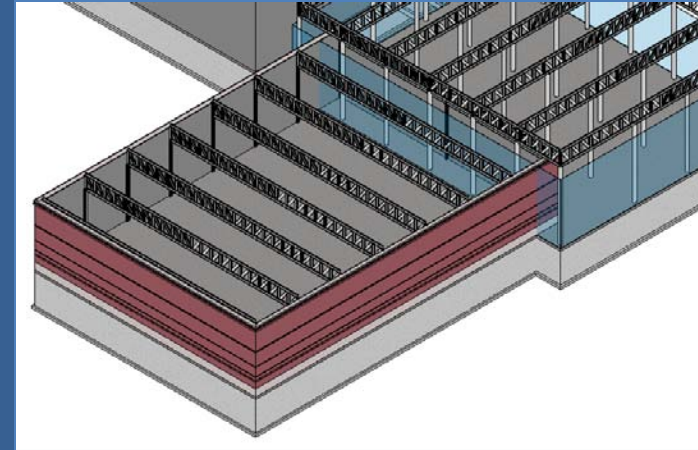
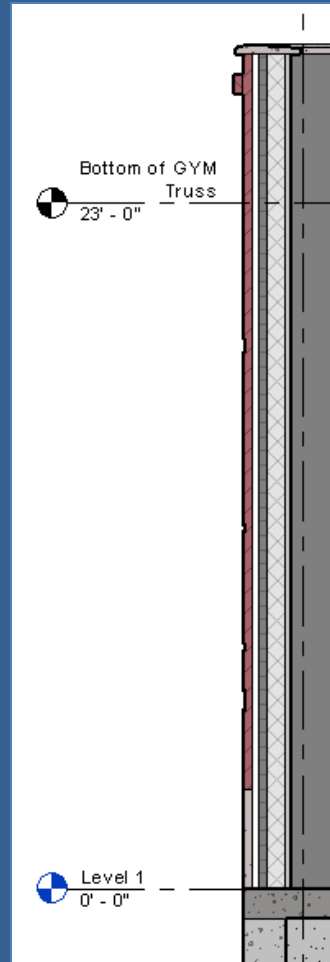
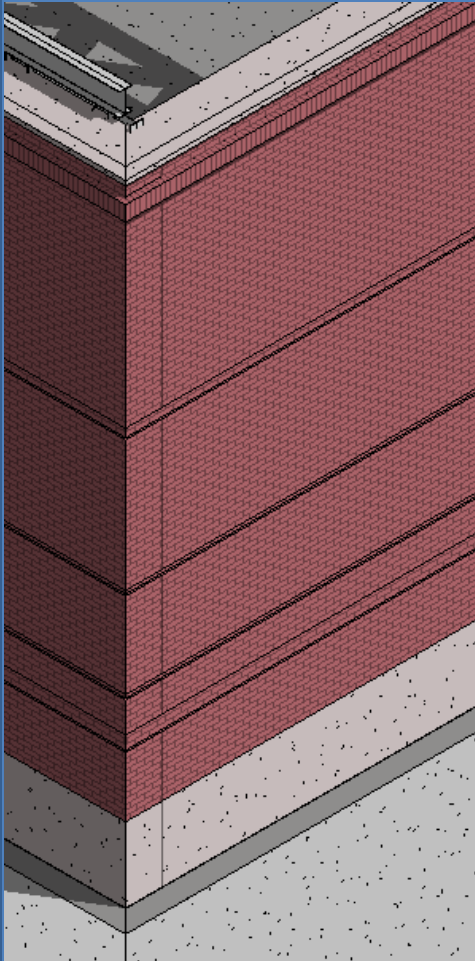
#### Autocad

- Coursing Study
- Layers & Units
- Wall Section

- Elevation
- Section

- Steps 1 2 3 4 5  
6 7 8 9 10

### Wrap-Up



# Masonry Wall : With Reveals and Sweeps

## Project Day 04

### GYM

#### Brick on CMU

- Duplicate
- Edit Structure
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- Assign Wall Type
- Add Reveals
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### Windows

- 96 x 144
- Insert & Align
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### GYM Overview

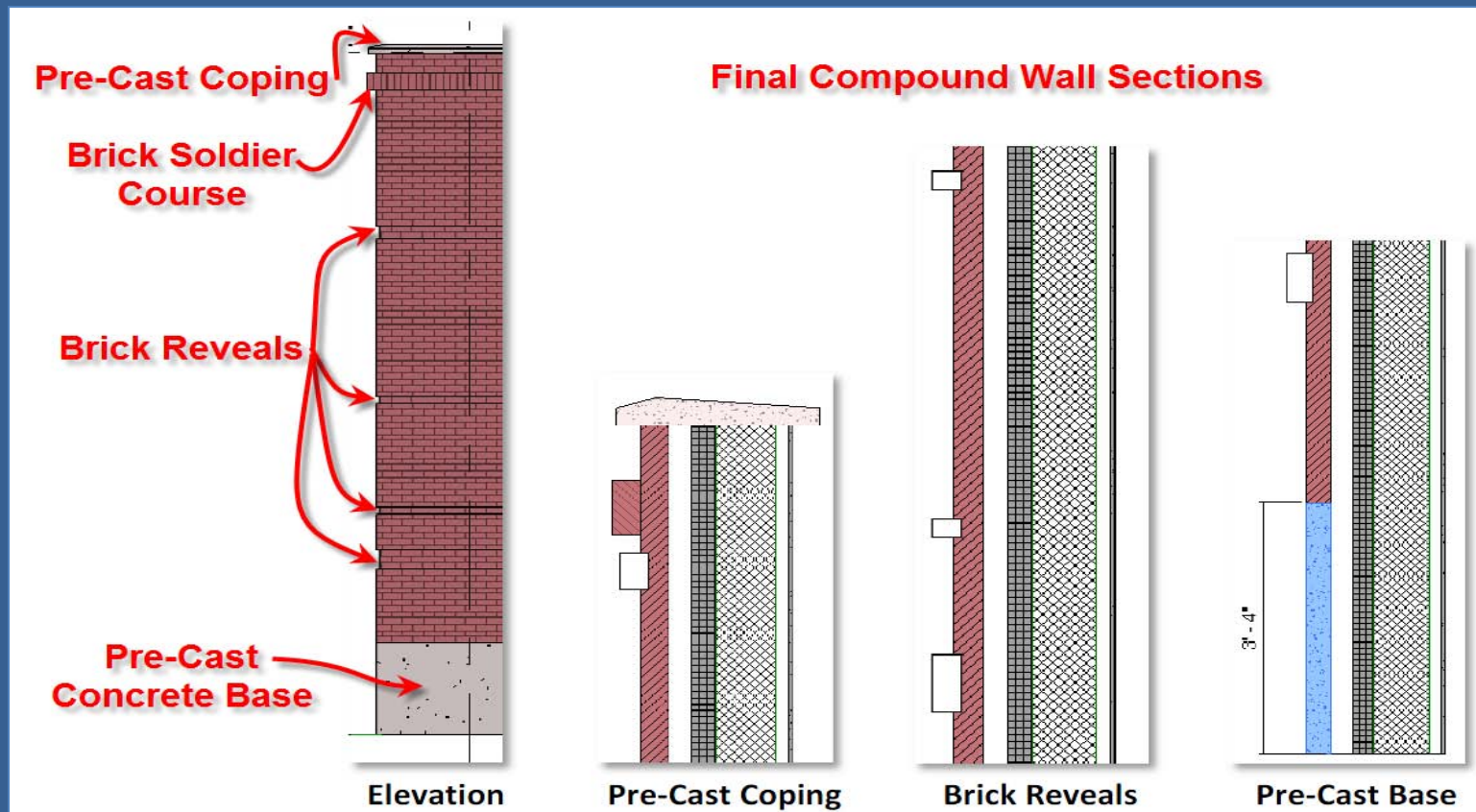
#### Autocad Coursing Study

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### Wrap-Up





## Project Day 04

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- 96 x 144
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### GYM Overview

### Autocad Courseing Study

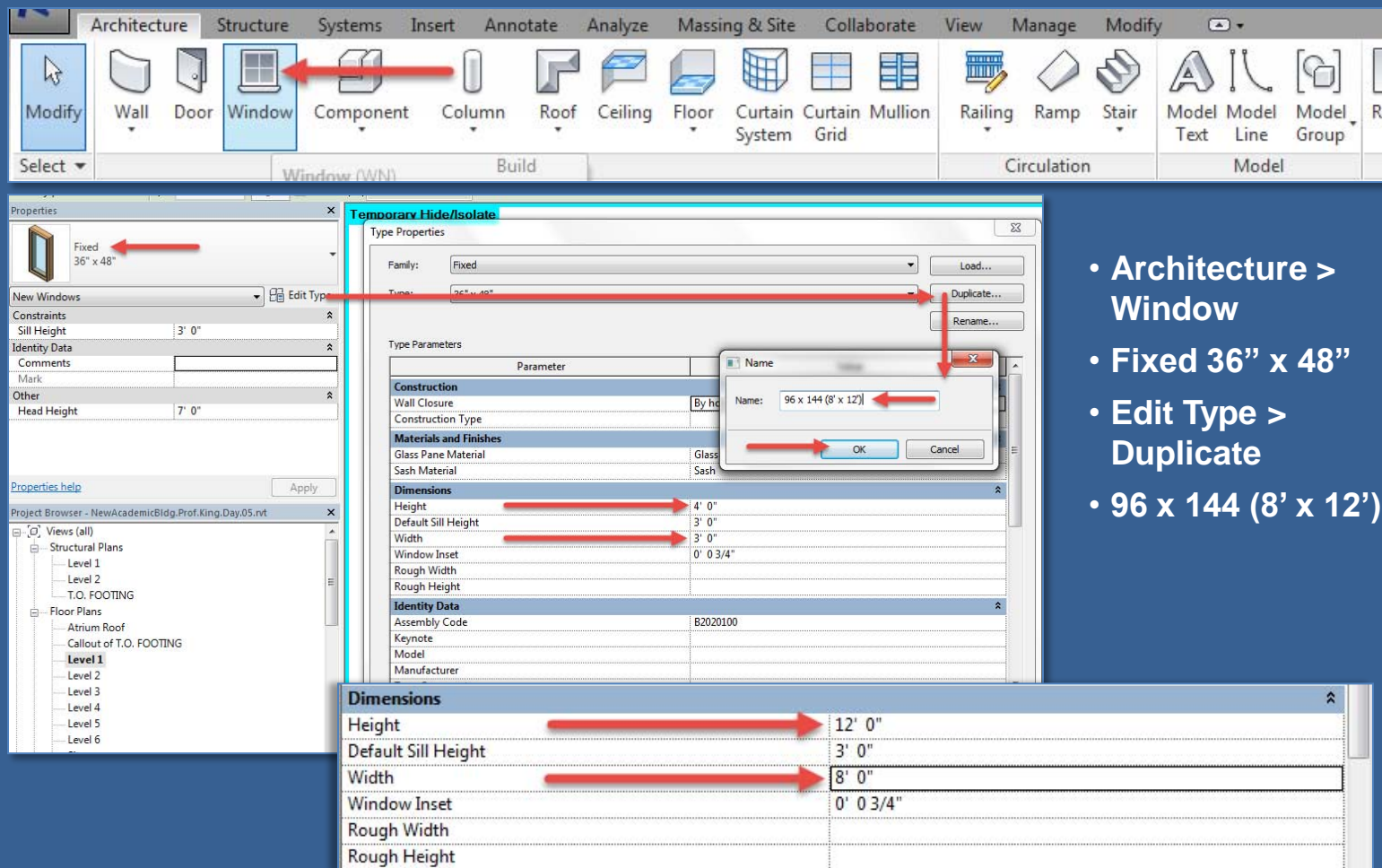
- Layers & Units
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### Wrap-Up

# Windows : Create New Type 96 x 144 (8' x 12')



The screenshot illustrates the steps to create a new window type in Revit Architecture:

- Architecture > Window**: The ribbon is set to the 'Architecture' tab, and the 'Window' button is selected.
- Fixed 36" x 48"**: The 'Properties' panel shows the selected window type.
- Edit Type > Duplicate**: The 'Edit Type' button is clicked, and the 'Duplicate' button is selected in the 'Type Properties' dialog.
- Name: 96 x 144 (8' x 12')**: The 'Name' dialog box is shown, with the new name entered.
- Dimensions**: The 'Type Properties' dialog shows the dimensions for the new window type.

Parameter	Value
Height	12' 0"
Default Sill Height	3' 0"
Width	8' 0"
Window Inset	0' 0 3/4"
Rough Width	
Rough Height	

- Architecture > Window
- Fixed 36" x 48"
- Edit Type > Duplicate
- 96 x 144 (8' x 12')

Project Day 04

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  - Assembly View
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- Split Region
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- Add Reveals
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  - Overview 1 2

Windows

- 96 x 144
- Insert & Align
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GYM Overview

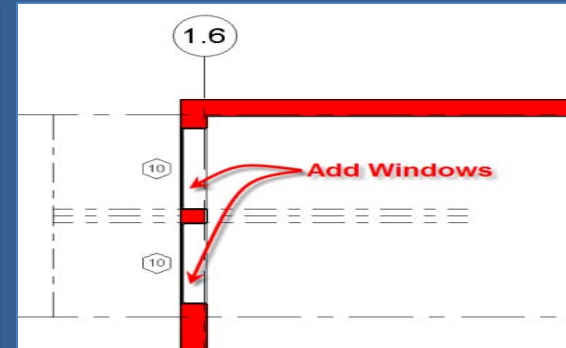
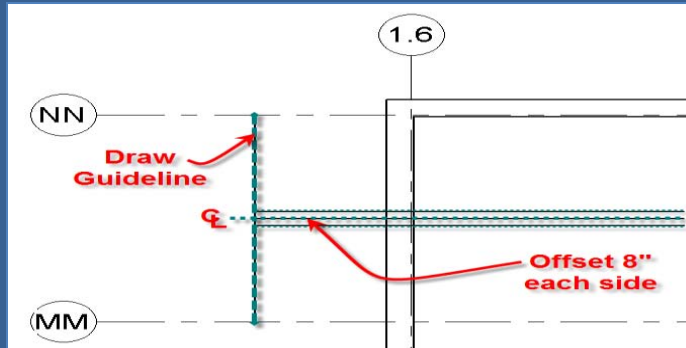
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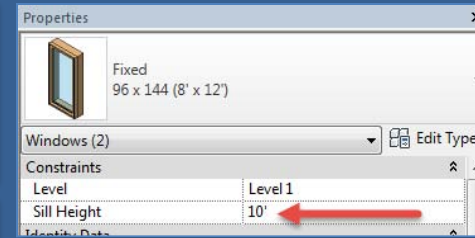
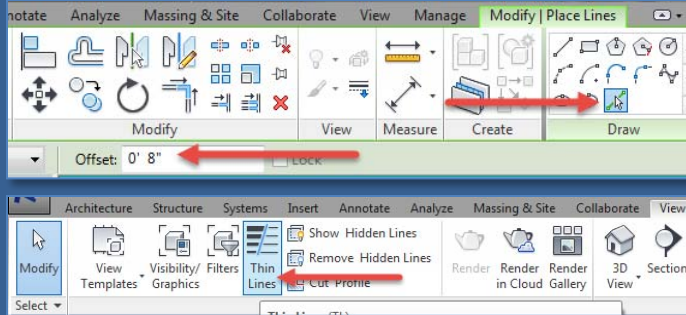
- Steps 1 2 3 4 5  
6 7 8 9 10

Wrap-Up

# Windows : 96 x 144 (8' x 12') : Insert & Align

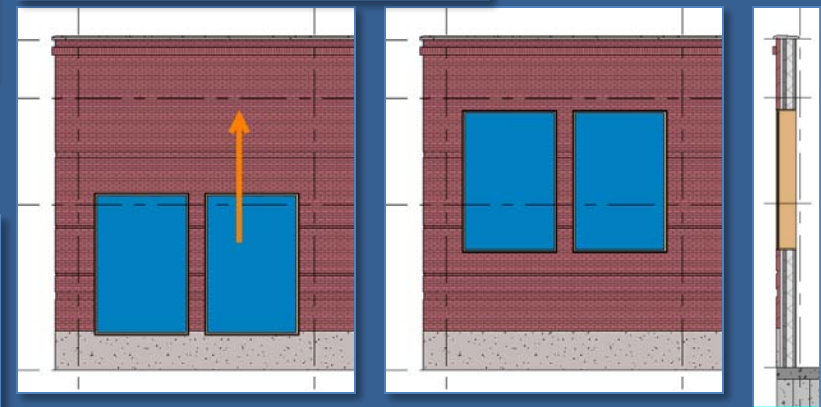
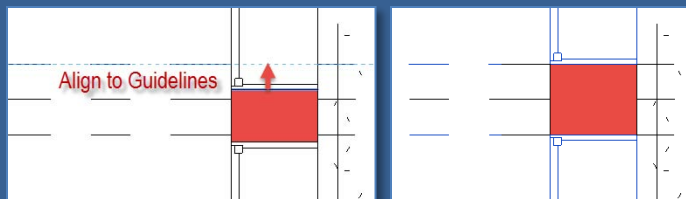


- Guidelines
- Offset 10'
- Offset 8" (2x)



- Sill Height 10'-0"

- Guidelines
- Align
- Thin Lines



# Windows : Copy & Mirror

## Project Day 04

### GYM

Brick on CMU

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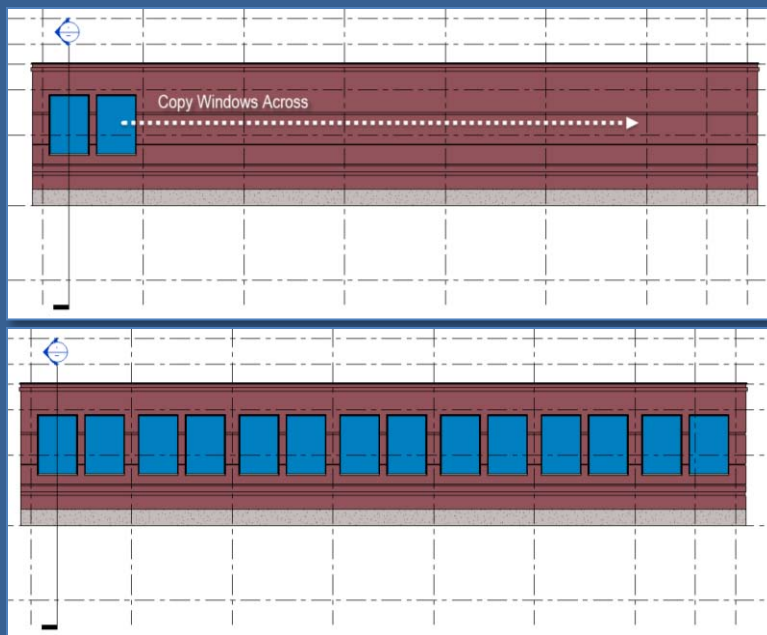
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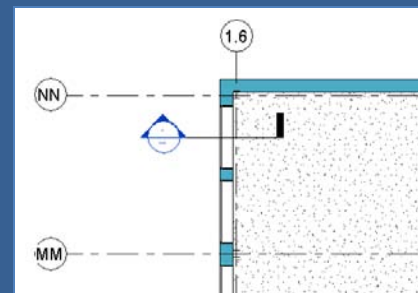
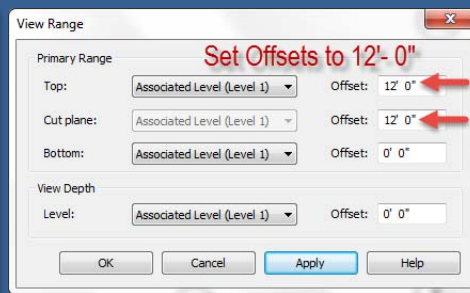
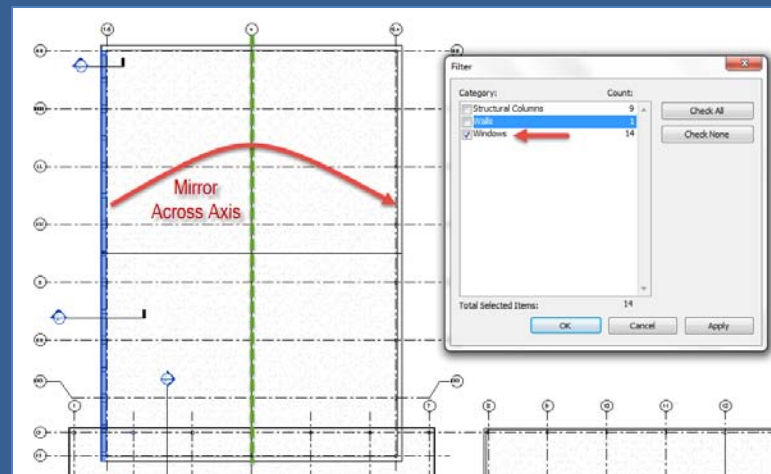
- Elevation
- Section

- Steps 1 2 3 4 5  
6 7 8 9 10

### Wrap-Up



- North Elevation
- Copy Across
- Select Windows
- Mirror across axis



- Level 1
- View Range
- Offsets to 12'



# GYM : Overview

## Project Day 04

### GYM

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### GYM Overview

#### Autocad

#### Coursing Study

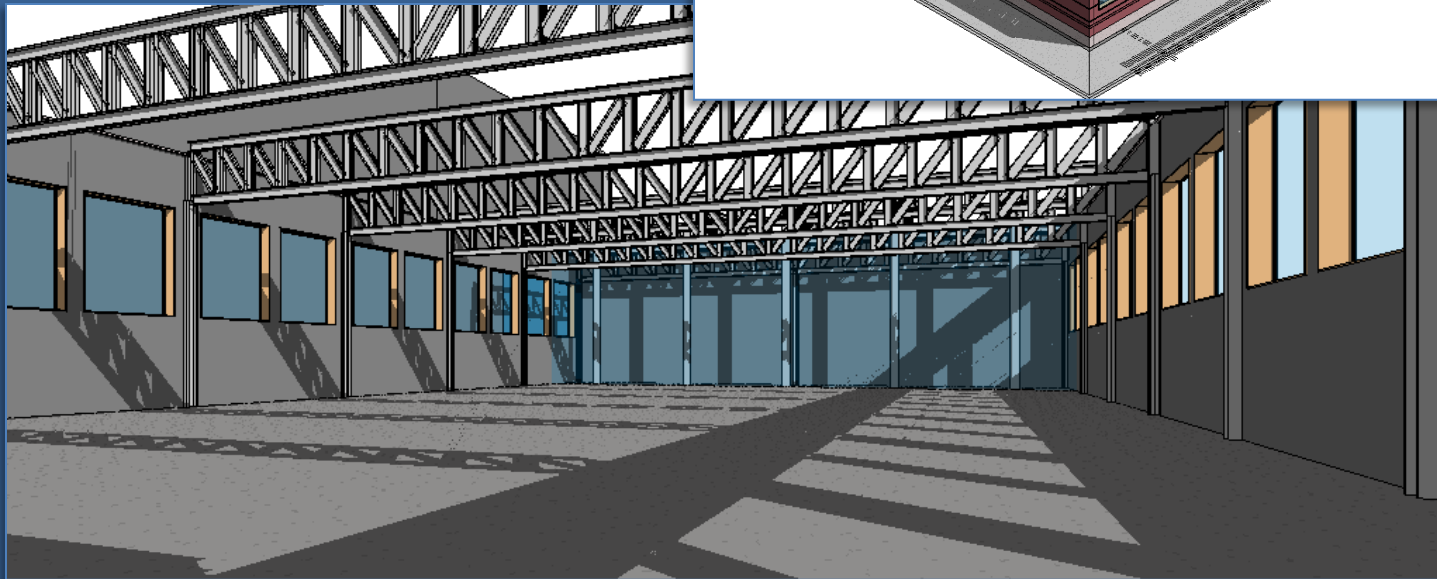
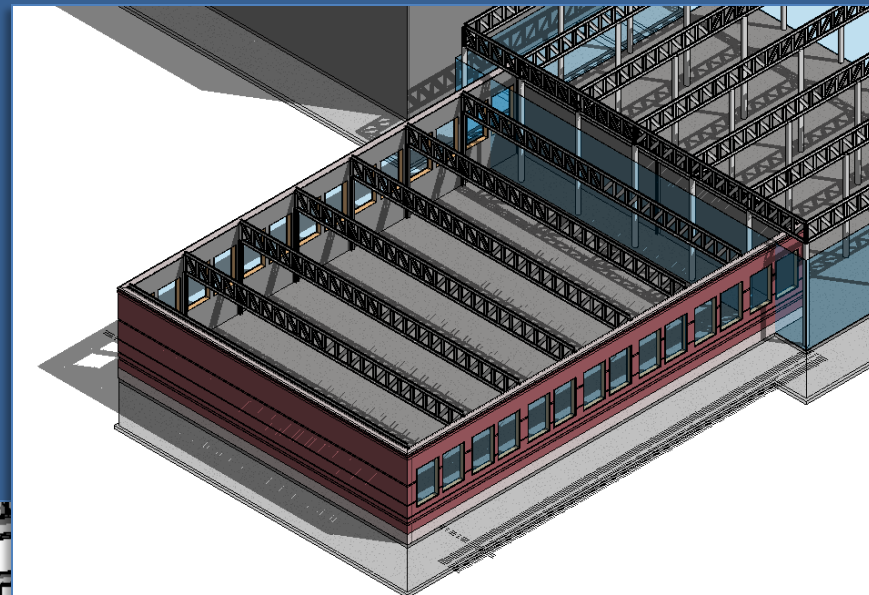
- Layers & Units
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- Section

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#### Wrap-Up

## • Isometric & Perspective views of GYM



ange  
o 12'

# Autocad Study : Layers & Units

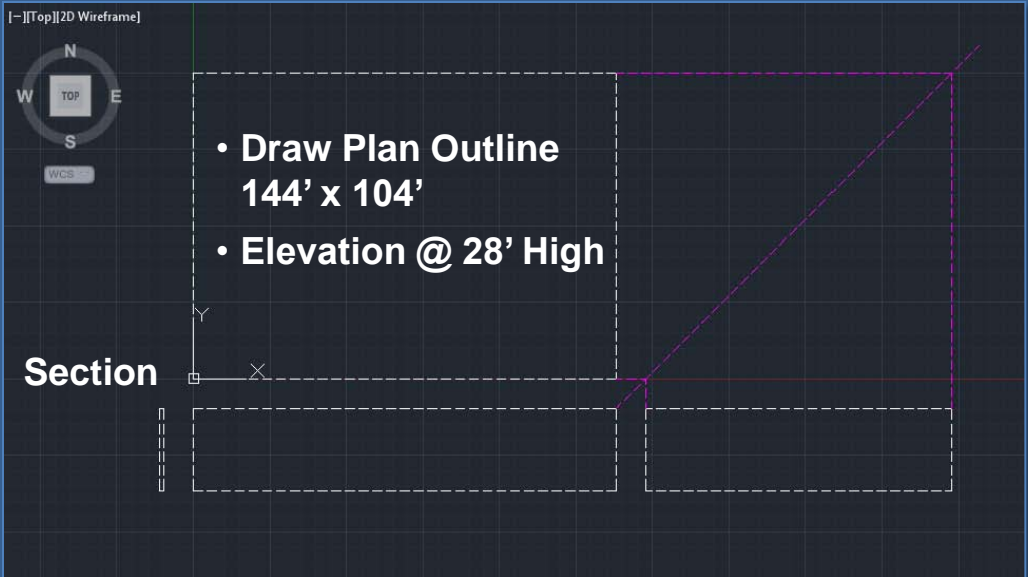
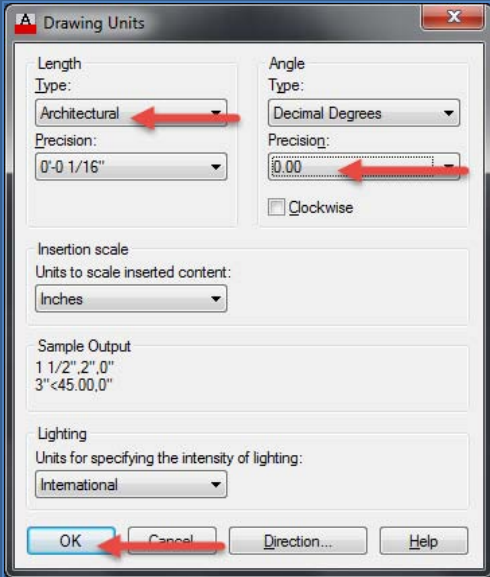
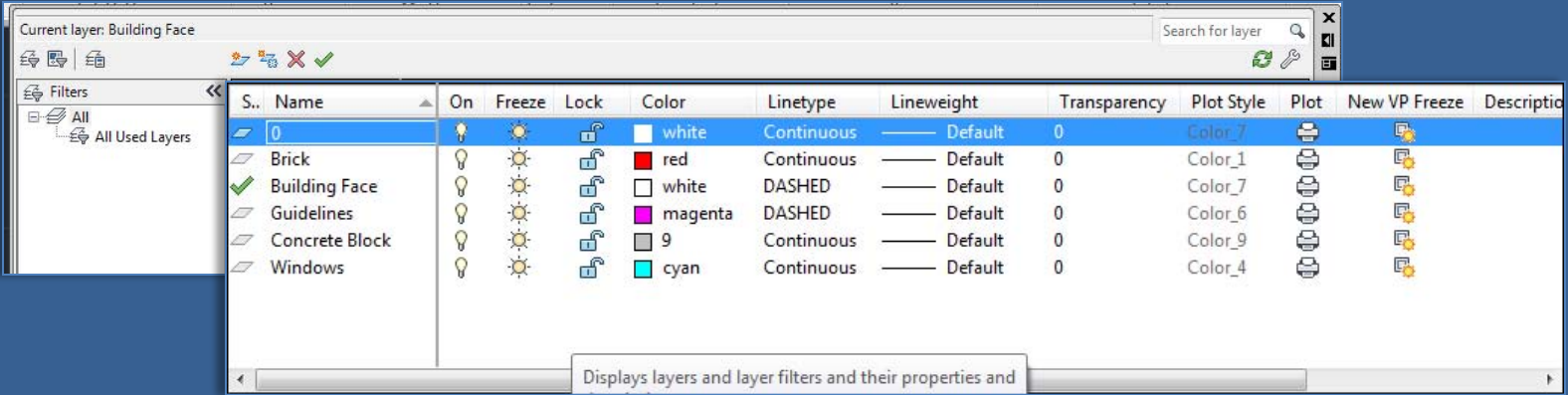
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## Wrap-Up



# Autocad Study : Layers of Masonry Wall

Project Day 04

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GYM Overview

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Wrap-Up

Edit Assembly

Family: Basic Wall  
Type: GYM - Exterior - Brick on CMU  
Total thickness: 1' 7 1/2"  
Resistance (R): 32.1276 (h·ft²·°F)/BTU  
Thermal Mass: 35.4526 BTU/°F  
Sample Height: 20' 0"

Layers

	Function	Material	Thickness	Wraps	Structural Material
1	Finish 1 [4]	Concrete, Precast	0' 3 5/8"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Finish 1 [4]	Brick, Common	0' 3 5/8"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Thermal/Air Lay	Air	0' 3"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Thermal/Air Lay	Rigid insulation	0' 3"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Membrane Laye	Damp-proofing	0' 0"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Core Boundary	Layers Above Wrap	0' 0"		
7	Structure [1]	Concrete Masonry Units	0' 7 5/8"	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Core Boundary	Layers Below Wrap	0' 0"		
9	Substrate [2]	Metal Furring	0' 1 5/8"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	Finish 2 [5]	Gypsum Wall Board	0' 0 5/8"	<input checked="" type="checkbox"/>	<input type="checkbox"/>

EXTERIOR SIDE

INTERIOR SIDE

Insert Delete Up Down

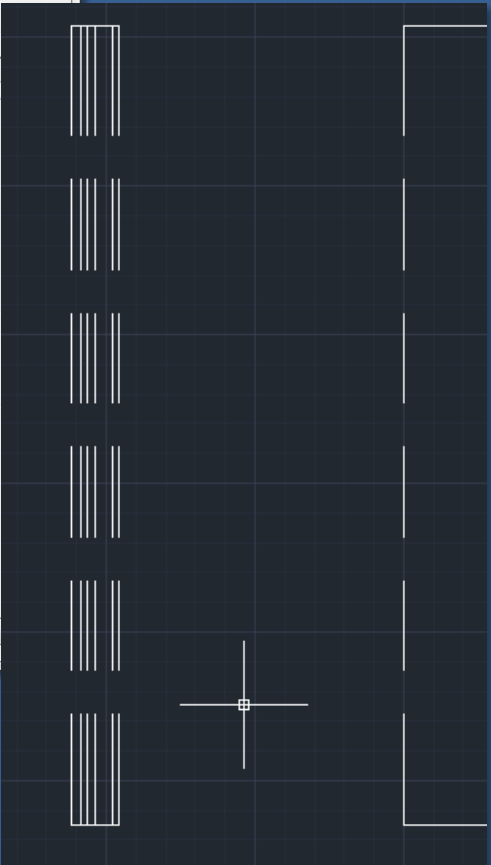
Default Wrapping

At Inserts: Do not wrap  
At Ends: None

Modify Vertical Structure (Section Preview only)

Modify Merge Regions Sweeps  
Assign Layers Split Region Reveals

Preview >> OK Cancel Help





Project Day 04

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GYM Overview

Autocad

Coursing Study

- Layers & Units
- Wall Section

• Elevation

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Wrap-Up

# Autocad Study : Layers of Masonry Wall

## The Elevation:

Create a set of guidelines based on the outlines of the elevations of the multi-use space taken from the Revit model. Add guidelines to find the center of the first brick and then account for the  $\frac{3}{8}$ " joint by offsetting this line  $\frac{3}{16}$ " in each direction. Use guidelines to draw the bricks.



Project Day 04

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Autocad

Coursing Study

- Layers & Units
- Wall Section

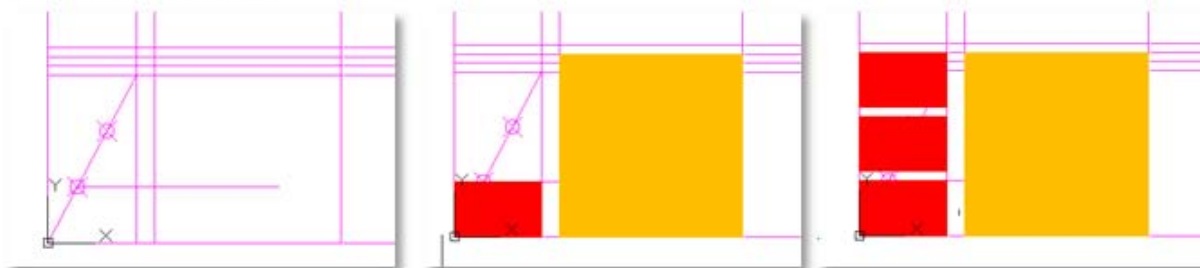
- Elevation
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6 7 8 9 10

Wrap-Up

# Autocad Study : Layers of Masonry Wall

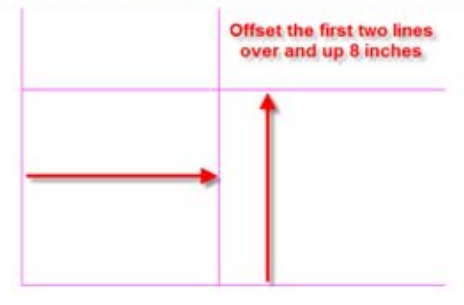
**The Section:** Start by drawing the guidelines. Create a horizontal line and offset this up 8". Remember that the first brick sits  $\frac{3}{8}$ " above the ground line. Next offset the top line down three times at a distance of  $\frac{3}{8}$ " to account for the mortar joints. Draw a diagonal line in the remaining space. Use the divide command to place "points" at the third points along the diagonal line. Draw your first brick in section. Draw your first concrete block. Copy the bricks to complete the first 8 inches of the wall.



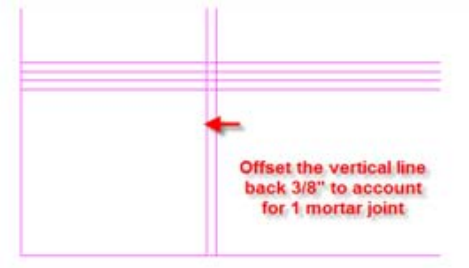
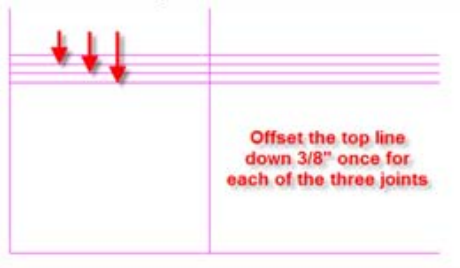
# Autocad Study : Layers of Masonry Wall

**Step by Step:** Creating properly coursed bricks in elevation using an 8" module

**Step 1:** Starting at 0,0 draw **horizontal and vertical lines** at least two feet long. Next **Offset** these two lines over and up at a distance of **8 inches**.



**Step 2:** Offset the **horizontal** lines down **three times** at a distance of **3/8"** once for each of the three joints. **Offset the vertical line left 3/8"** to account for 1 mortar joint.





## Project Day 04

GYM  
Brick on CMU

- Duplicate
- Edit Structure
- Assembly View

- Split Region
- Assign Material
- Assign Wall Type

- Add Reveals
- Add Sweeps
- Overview 1 2

Windows

- 96 x 144
- Insert & Align
- Copy & Mirror

GYM Overview

Autocad  
Coursing Study

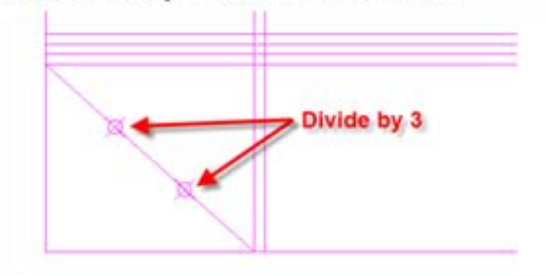
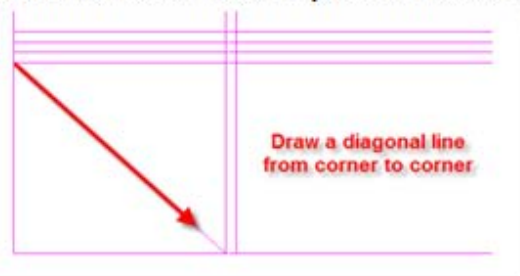
- Layers & Units
- Wall Section

- Elevation
- Section

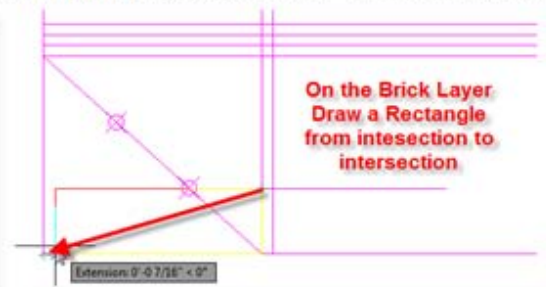
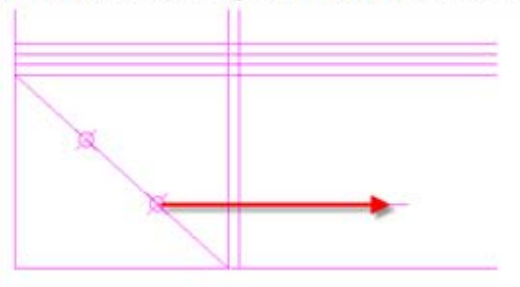
• Steps 1 2 3 4 5  
6 7 8 9 10

Wrap-Up

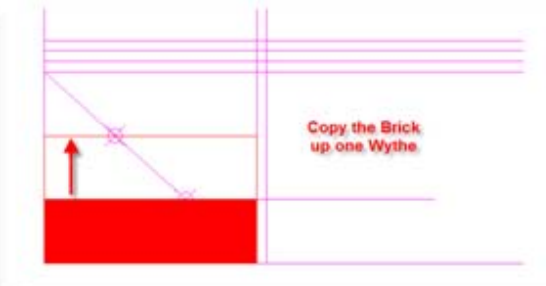
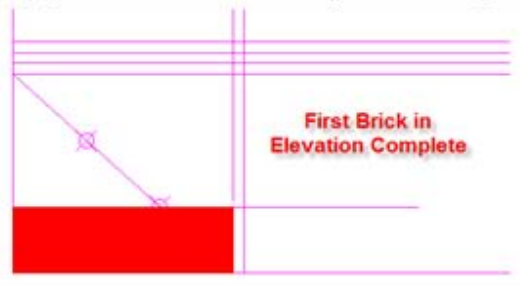
**Step 3:** Draw a diagonal line from intersection to intersection. Use the divide command to locate point notes at the **third points** of the line.



**Step 4:** Draw a horizontal guideline from the first point node across the vertical lines. On the Brick Layer draw a rectangle from intersection to intersection.



**Step 5:** Copy the first brick up the height of the brick.



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#### Autocad Coursing Study

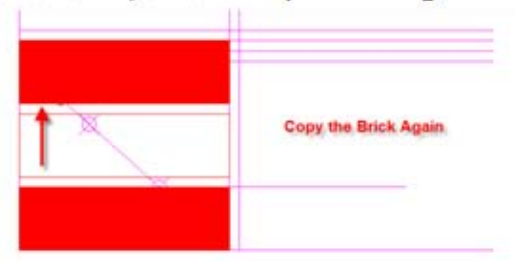
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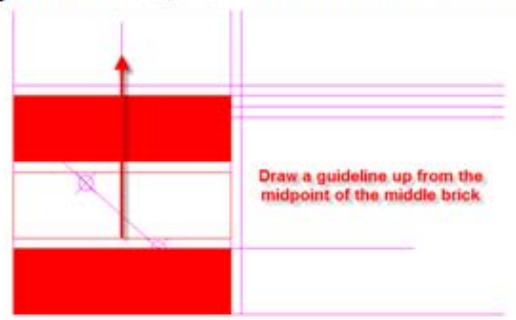
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### Wrap-Up

**Step 6:** Move the second brick up  $\frac{3}{8}$ " or the height of 1 mortar joint. Copy the second brick up again the distance of 1 brick and 1 joint. Snap to the guidelines.



**Step 7:** Draw a guideline from the midpoint of the second brick directly up. Offset this guideline  $\frac{3}{16}$ " in each direction to account for a full mortar joint.



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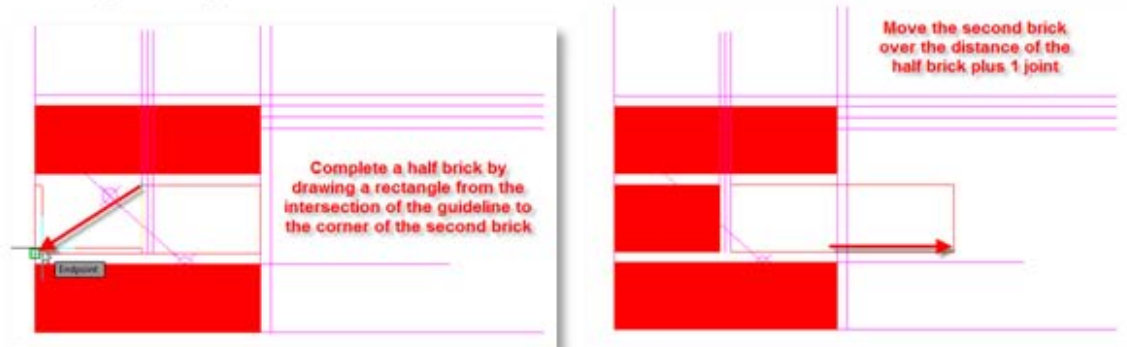
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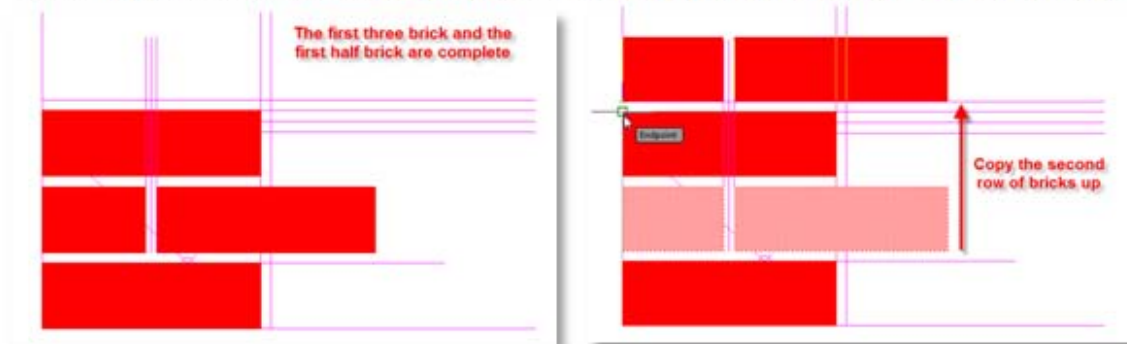
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Wrap-Up

**Step 8:** Complete a half brick by **drawing** from the **intersection** of the guidelines to the **corner of the second brick**. Move the second brick over the distance of the half brick plus 1 joint.



**Step 9:** Copy the second row of bricks **up** to complete the first set of bricks.



**Step 10:** Working with this set of bricks use the **Array** command to copy bricks to fill the horizontal and vertical dimensions of the elevations. Working with proper coursing work out all the vertical and horizontal masonry openings.

**Note:** The half brick should be used to begin developing the wall section.



# Day 16 / Revit Day 08 / Project Day 05 - Wrap Up

## Project Day 04

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