



SUBJECT

# MASONRY

## masonry wall construction

chapter 10

DATE

FALL 2012

PROFESSOR

MONTGOMERY

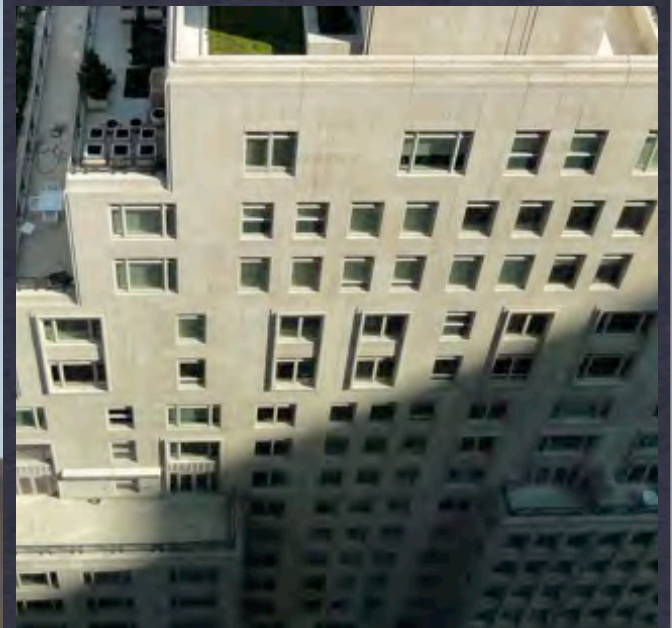


# MASONRY WALL CONSTRUCTION

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historic + modern

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# MASONRY WALL CONSTRUCTION

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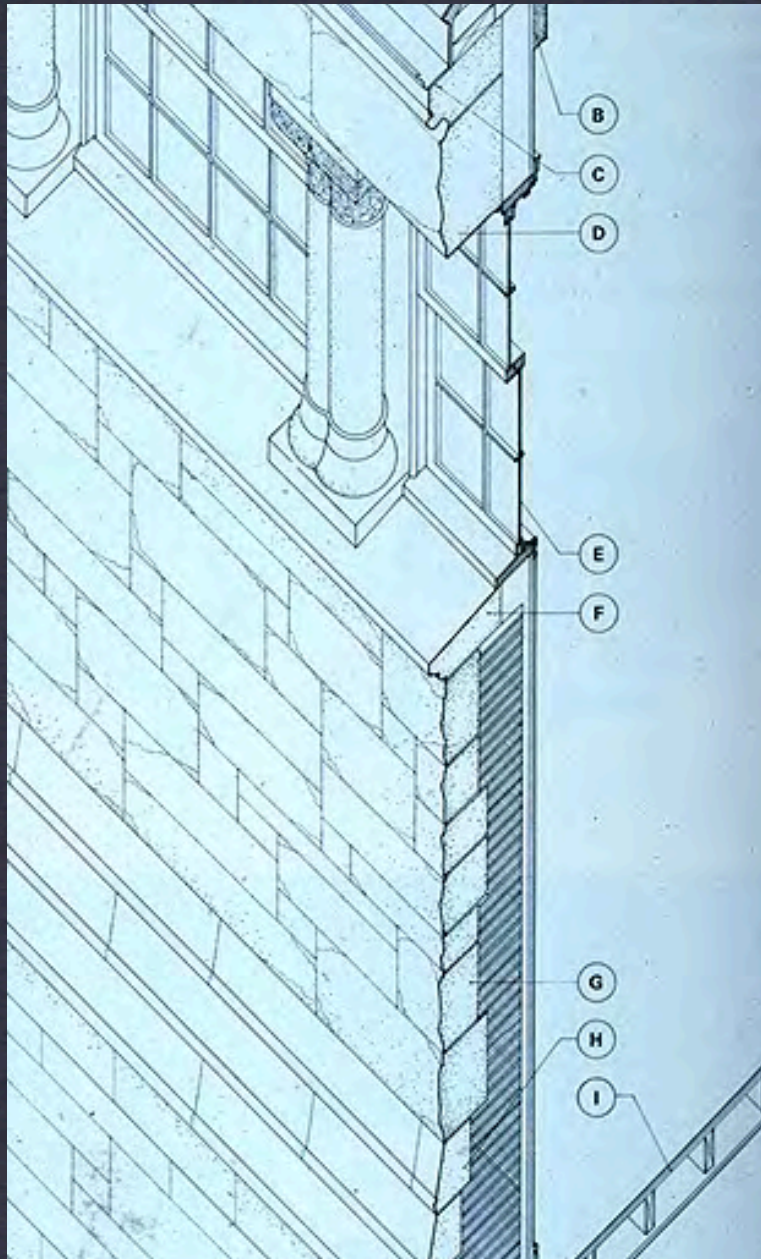
# this week

## **objective:**

to explore methods of construction of exterior masonry walls and their relationship to the primary structural system



- \* types of masonry walls
- \* detailing masonry walls
- \* spanning systems for masonry bearing wall construction
- \* special considerations



## TYPES OF MASONRY WALLS:

- MASONRY LOAD BEARING WALLS
- REINFORCED MASONRY WALLS
- POSTTENSIONED MASONRY WALLS
- MASONRY CAVITY WALLS
- COMPOSITE MASONRY WALLS
- COMPOSITE CAVITY MASONRY WALLS

**MASONRY WALL CONSTRUCTION**

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**types of masonry walls**

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# MASONRY WALL CONST.

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# load bearing masonry walls

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**MASONRY WALL CONST.**

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**load bearing masonry walls**

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**MASONRY WALL CONST.**

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**load bearing masonry walls**

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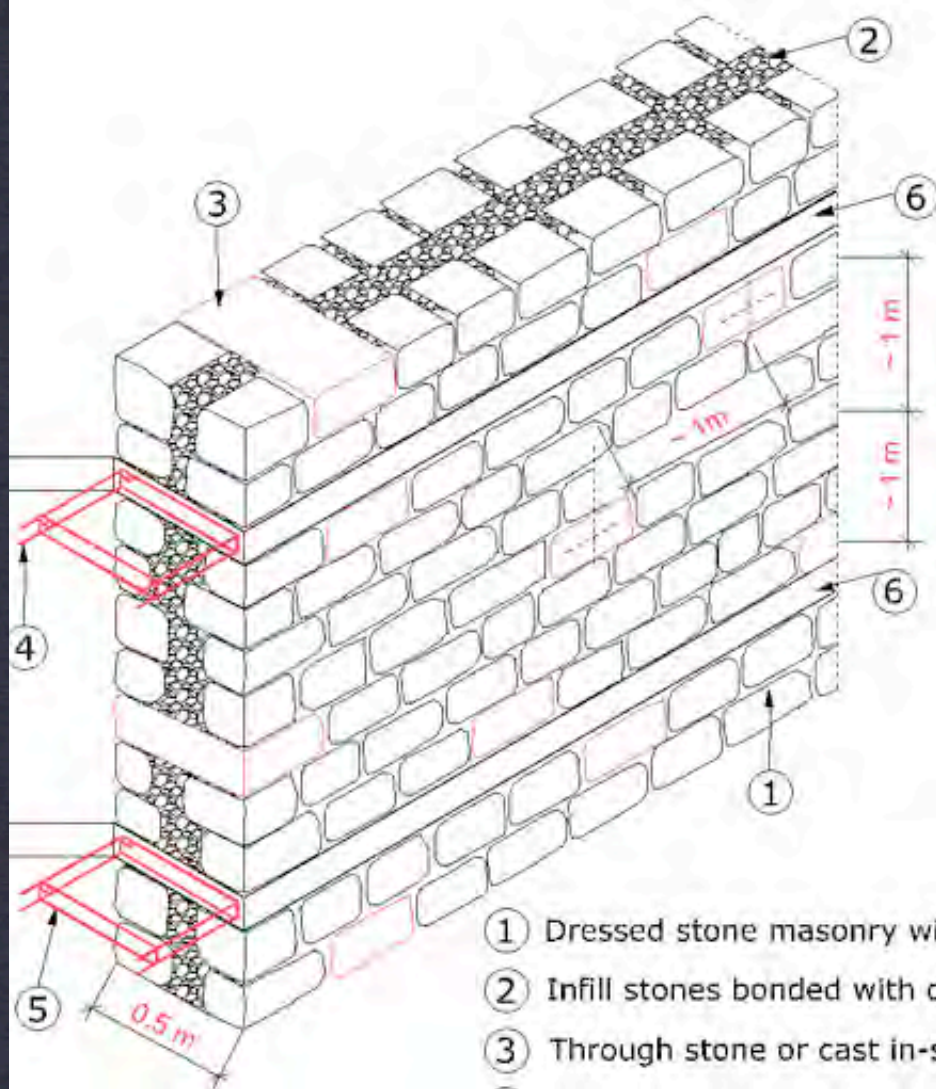


**MASONRY WALL CONST.**

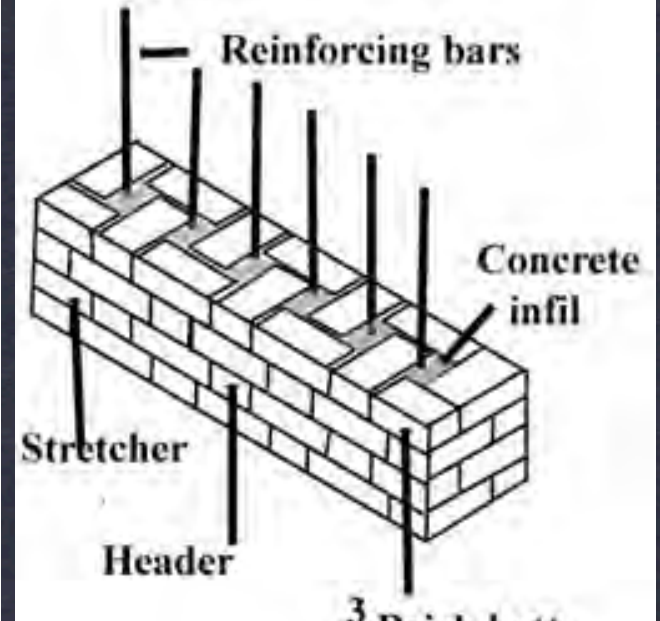
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**load bearing masonry walls**

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- ① Dressed stone masonry with rubble infill
- ② Infill stones bonded with cement sand mortar
- ③ Through stone or cast in-situ reinforced concrete
- ④ 4 high-tensile strength ribbed rebar  $\text{Ø}12$
- ⑤ Mild steel stirrups  $\text{Ø}8 @ 200 \text{ O/C}$
- ⑥ Reinforced concrete (RC) bond beam



# MASONRY WALL CONST.

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# reinforced masonry walls

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NOTE: Roof covering not shown for clarity.

Metal roof decking  
screwed to joists

Steel joist welded  
to base plate

Grouted base  
plate with 2 hooked  
anchor bolts

A single bond beam  
will be adequate in  
most cases. Use a  
double bond beam  
when large wall  
openings are present.

2 horizontal bars

Vertical reinforcement

Horizontal joint  
reinforcing every other  
course

**Connection of CMU Wall  
to Roof Structure**

Overlap for reinforcing  
steel determined on  
uplift and lateral  
windloads

Lap splice in  
accordance with  
masonry code

Vertical reinforcement

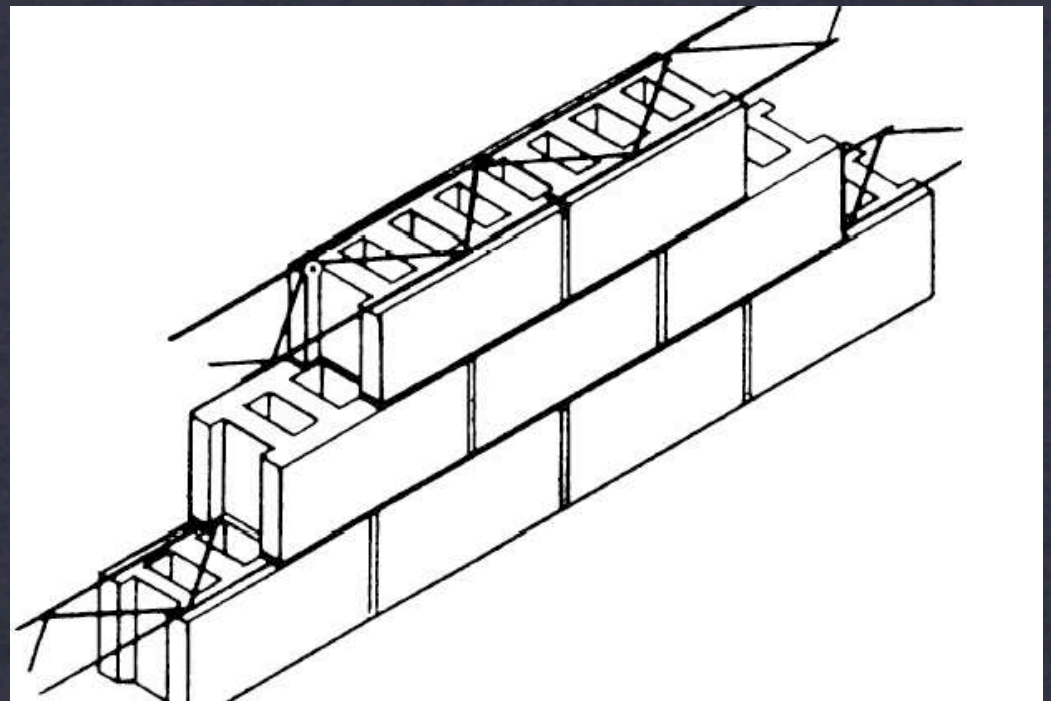
Grade

Slab on grade

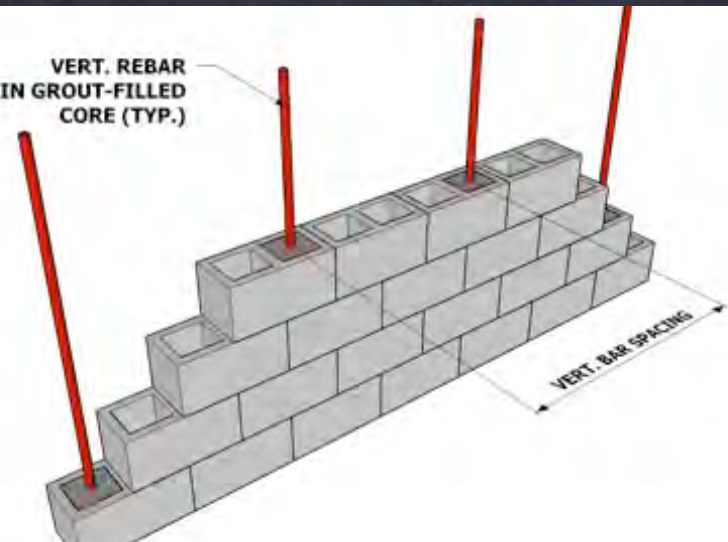
**Connection of CMU Wall  
to Foundation**

Foundation

Hook vertical bars  
in foundation



VERT. REBAR  
IN GROUT-FILLED  
CORE (TYP.)



# MASONRY WALL CONST.

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# reinforced masonry walls

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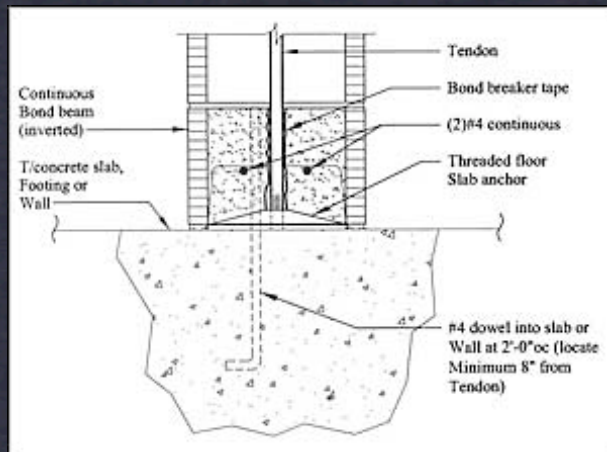
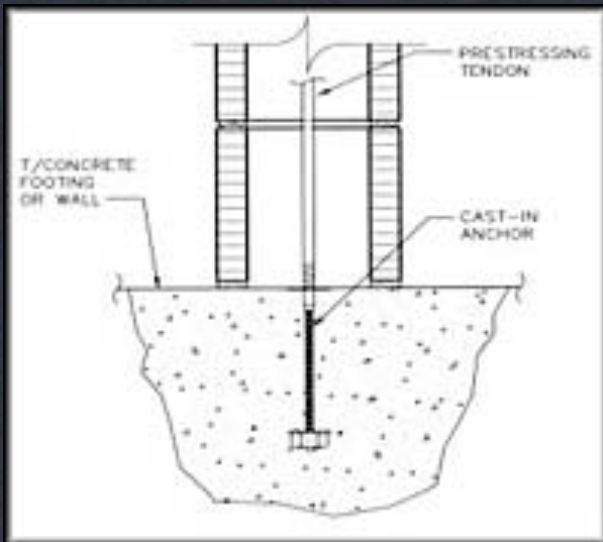
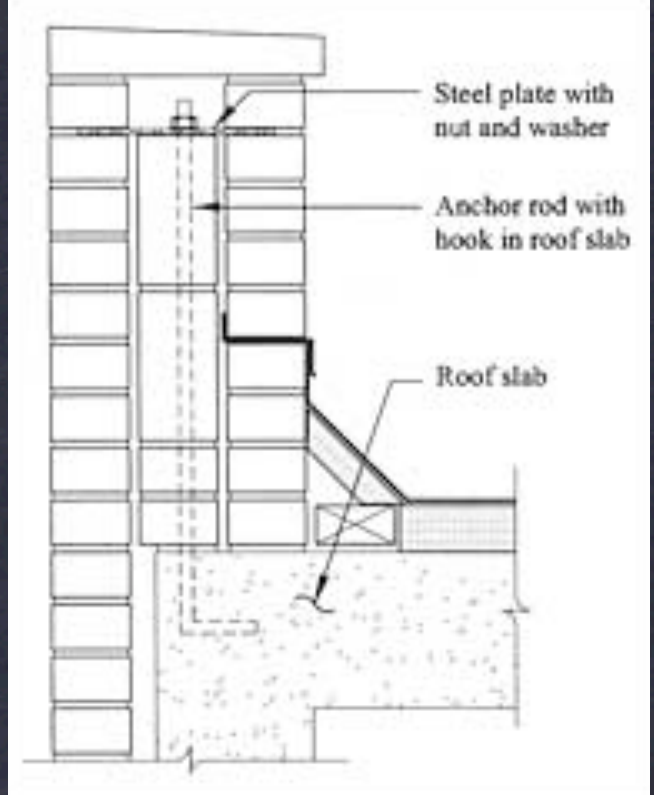
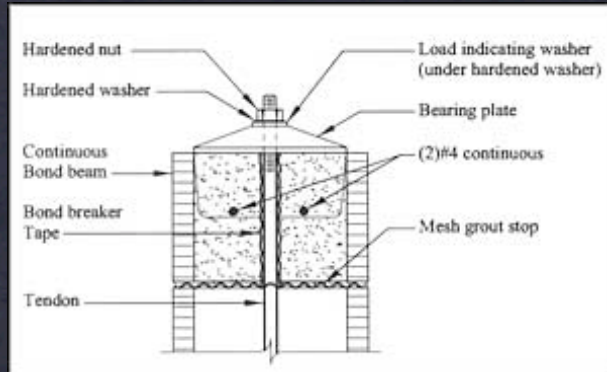
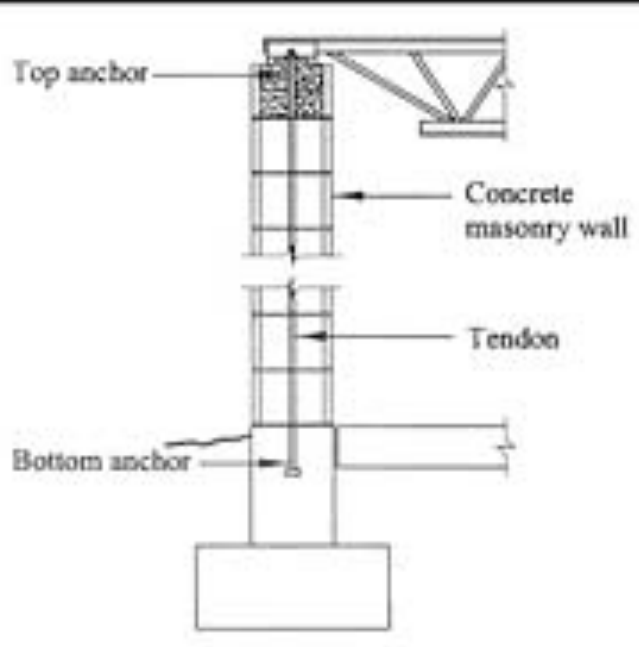


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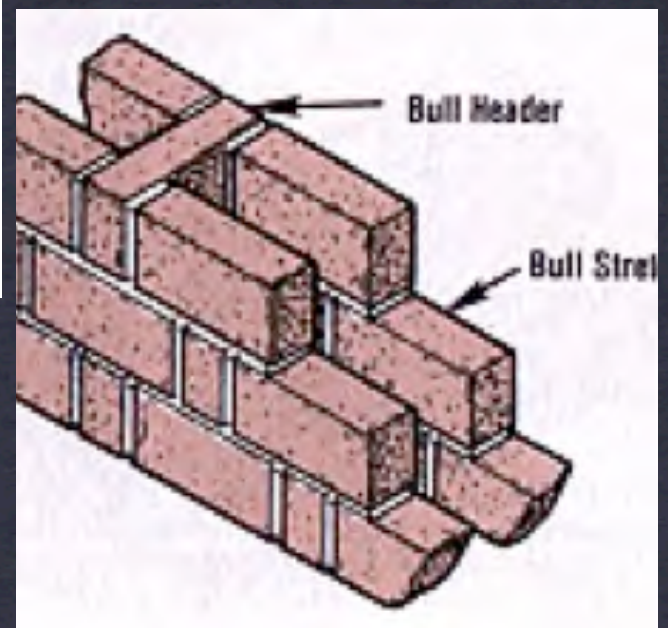
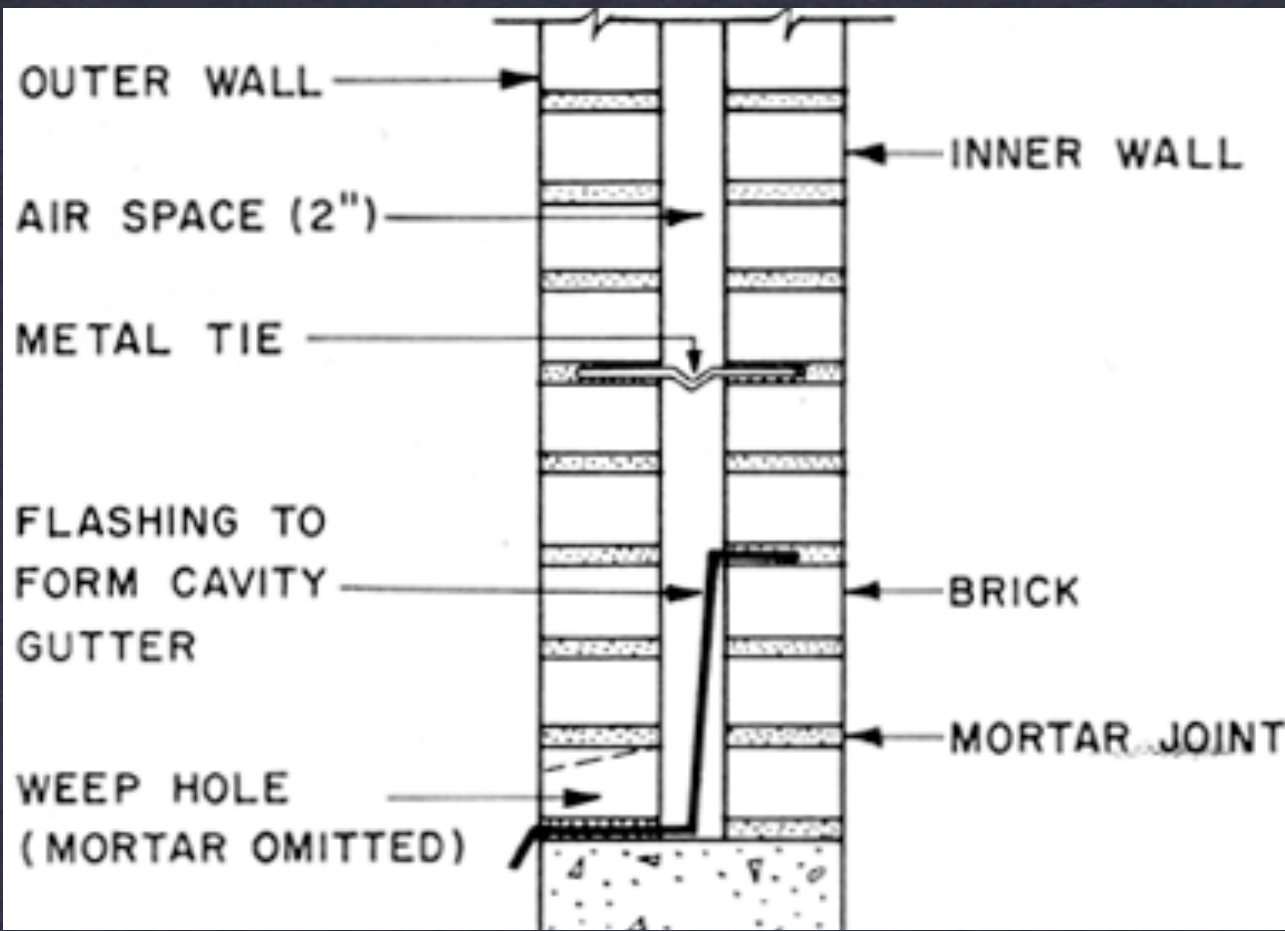
**reinforced masonry walls**

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# MASONRY WALL CONST.

# posttensioned masonry walls



**FIRST GOAL OF CAVITY: STOP MOISTURE PENETRATION**  
**SECOND GOAL: THERMAL SEPARATION AND INSULATION**

## MASONRY WALL CONST.

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cavity masonry walls

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**CAVITY MASONRY  
WALL**

**REINFORCING  
SPANS ACROSS THE  
CAVITY**

**BRICK VENEER IS  
NON STRUCTURAL**

**MASON MUST KEEP  
THE CAVITY CLEAN  
AND FREE OF  
MORTAR AND  
OTHER MATERIALS**

**MASONRY WALL CONST.**

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**WEEP HOLES: ALLOW WATER TO ESCAPE FROM CAVITY -  
LOCATED AT CAVITY BOTTOM ABOVE FLASHING**

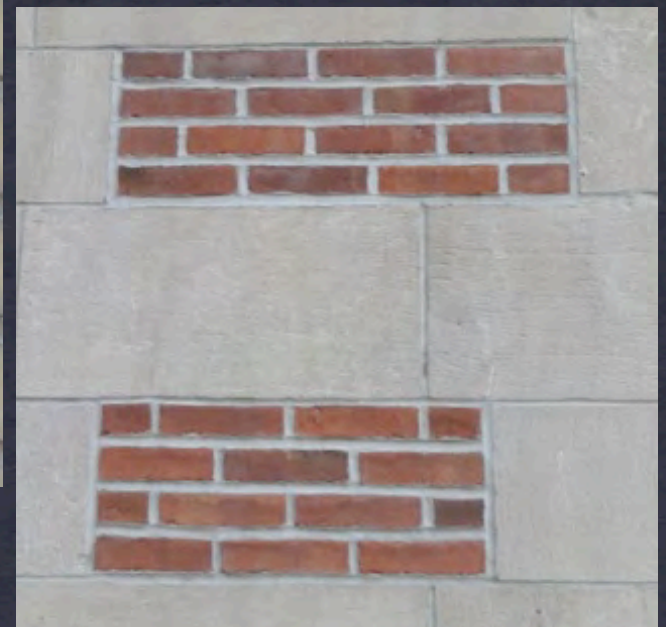
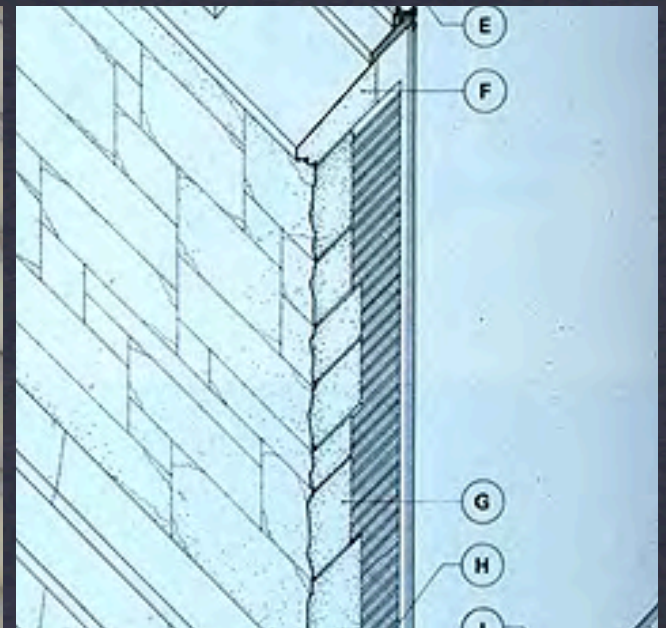
## **MASONRY WALL CONST.**

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**cavity masonry walls**

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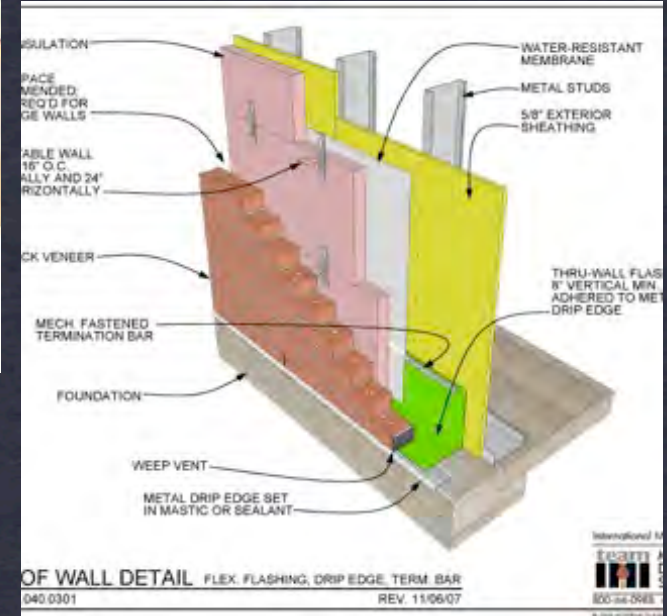
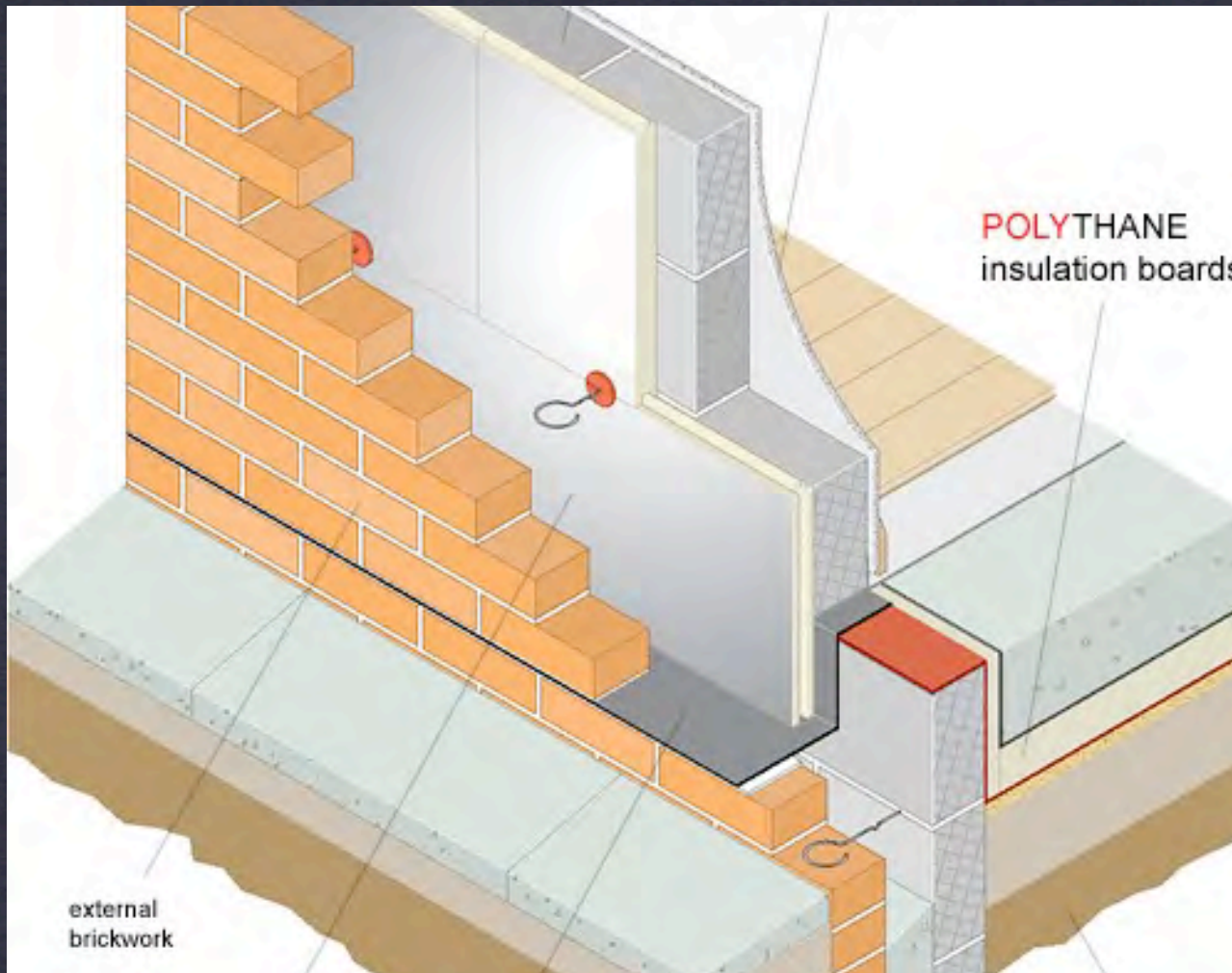
COMPOSITE MASONRY WALLS: WALLS OF MORE THAN ONE WYTHE WITH DIFFERENT FACING AND BACKUP MATERIALS.

## MASONRY WALL CONST.

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composite solid masonry walls

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**IMPROVED THERMAL PERFORMANCE:  
 INSERT RIGID BOARD INSULATION INTO  
 CAVITY W/ AT LEAST 1" AIRSPACE**

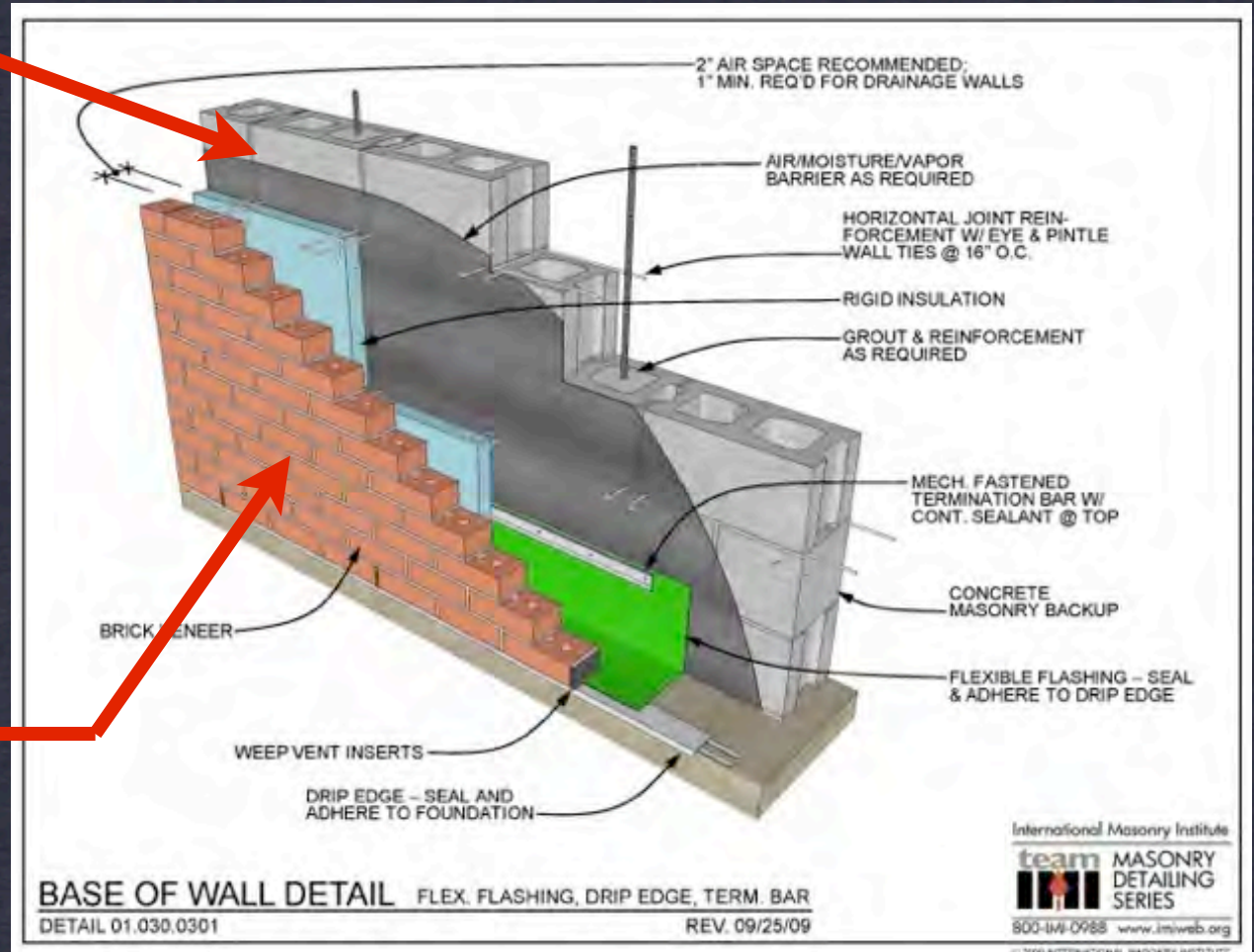
**MASONRY WALL CONST. composite cavity masonry walls**

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INNER WYTHE OF A  
COMPOSITE CAVITY  
MASONRY WALL  
PERFORMS AS  
STRUCTURAL ELEMENT

OUTER WYTHE SERVES  
AS A NONSTRUCTURAL  
FACING OR VENEER

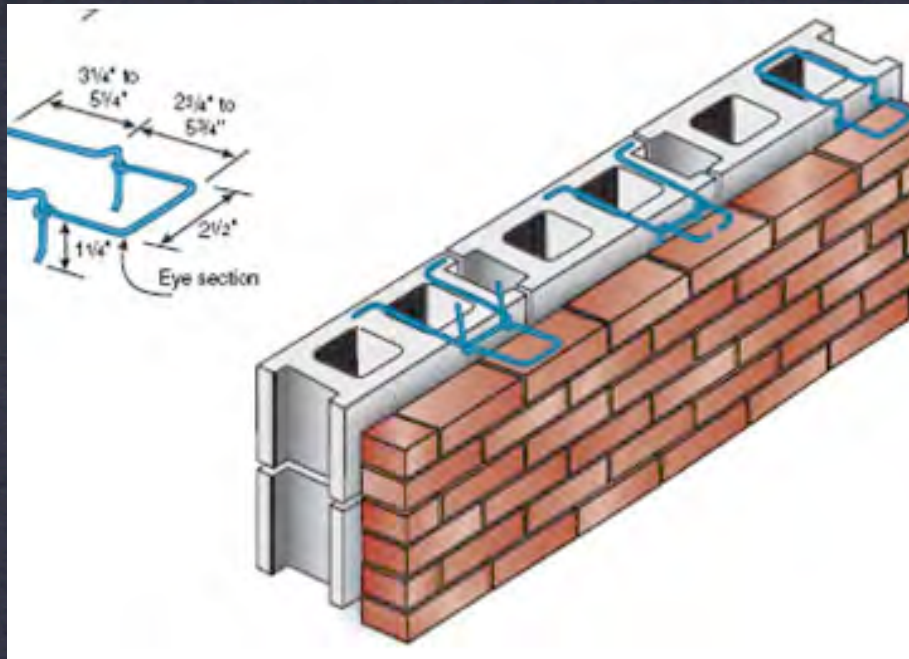


**MASONRY WALL CONST.**

**composite cavity masonry walls**

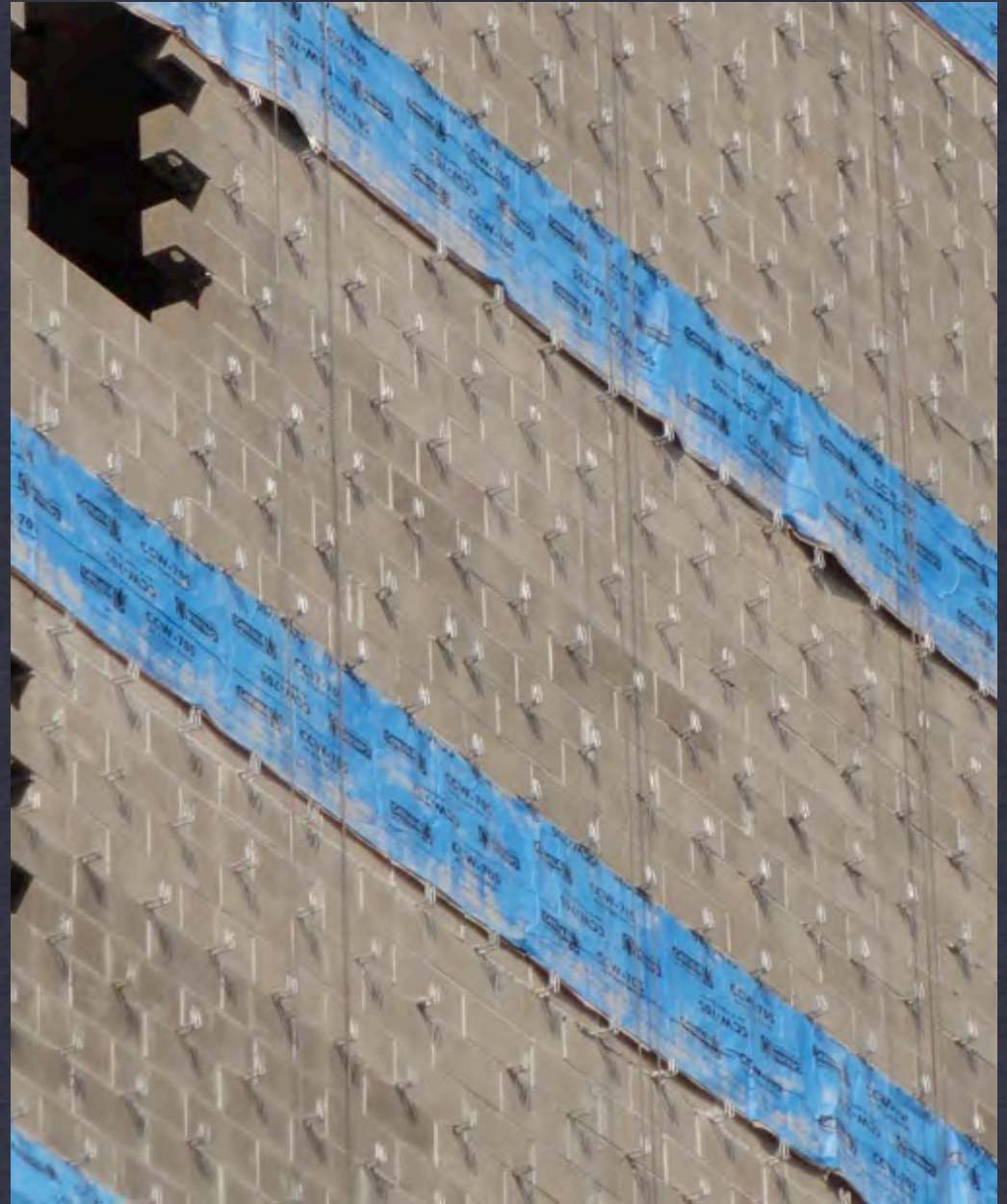
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**STEEL TIES CONNECT ACROSS THE CAVITY TO LINK THE INNER WYTHE OF CMU BLOCK W/ BRICK VENEER.**

**THE TIES PROVIDE LATERAL SUPPORT AGAINST WIND & SEISMIC FORCES.**

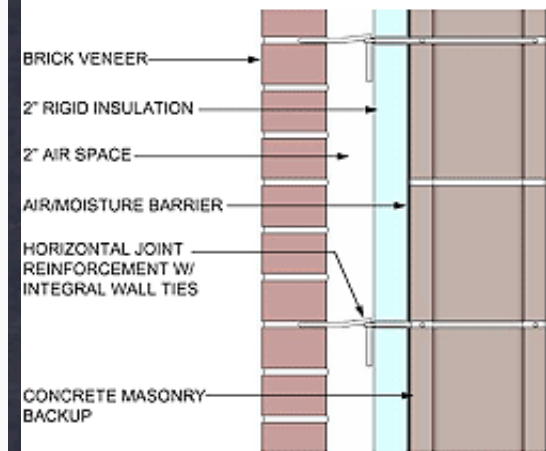
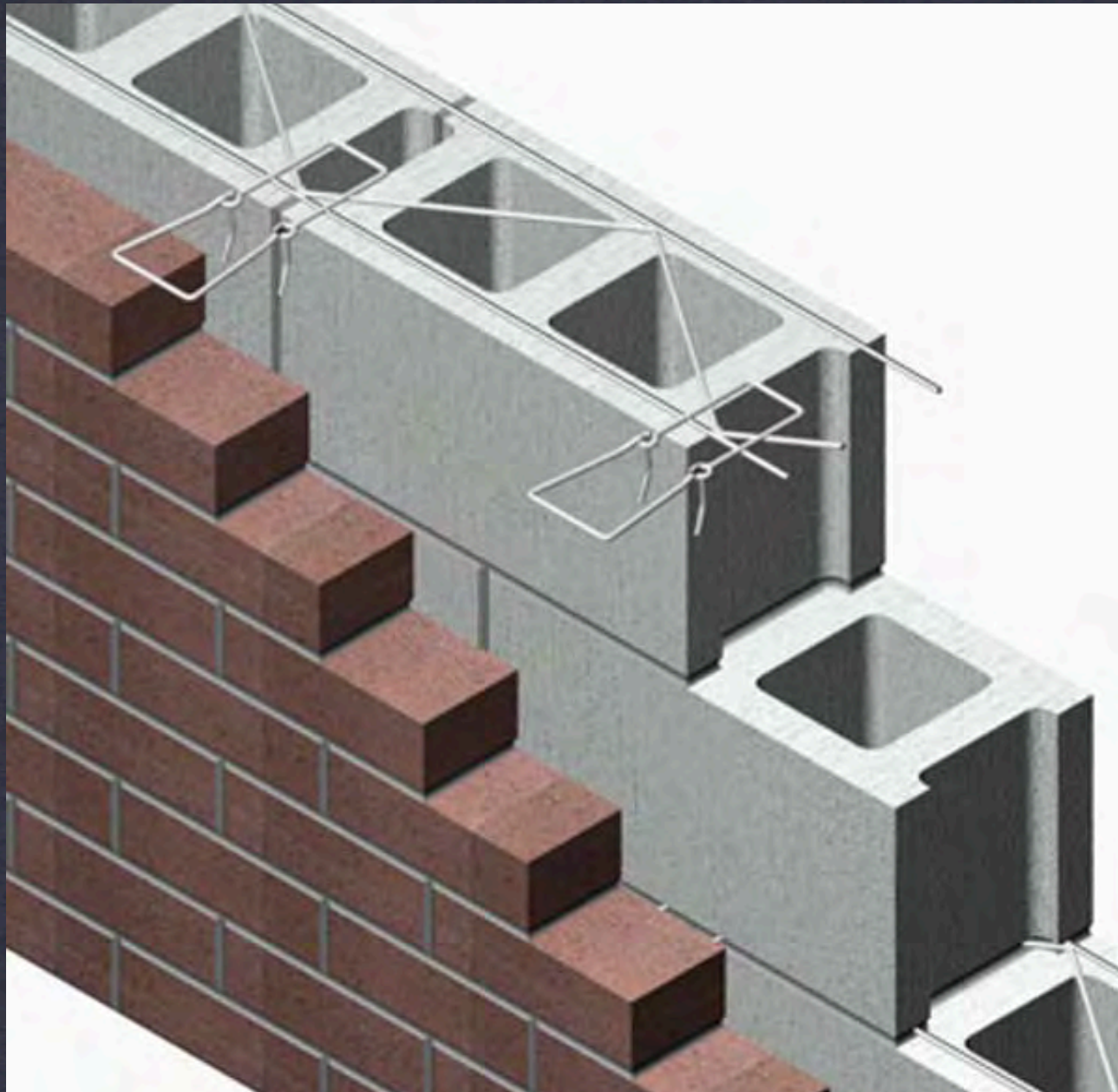


**MASONRY WALL CONST.**

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**composite cavity masonry walls**

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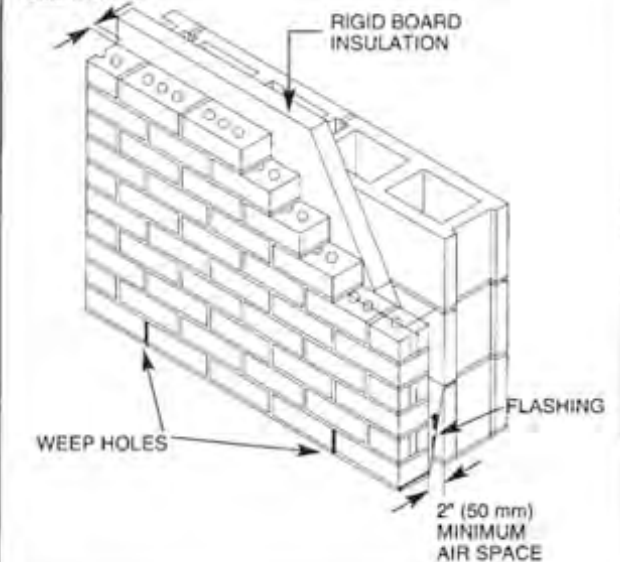


**CAVITY WALL**

REV. 01/19/07

International M  
**team** r  
 C  
 S  
 1-800-440-0999

1" (25 mm) MIN.  
 CLEARANCE



**MASONRY WALL CONST.**

**composite cavity masonry walls**

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**MASONRY AS: LOAD BEARING  
STRUCTURAL SYSTEM**

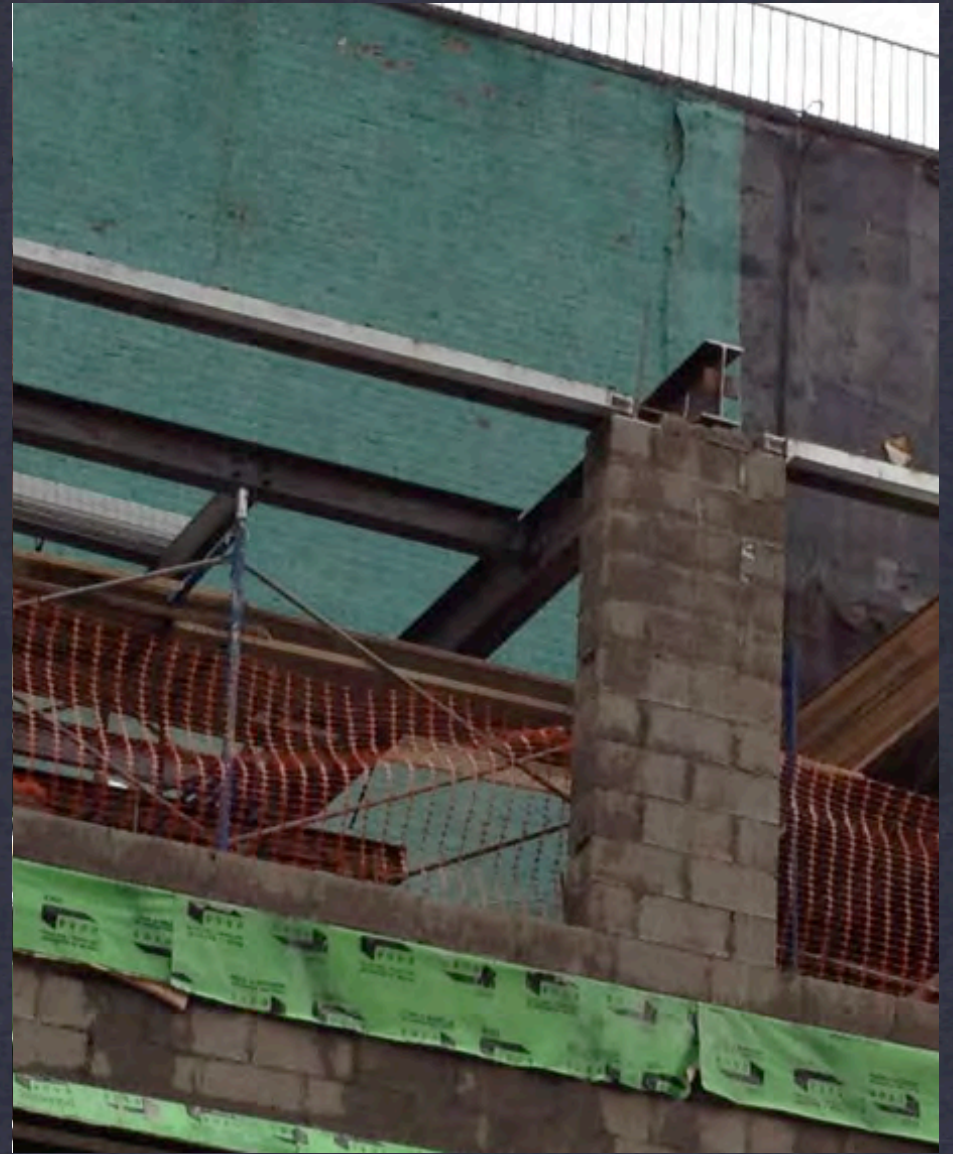
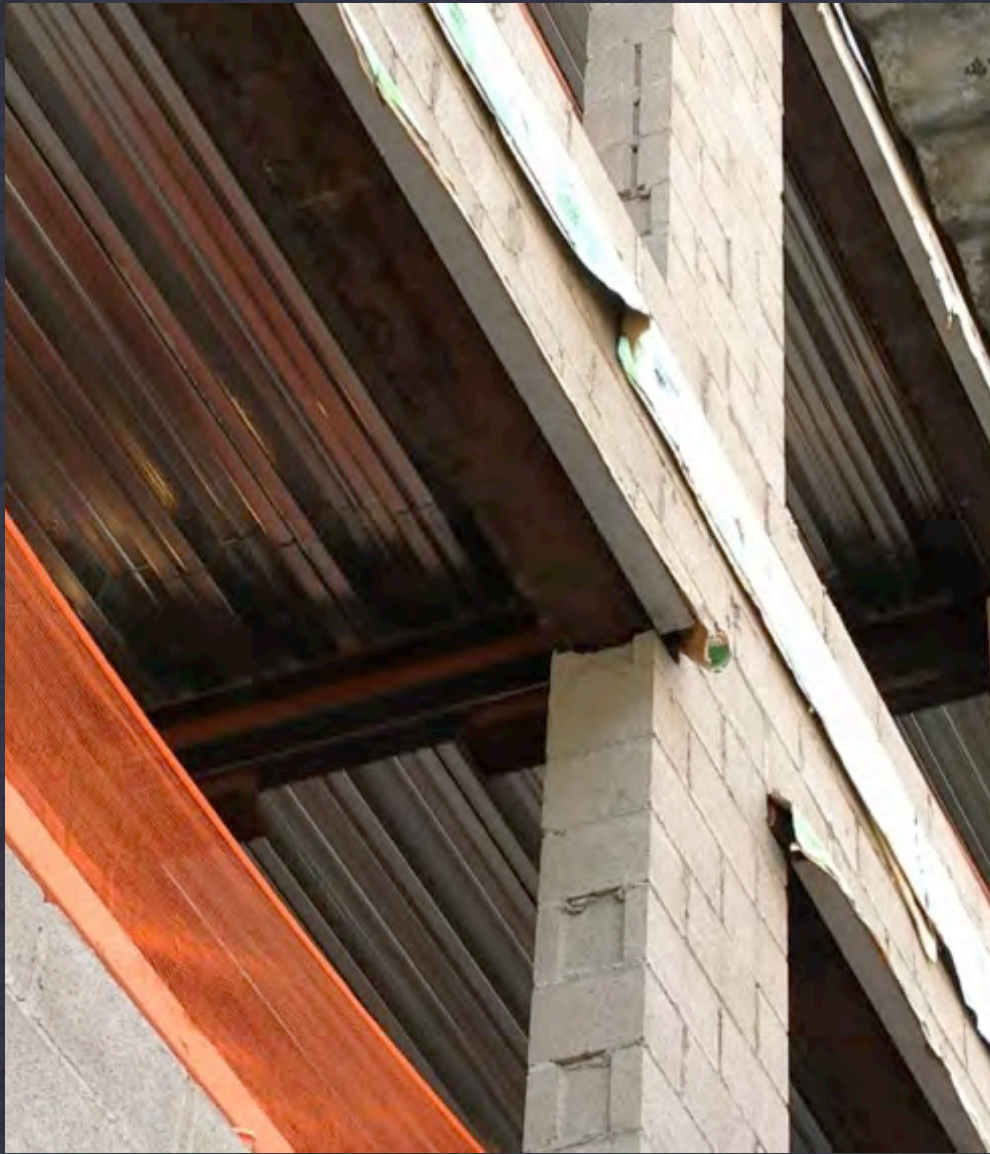
**MASONRY AS: INFILL + VENEER WITHIN  
STRUCTURAL FRAME (NON-STRUCTURAL)**

**MASONRY WALL CONST.**

**structural role of masonry walls**

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## MASONRY AS LOAD BEARING STRUCTURAL SYSTEM

**MASONRY WALL CONST.**

**structural role of masonry walls**

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**MASONRY AS: INFILL + VENEER WITHIN STRUCTURAL FRAME**

**MASONRY WALL CONST.**

**structural role of masonry walls**

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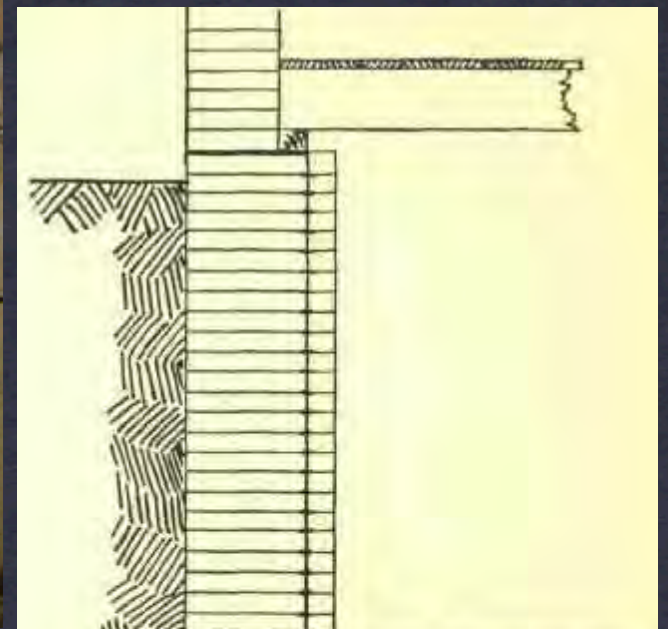
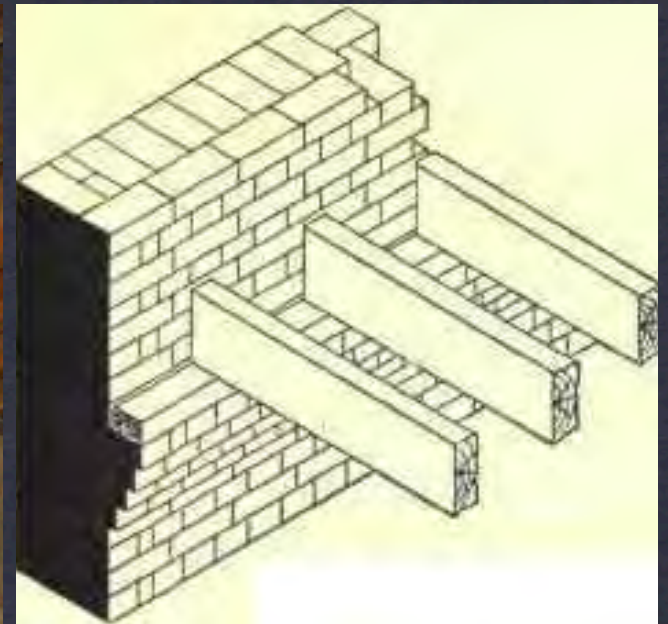
**CAVITY + BRICK VENEER ADDED ON TOP OF CMU BACKUP**

**MASONRY WALL CONST.**

**structural role of masonry walls**

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# MASONRY WALL CONST. spanning systems: ordinary joist

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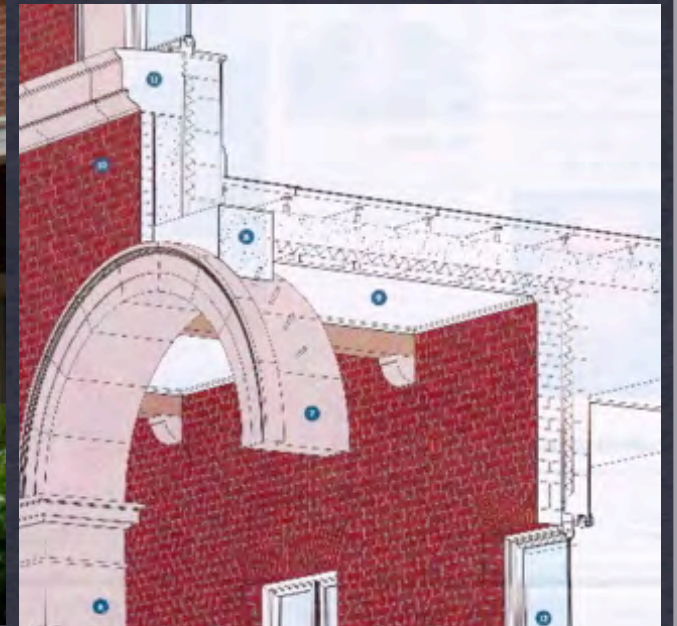
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# MASONRY WALL spanning systems: steel + concrete decks

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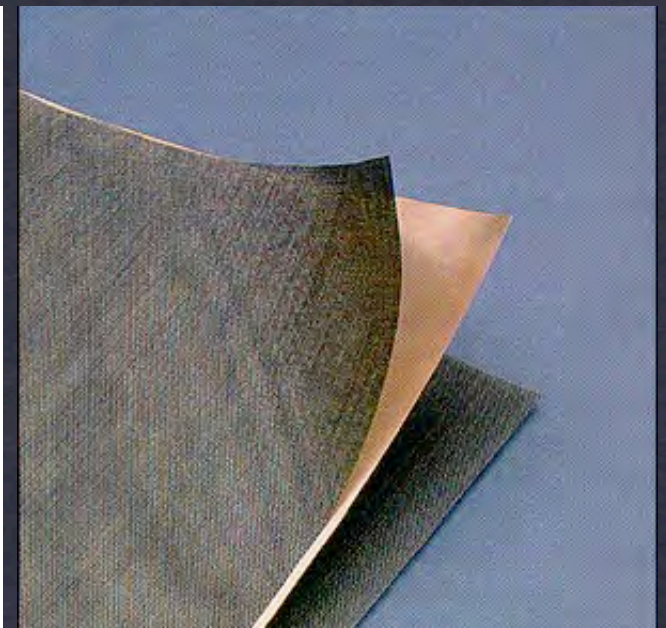
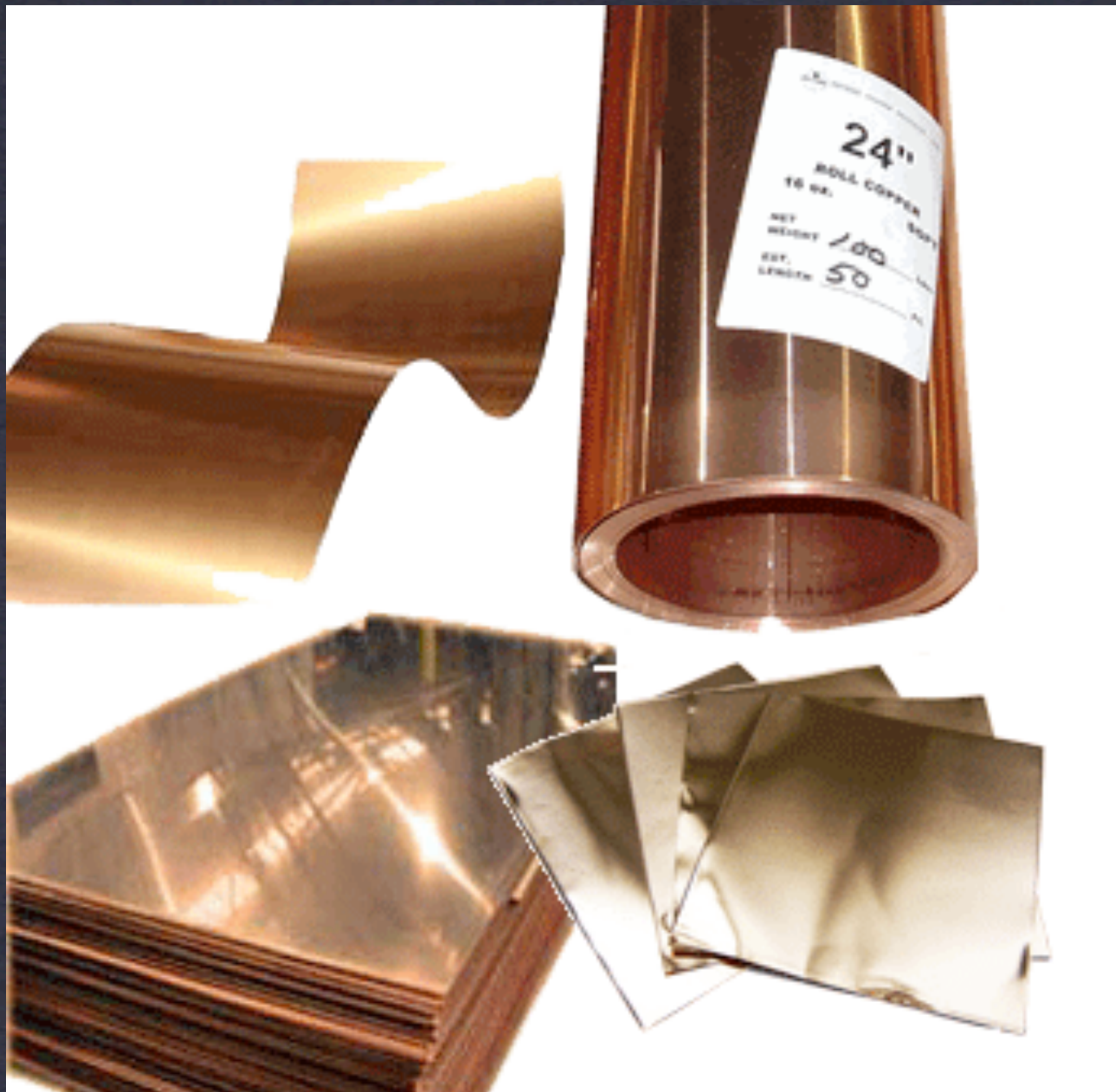
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# MASONRY WALL spanning systems: steel + concrete decks

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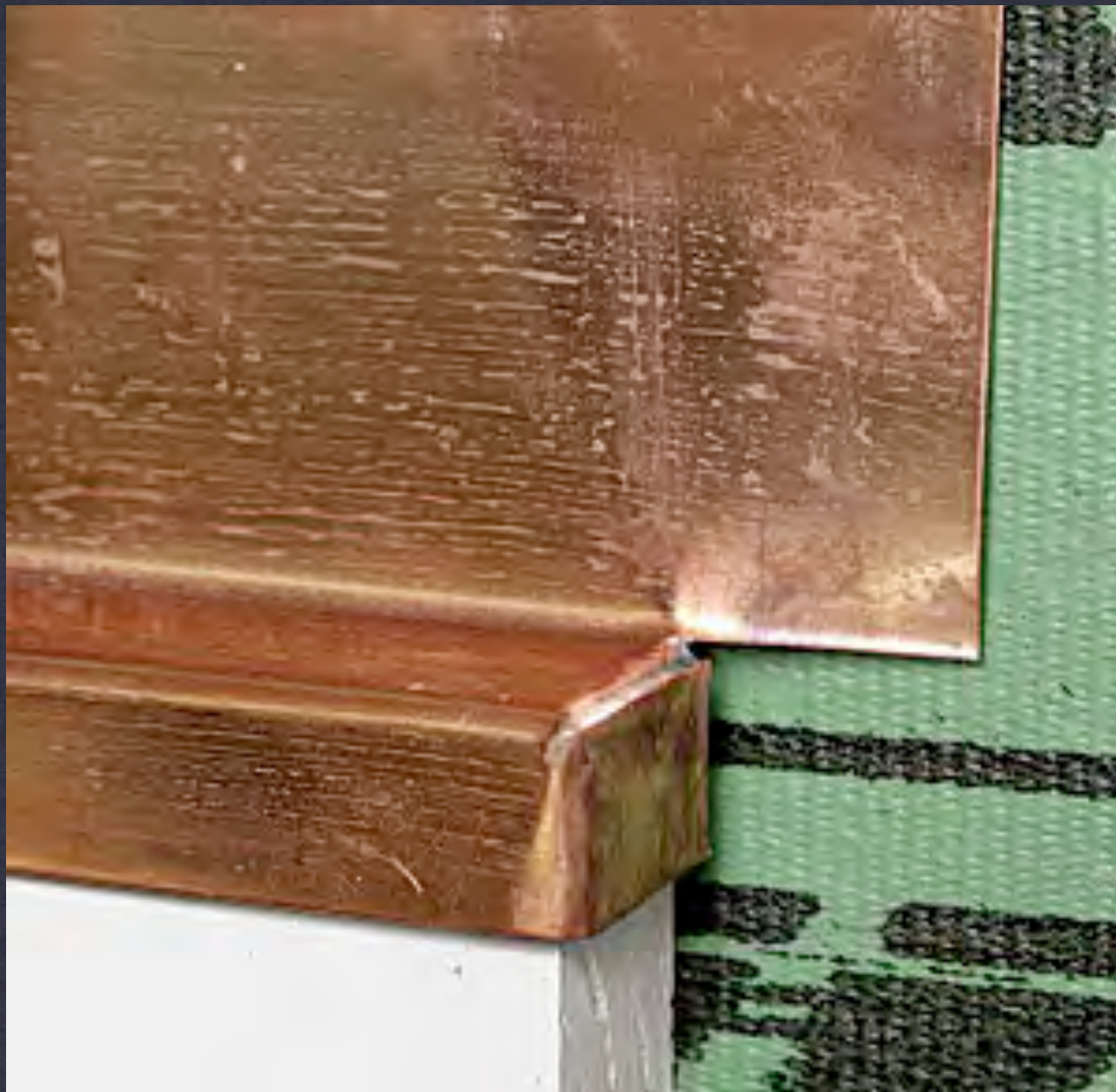
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# MASONRY WALL CONST. detailing: flashing @ exterior wall

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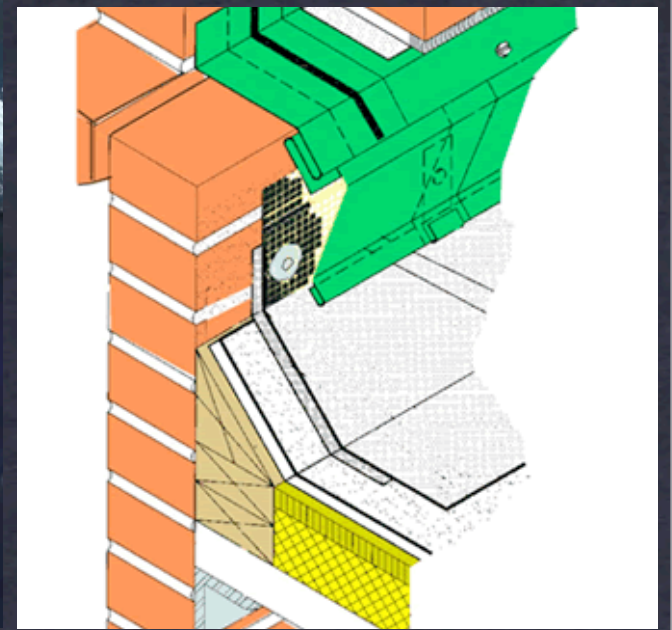


# MASONRY WALL CONST.

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detailing: flashing

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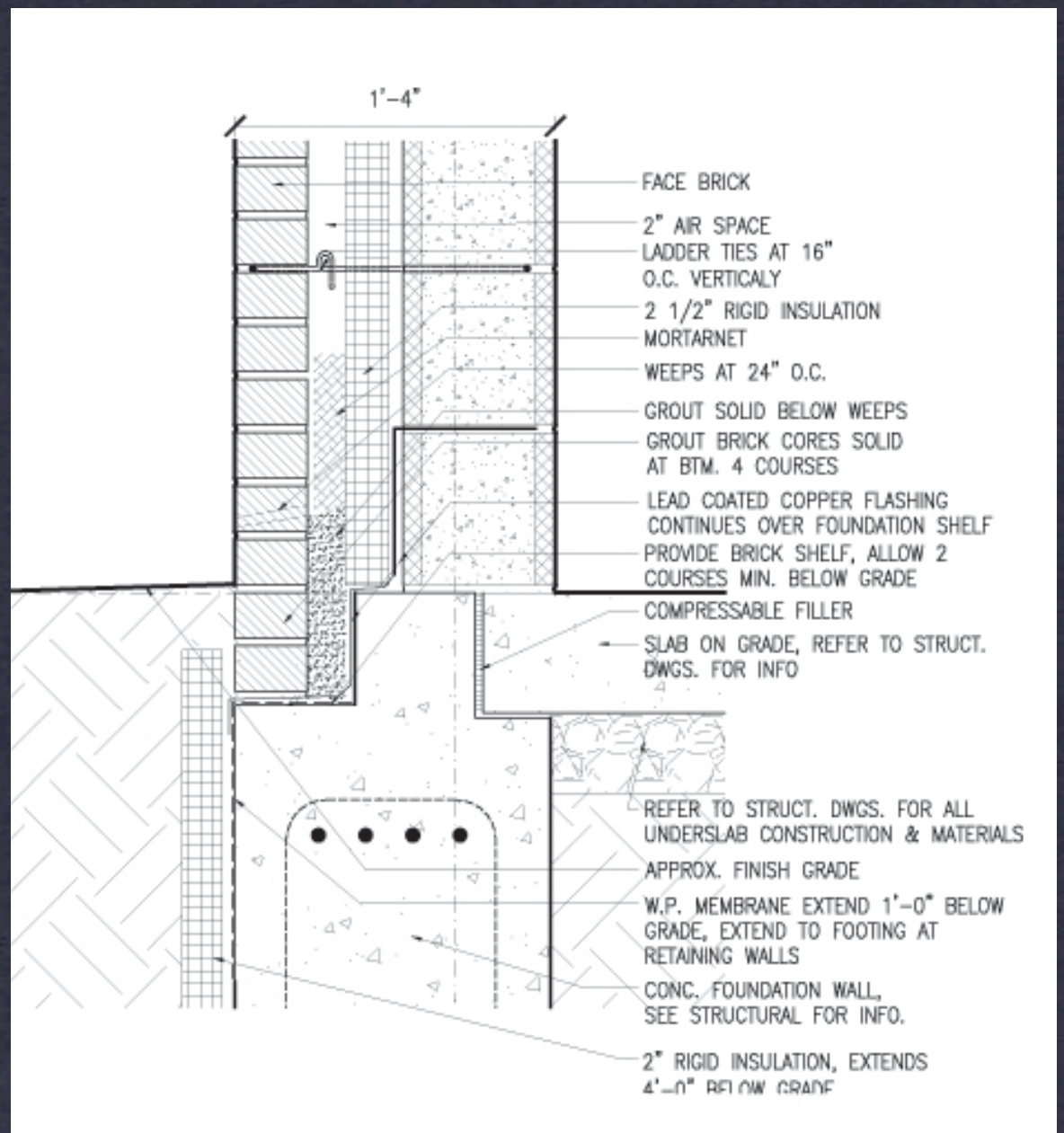
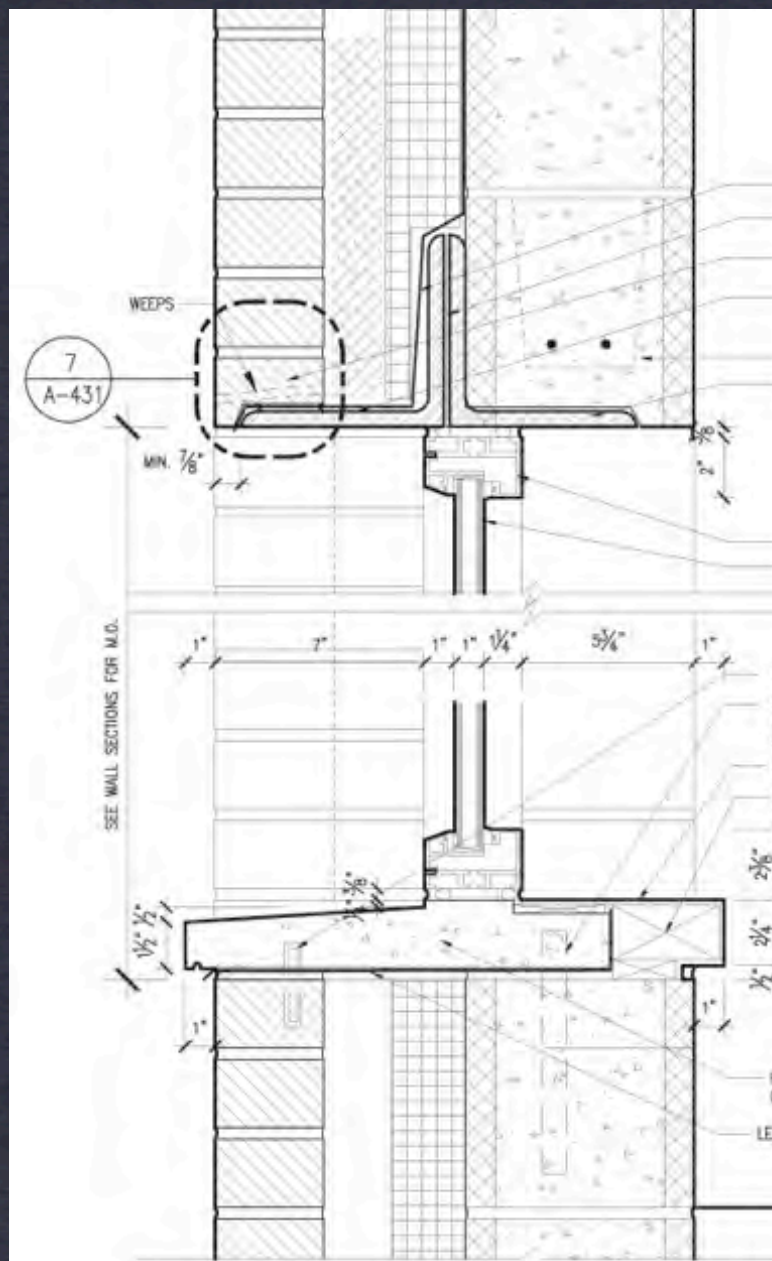


**MASONRY WALL CONST.**

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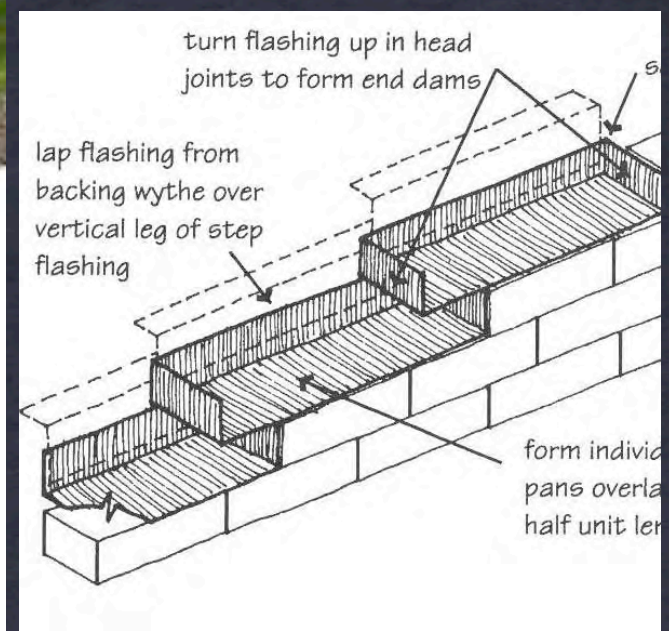
**detailing: flashing @ parapet**

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# MASONRY WALL CONST. detailing: flashing @ exterior wall

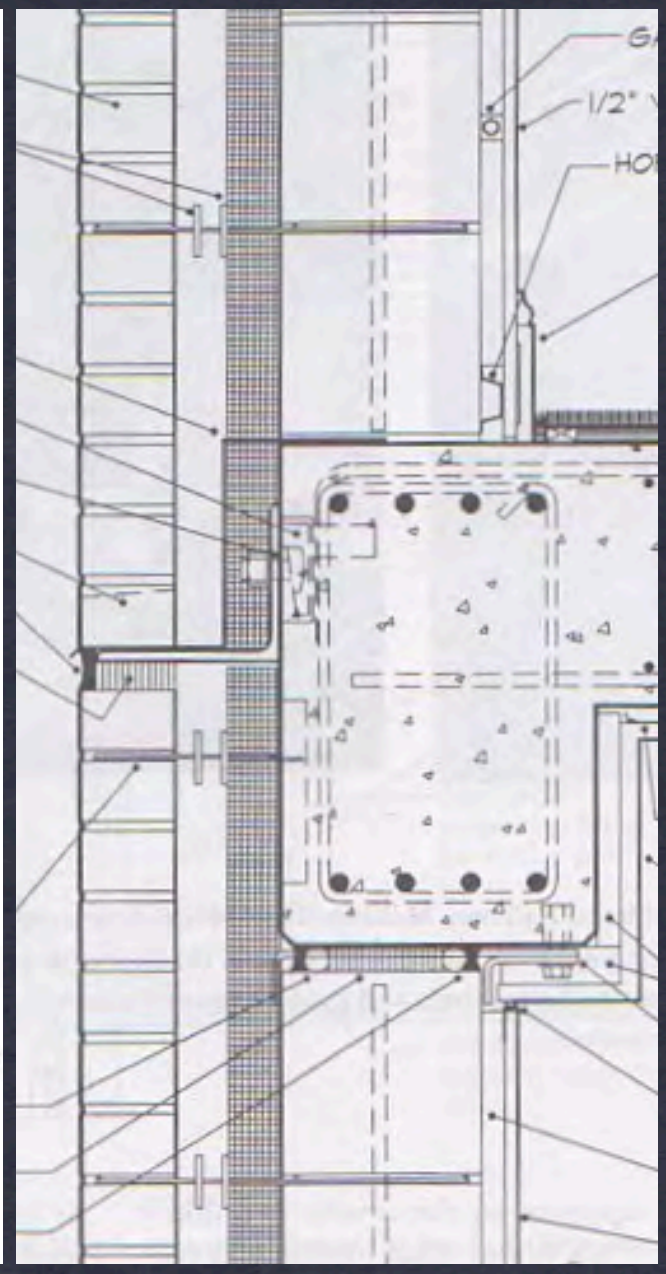
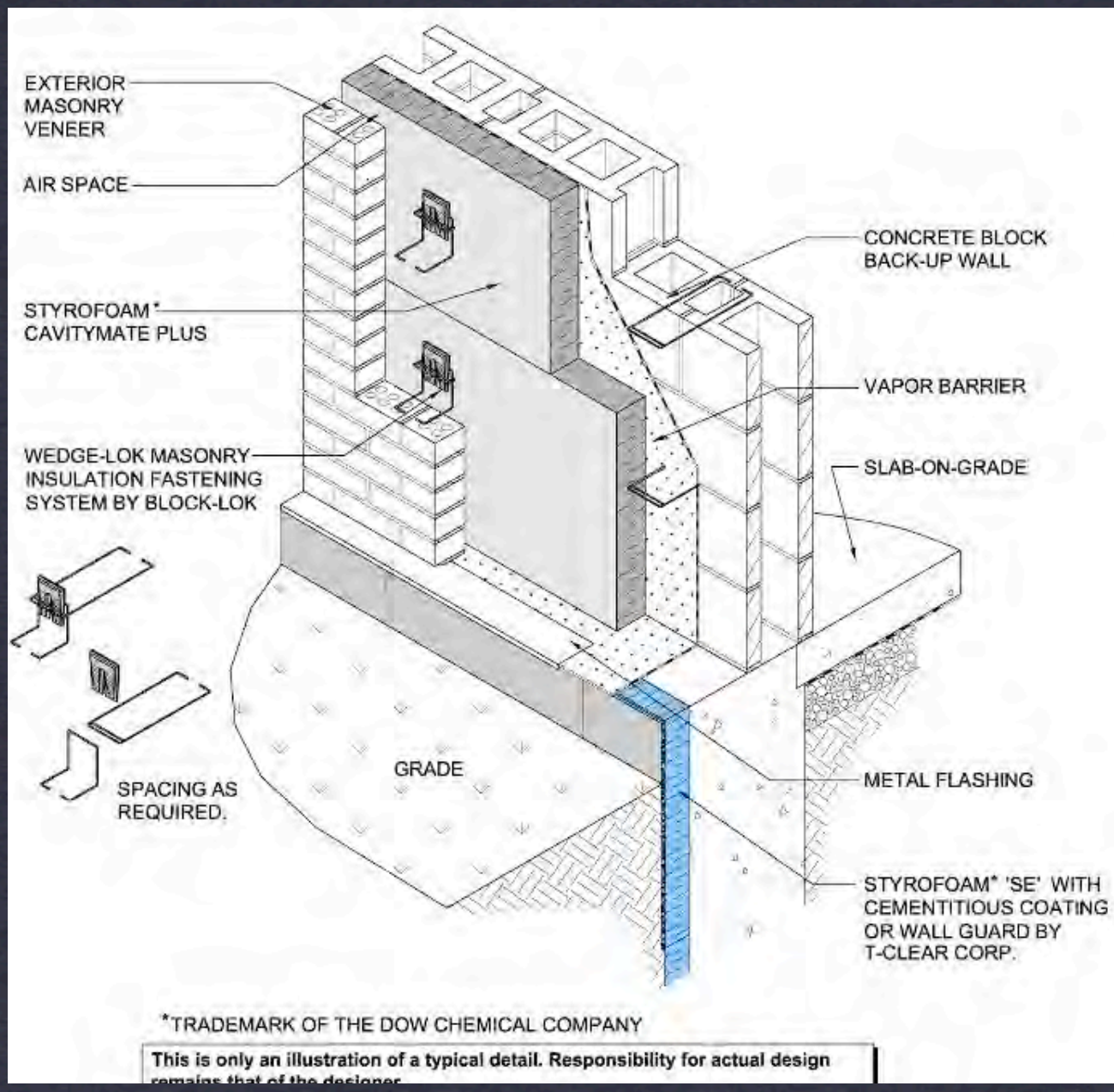




# MASONRY WALL CONST. detailing: flashing @ exterior wall

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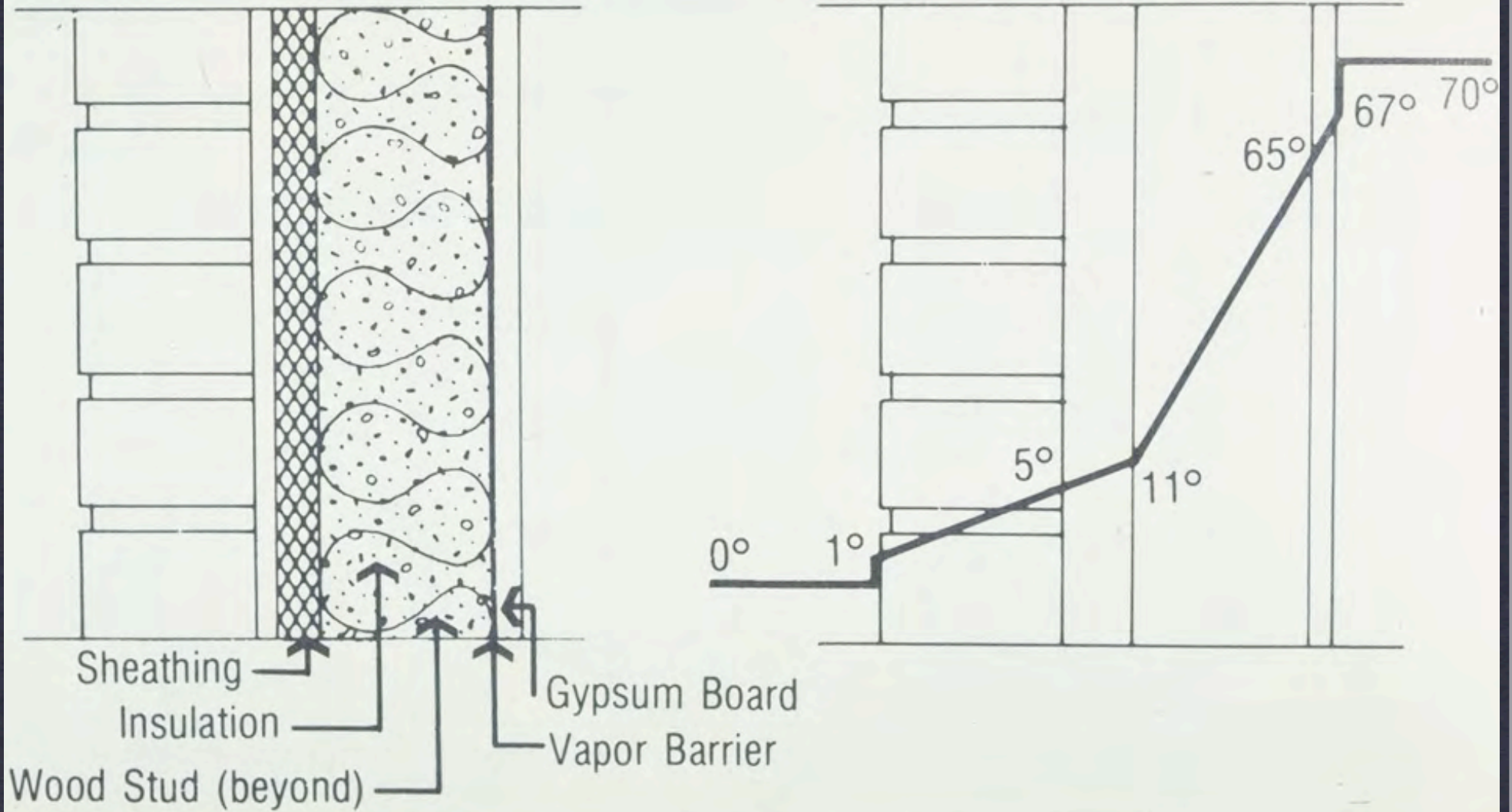
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# thermal insulation

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# THERMAL GRADIENT CURVE



**MASONRY WALL CONST.**

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# MASONRY WALL CONST.

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special considerations

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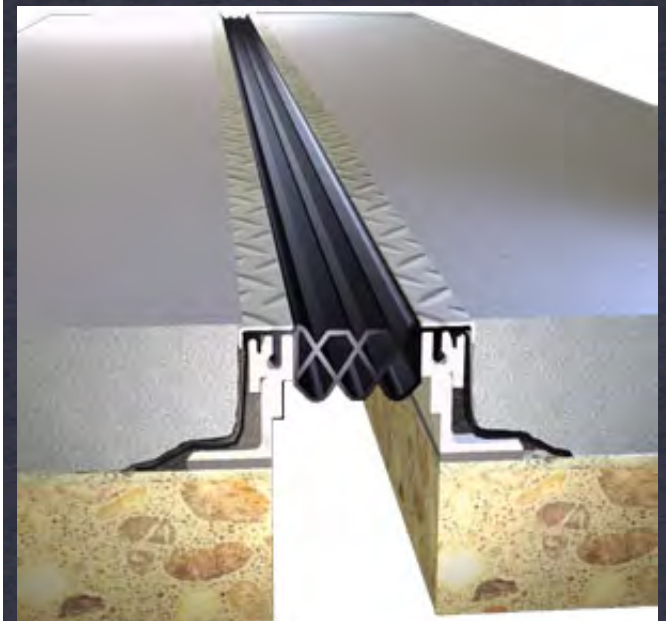
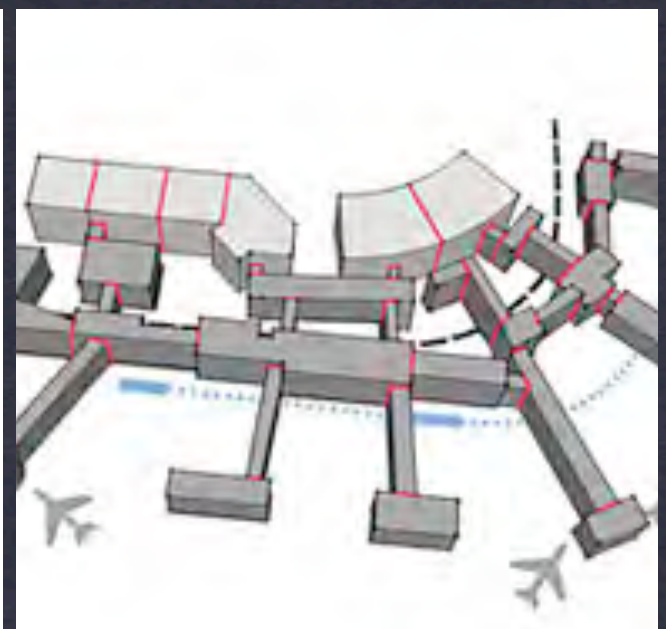
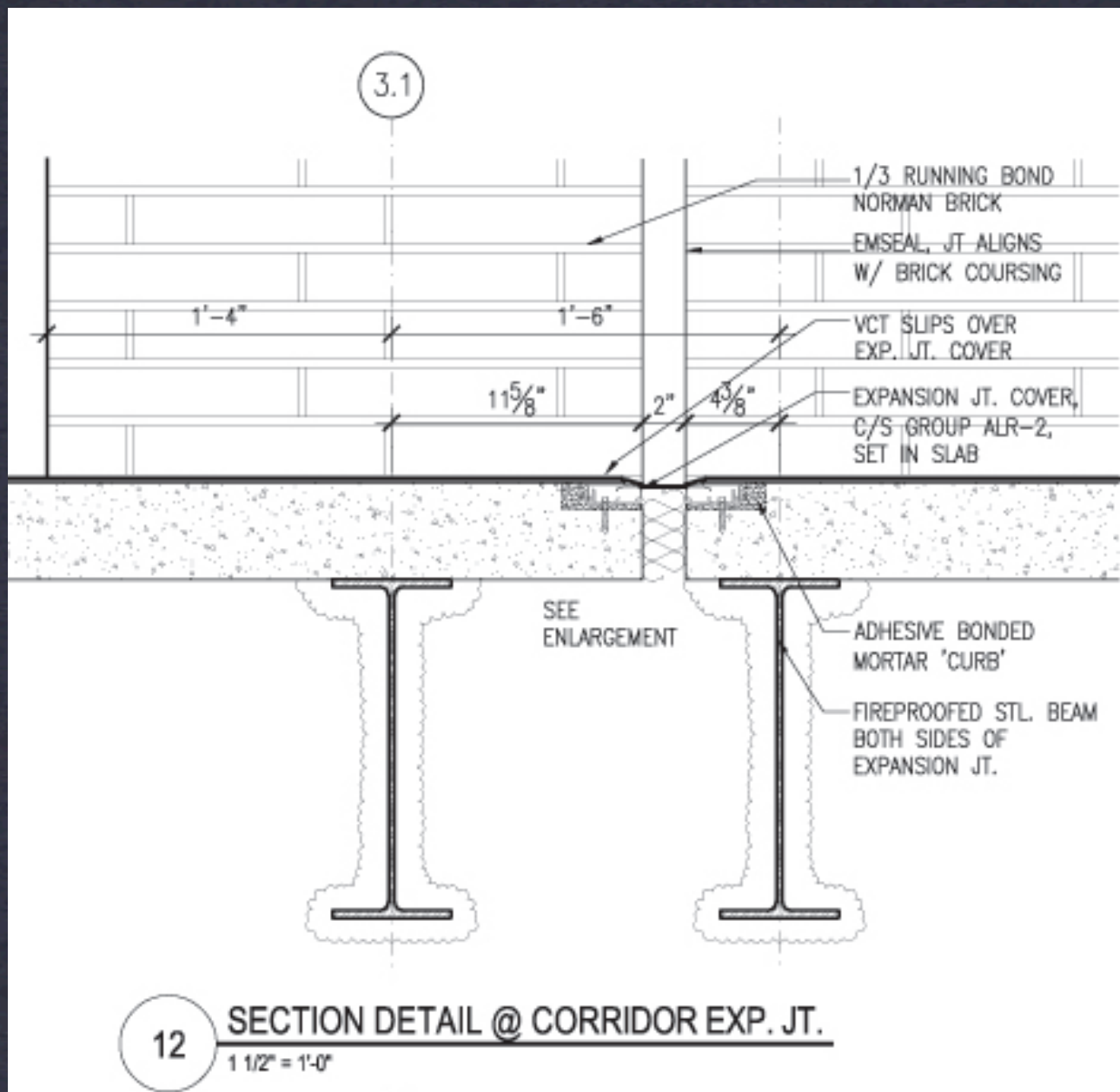


# MASONRY WALL CONST.

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surface divider joints

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# MASONRY WALL CONST.

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# movement joints

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# wrap up



- \* masonry wall construction dominates in NYC
- \* low rise: load bearing systems make sense
- \* high rise: panelized cavity wall construction
- \* complex detailing to address moisture penetration, thermal insulation, and movement due to expansion, contraction
- \* aesthetic considerations: continuous masonry wall or panelized system
- \* timeless: power and durability