

Mid-Century Modern: The Challenges for a CM to Add Value

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Mid-20th Century Buildings Workshop

Facility Officers Conference/ Columbus, Ga./ 26 October 2011

The Challenges for a CM to Add Value

Session Outline

Discussion of Multiple Building Systems

Discussion of Changing Building Technology

Typical System Failures and Limitations on Repair

Case Studies

Best Practices



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Post WWII saw many changes to building technology

- Reliance on mechanical HVAC systems.
- Manufactured “systems” in lieu of trade based systems.
 - No longer did the carpenter or mason have majority of construction responsibility.



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Post WWII Changes

- Structural systems were now typically all steel or concrete frame. Larger floor plates were more common.
- Building skins changed immensely.
 - Introduction to interstitial dew point issues, pressure balancing/equalization of buildings, vapor transmission, etc.



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Post WWII Changes

- Glass was no longer simply clear
 - Tinted, reflective, insulated, structural, etc.
- Asbestos and lead paint were used for ***everything!***
- Caulk is ***King*** ... it can fix anything!
- Buildings designs were looking for “zero” maintenance systems and funded them accordingly.



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Executive Summary

- Our experience is that mid-century buildings can be successfully reused for many purposes including new purposes not originally contemplated.
- Like working on any other period building, the structure, systems, and implications of change need to be fully understood by all team members to accurately plan, budget and implement.
- The cost of repurposed buildings is typically less than a complete replacement.
- Repurposed buildings can be as economical to operate as new buildings.
- Keeping existing buildings has less impact on the environment



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HOWEVER,

THE DEVIL IS IN

THE

DETAILS



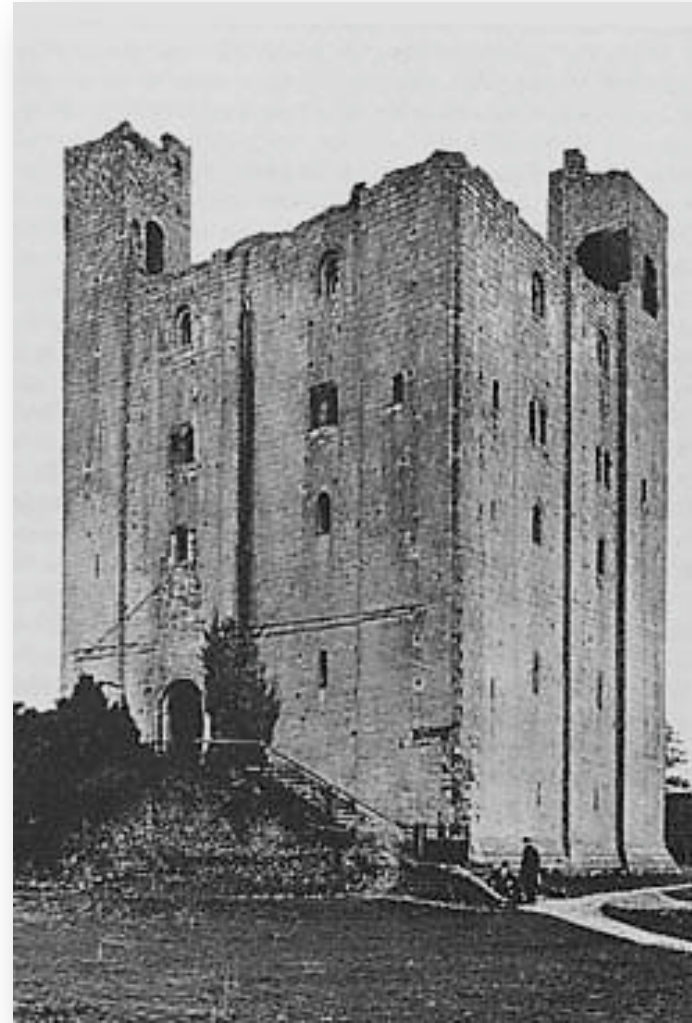
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The Challenges for a CM to Add Value

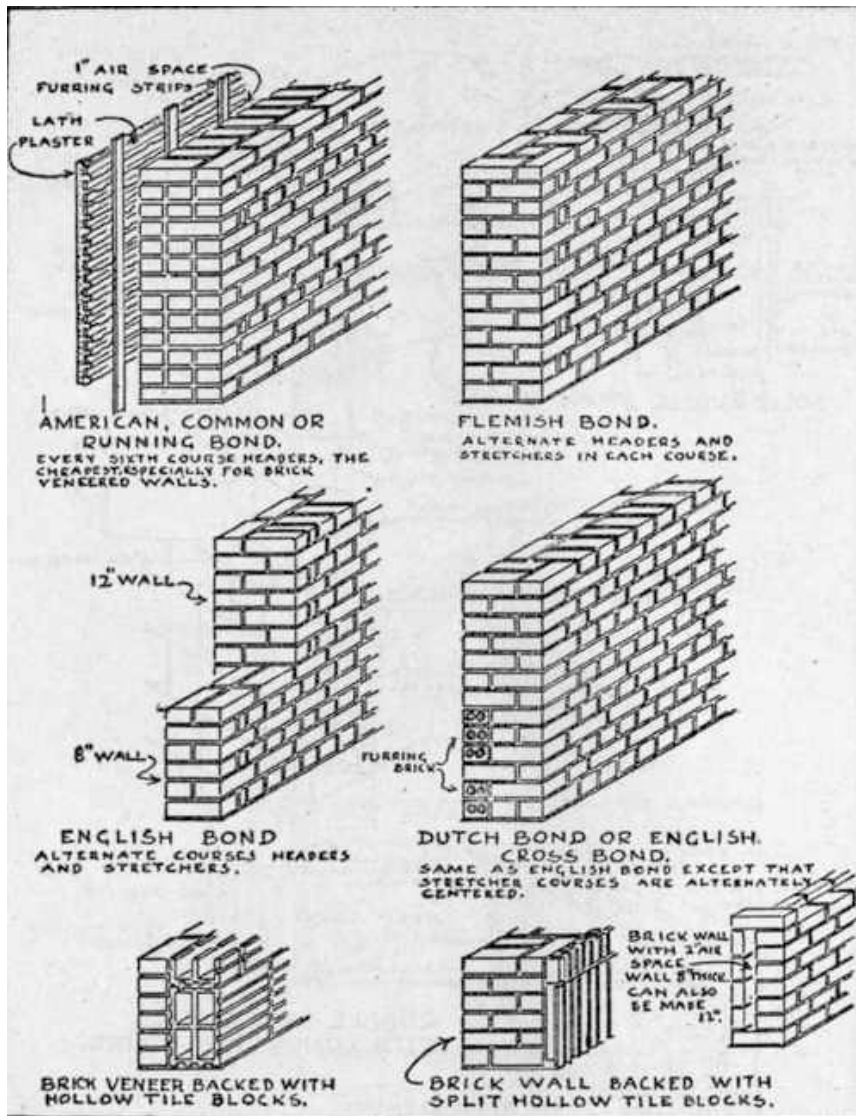
- Why do some systems last and others do not?
- What does time show us for “traditional” versus “contemporary” building systems?
- What is the culprit for the majority of system failures?
- Results of deferred maintenance on 19th century vs. 20th century buildings.
- What can't we see?

Let's talk about wall systems ...



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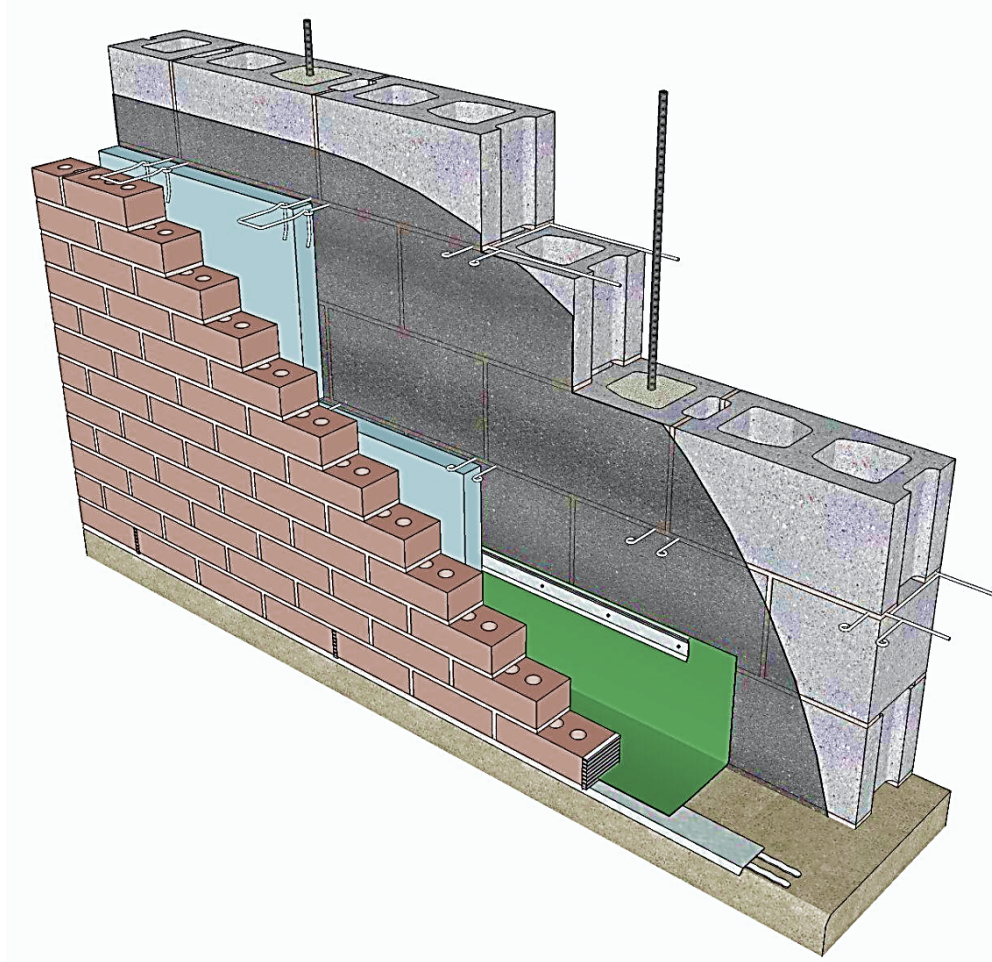
“Traditional” Wall Design

- Understood allowance for movement and cross connection of wythes of masonry.
- Moisture is separated from inside to outside based upon material volume.
- Flexible mortar is self healing and eliminated the need for expansion joints.
- System is water tolerant.



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Common Mid-Century Wall Details

- Rain screen masonry or panel system
- Materials with different coefficients of expansion
- Hard mortar that requires expansion joints
- Thin cross section connections subject to corrosion
- Detailed engineered system
- Death by water



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The Problem With “New” Engineered Systems?

- Give a trade the chance to make a mistake, *and they will.*
- Success depends upon multiple trades all getting it correct.
- Training and education to ***fully understand*** how a system performs *seldom exists.*
- Quality control in the commercial construction process can be less than adequate to oversee the little details.

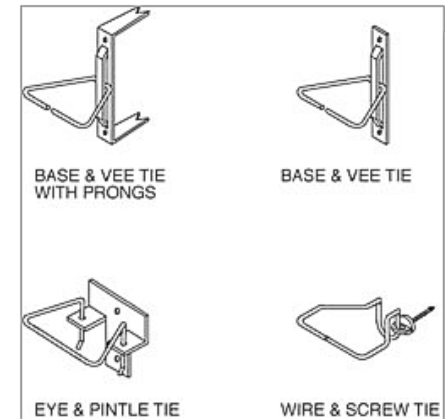
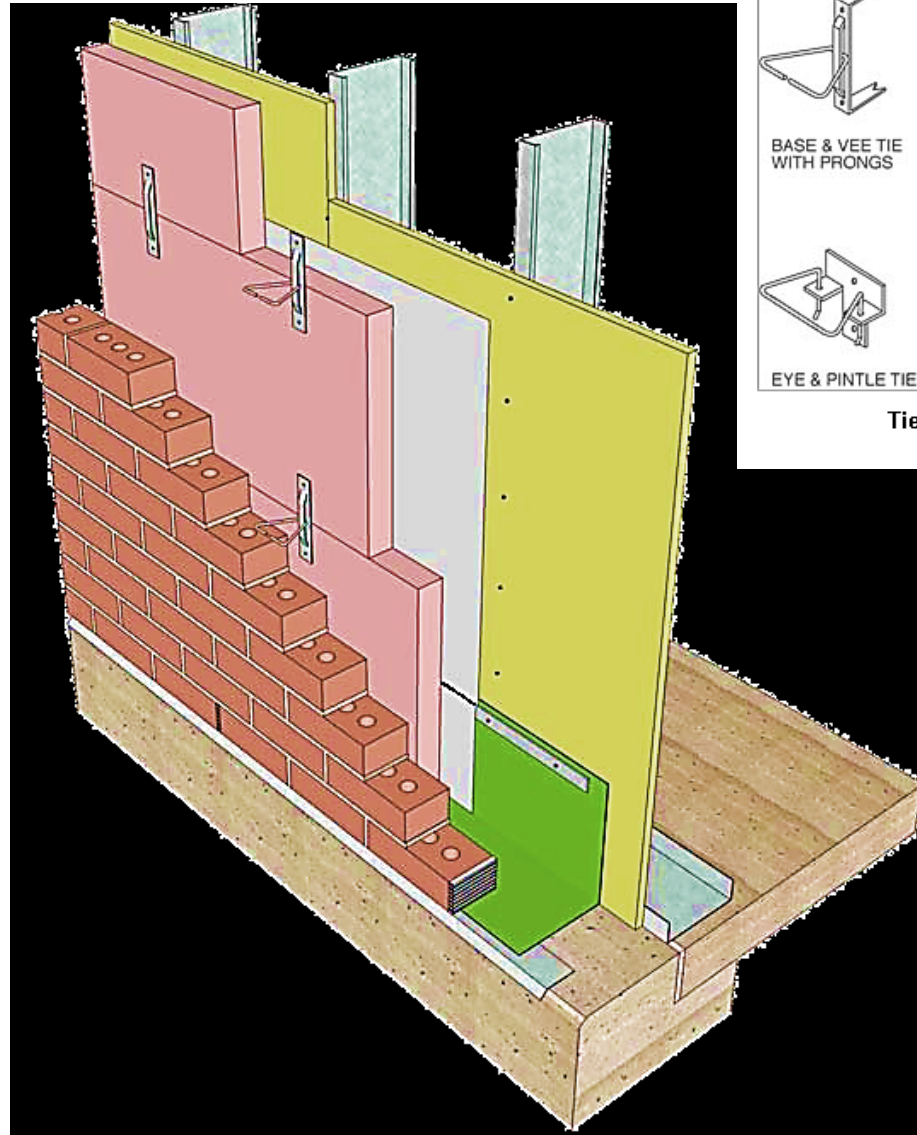


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Detail Economies

- Over time details have changed and continue to change to lessen cost.
- Modifications to an interior stud wall can now have serious implications to the exterior masonry support.
- A system's performance can now be a success or failure based upon the placement or deterioration of a single screw.



Tie Assemblies
Fig. 5

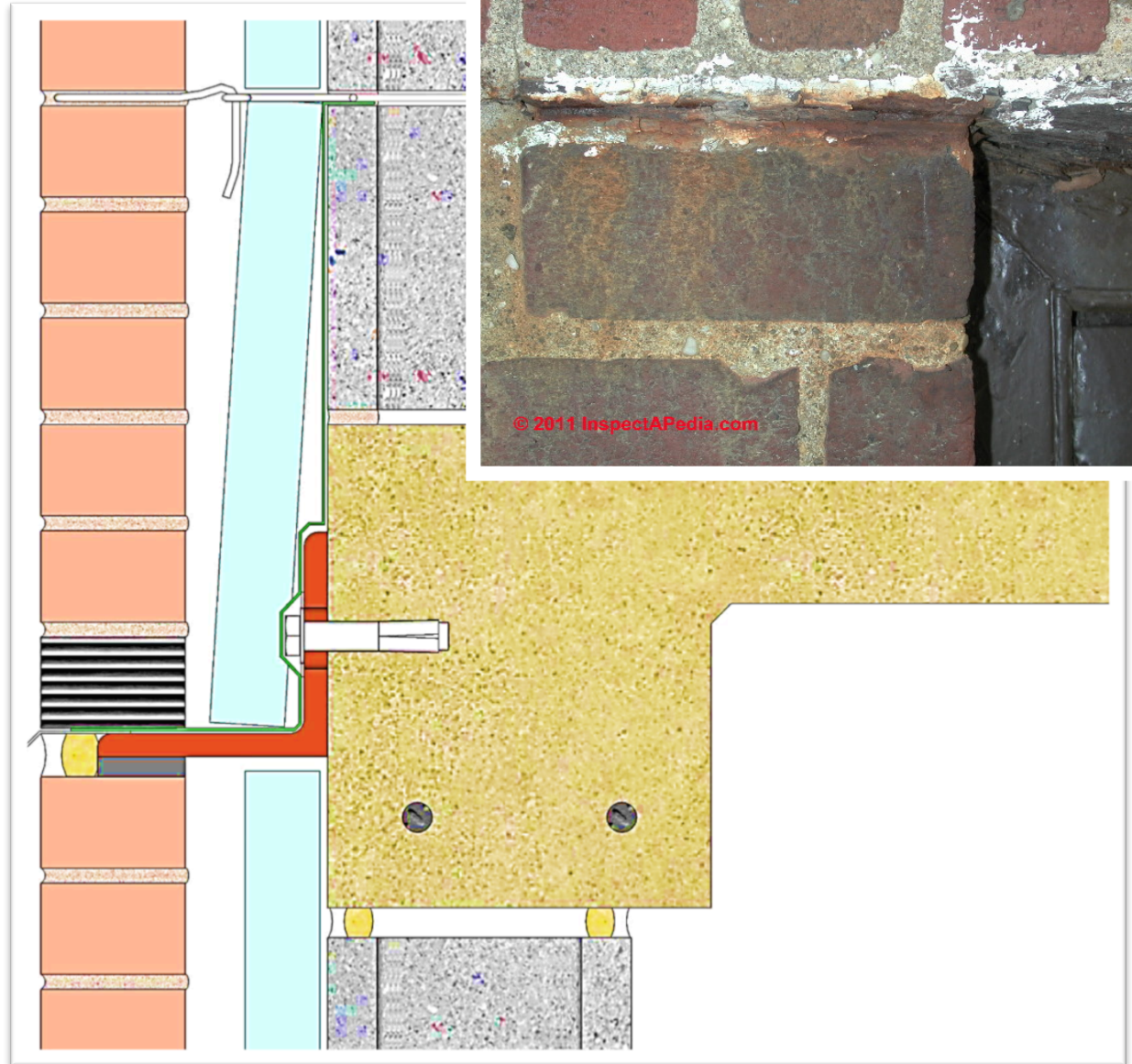


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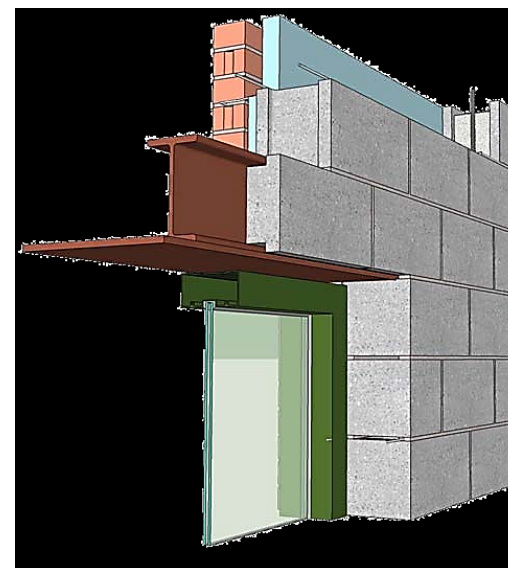
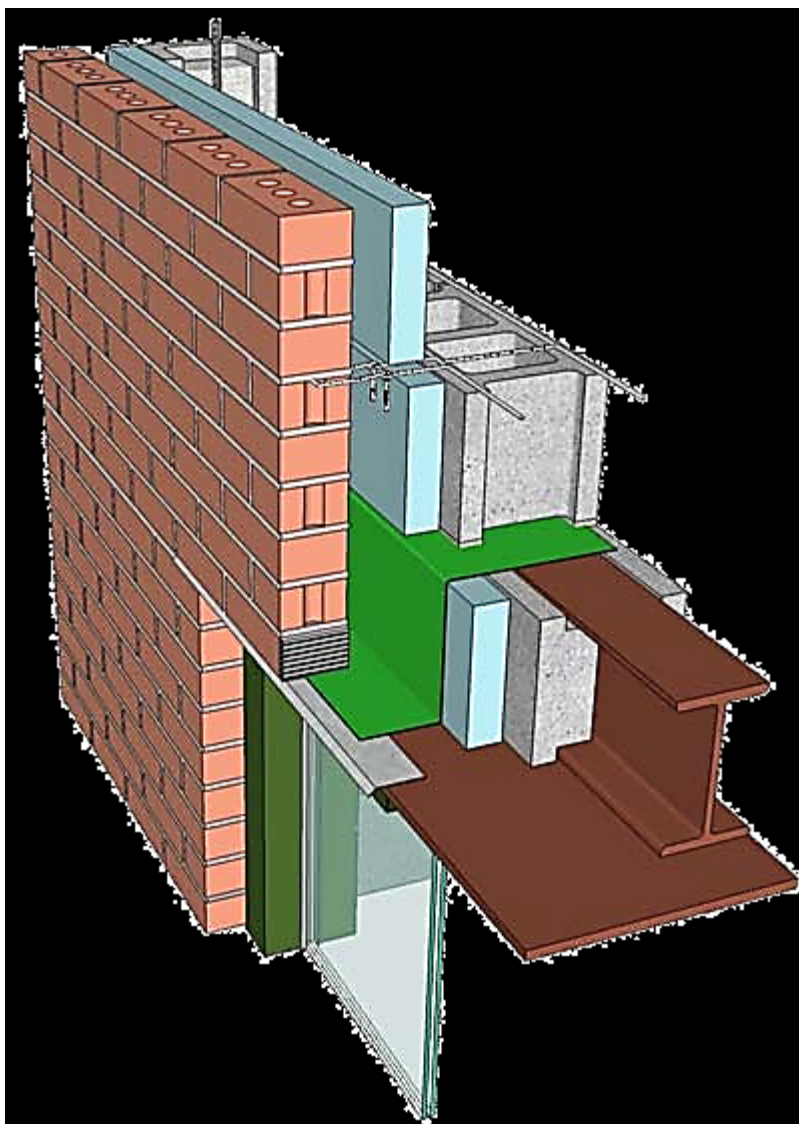
The Shelf Angle Weakness

- Failure to provide underside soft joint
- Failure to get moisture “all” the way out
- Rust jacking of shelf due to condensation or other moisture
- Differential shrinkage of concrete, block and brick
- Wire tie failure



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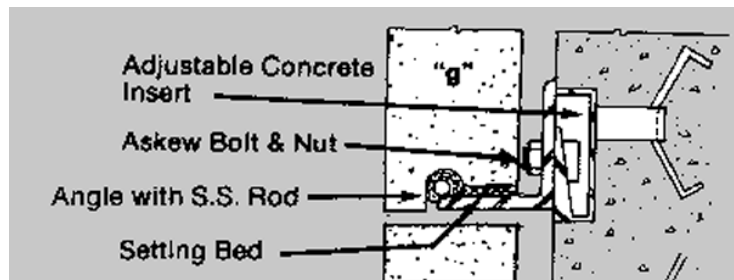
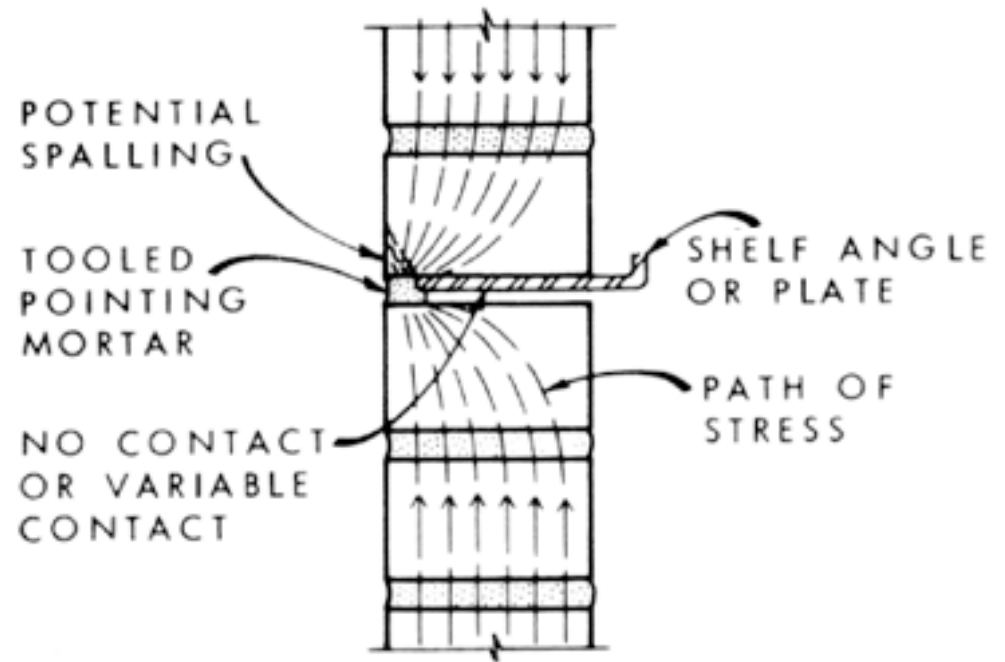
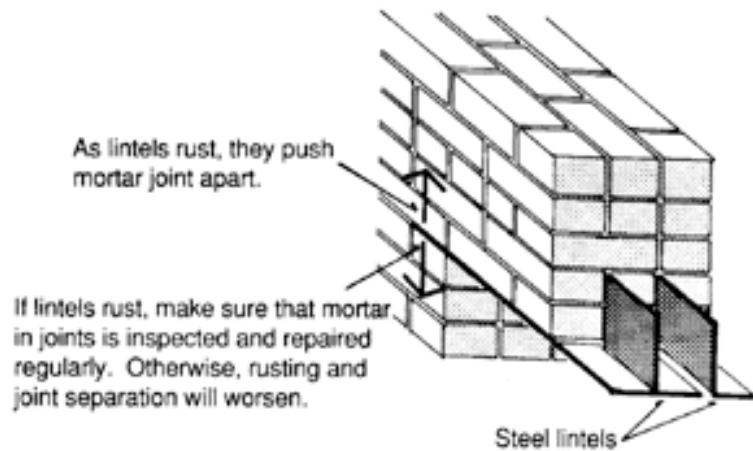
Hidden Lintel Conditions

- Extent of oxidation cannot be seen without investigation.
- Were the lintels installed as designed or could double angles have been used.
- How do you stop oxidation once it starts and budget its accurate repair?



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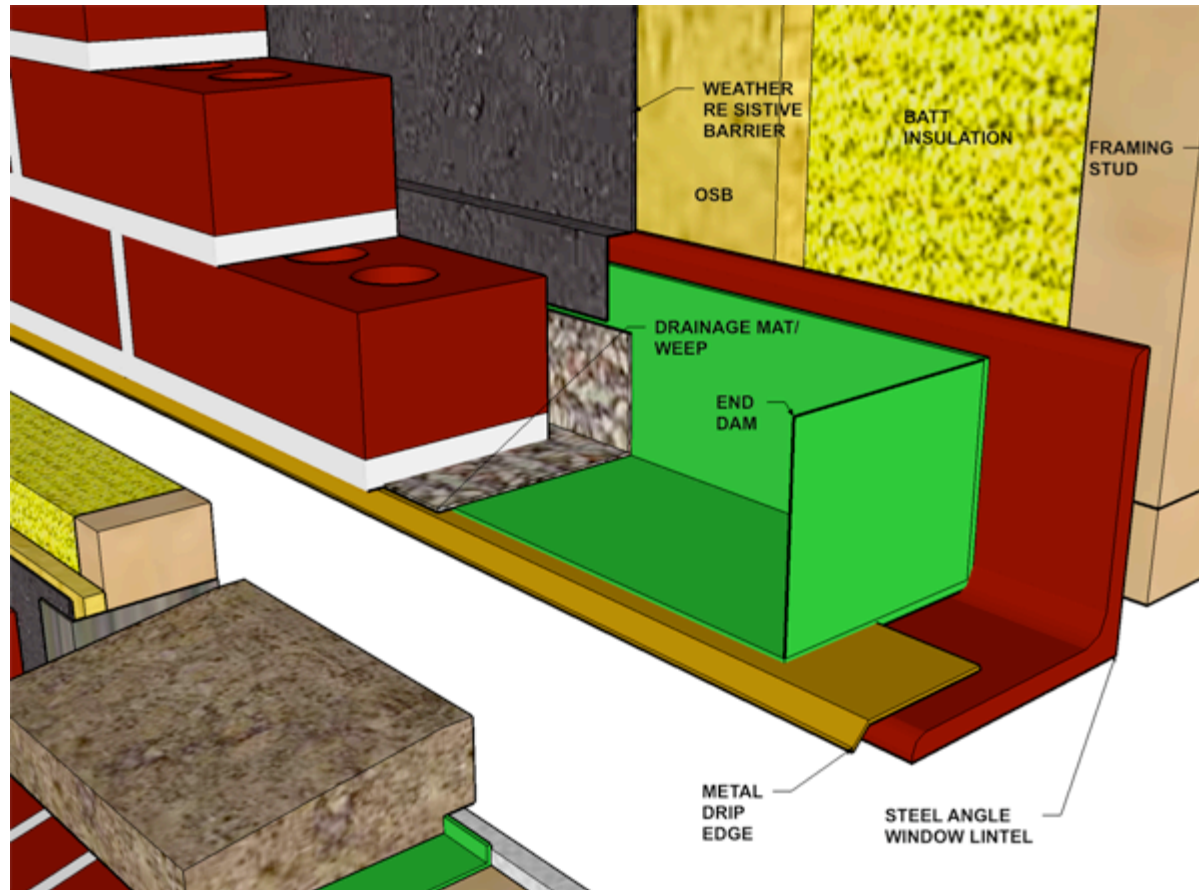
- Once deterioration starts, common “fix” is to caulk or point, sealing in more moisture.
- Patented systems will likely be even less understood by construction or maintenance personnel



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Mid-Century Challenges – End Dams



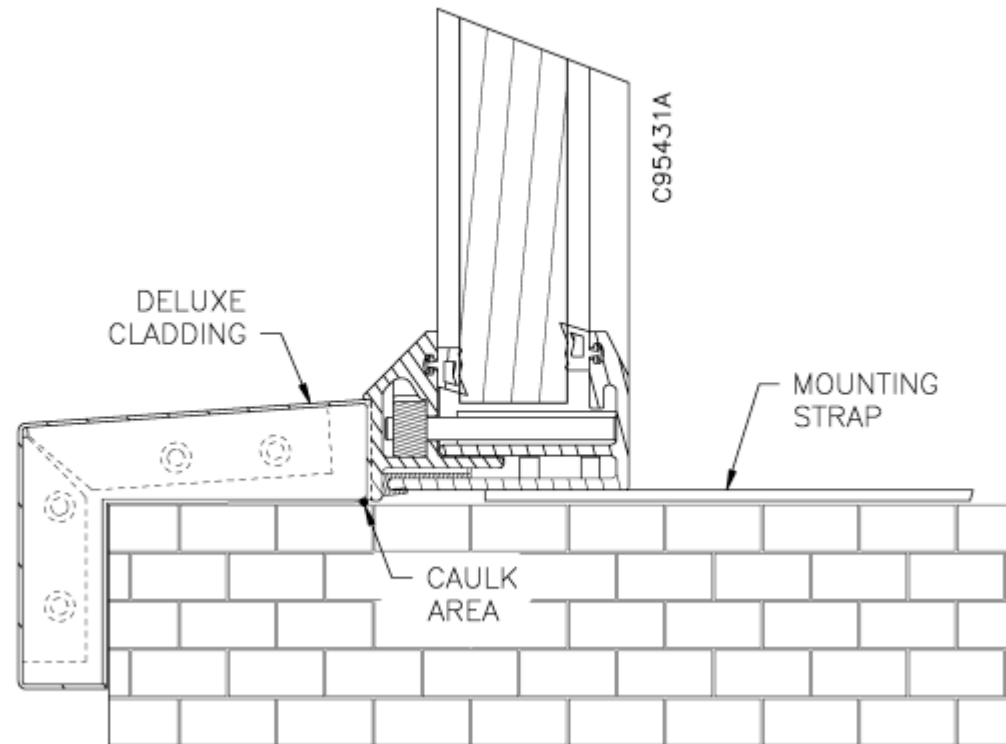
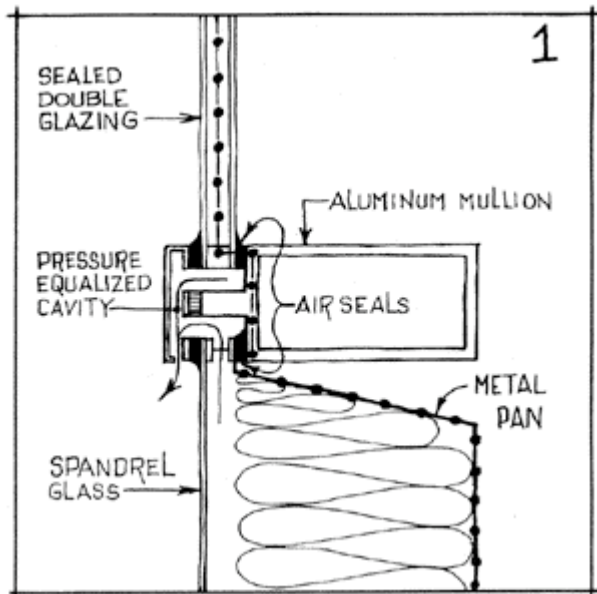
- On shelf angles
- At corners and offsets
- On window curtain walls
- On windows
- Critical to short and long term performance



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Mid-Century Challenges – Glazing Systems



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The Construction Material of the Mid-Century, and Beyond?



How did we build for centuries and keep water out of buildings without sealants?

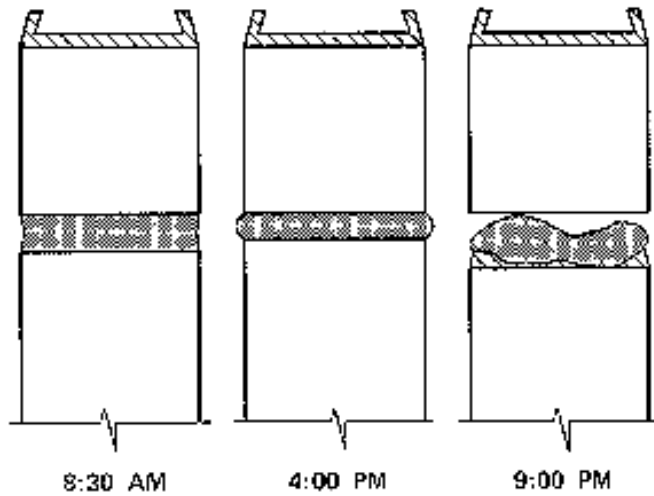
This single product is misused, inappropriately installed and not maintained to create the most problems in mid-century buildings.



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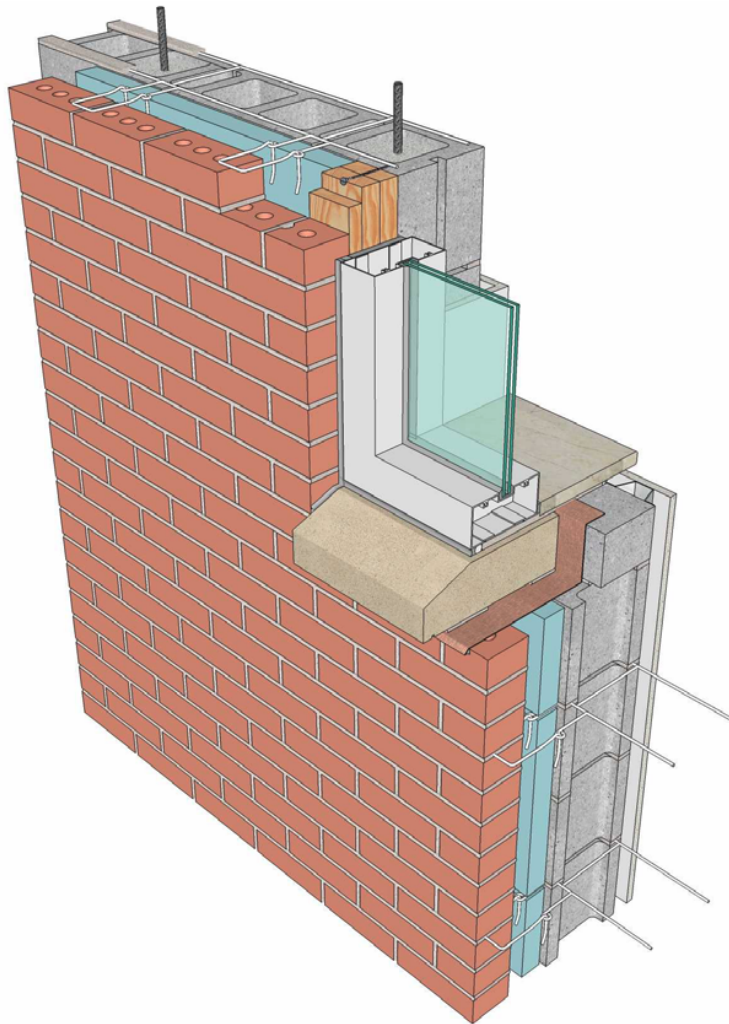
Importance of Sealant System Design

- Material compatibility
- System requirements for performance
- Maintenance requirements
- Implications of failure ... where's the water and air going?



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Case Study on Mid-Century Window Upgrade

- Need for better thermal performance
- Gasket failure / replacement
- Desire to match previous design of glass and spandrel panels



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A “simple window replacement” opens many details ...

- Lack of a nailer to secure new design
- Width of system to cover previous sealant joint
- Fire stop floor to floor
- Connection / interface with previous moisture control systems



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A “simple window replacement” opens many details ...



- Head offset discovery
- Existing sealants which would be near impossible to remove

The best opportunity for success is to:

- 1. Discover these issues early*
- 2. Engineer the solution as part of the bid*



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Best Practices for Mid-Century Buildings

- Most mid-century buildings typically have very stable and salvageable structural frames.
- Skin systems are less forgiving than early century or turn of the century systems.
- Hidden corrosion and rust jacking must be corrected, can be hard to determine, and expensive to correct.
- Floor to floor dimension may be tighter than desired but with good design and BIM, space can be made efficient for today's systems.



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How Best Can a CM Add Value?

1. Understand the building type, challenges and opportunities.
2. Assist with a detailed condition assessment.
3. Assist with a comprehensive existing construction detail investigation (probes).
4. Estimating team must be able to conceptualize cost impact to “fit” a contemporary larger air volume HVAC systems into building with limited floor to floor spacing.



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Mid-Century Buildings Can Be Reused!



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Questions?

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