

FIRE SAFETY WITH CONCRETE PRODUCTS

by
Rich Walke
UL

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TJC - ASHE - UL - FCIA
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Fire Protection Triad

1

Automatic Detection Systems (Alarms)



2

Automatic Sprinkler Systems (Sprinklers)



3

Compartmentation - (Fire Resistive Construction)



Firewall Performance



Firewall Performance



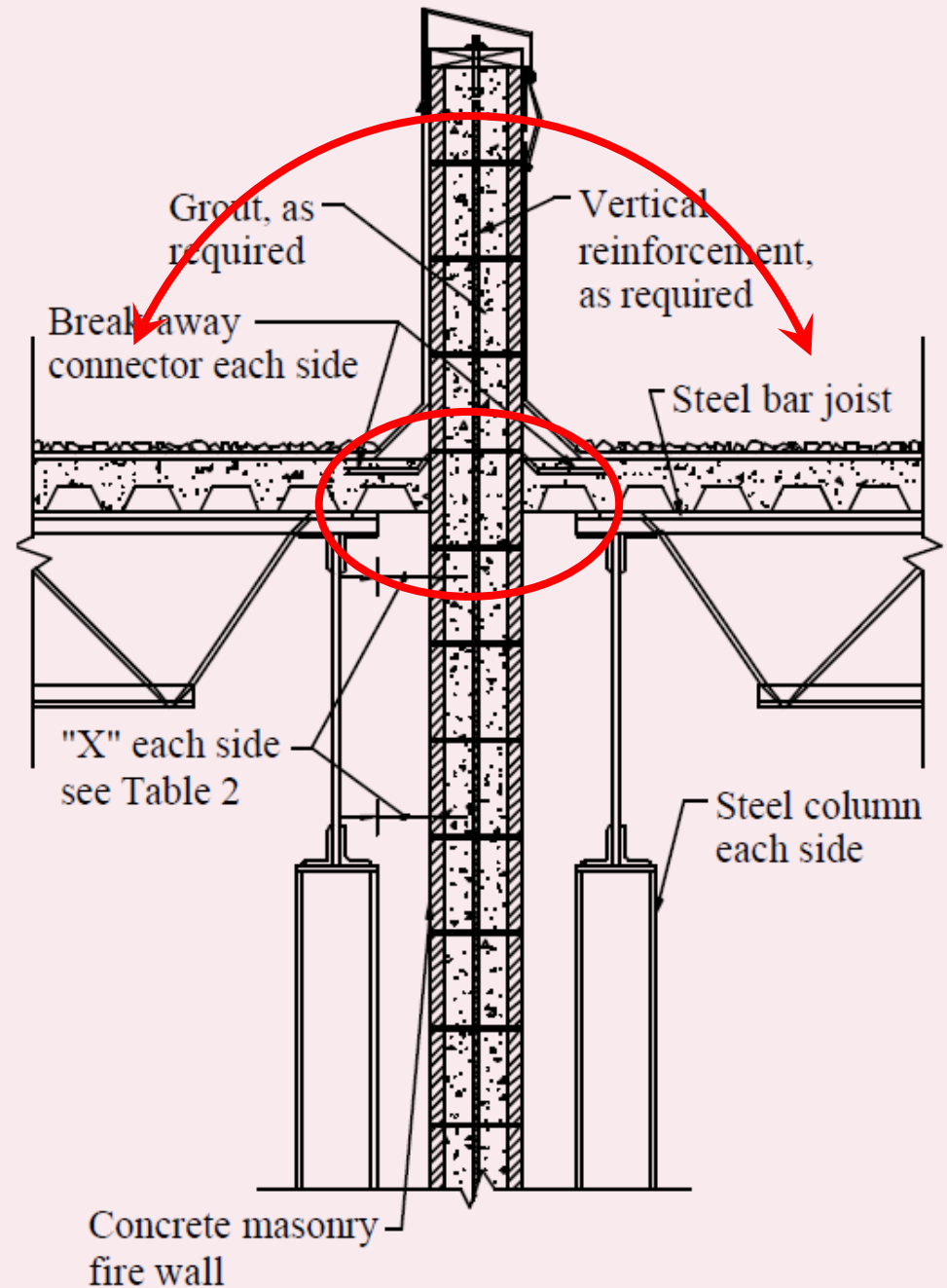
Firewall Performance



Consequence of No Fire Walls



Independent support and breakaway connectors to allow collapse of adjacent construction



Use of Masonry to Create Protected Means of Egress

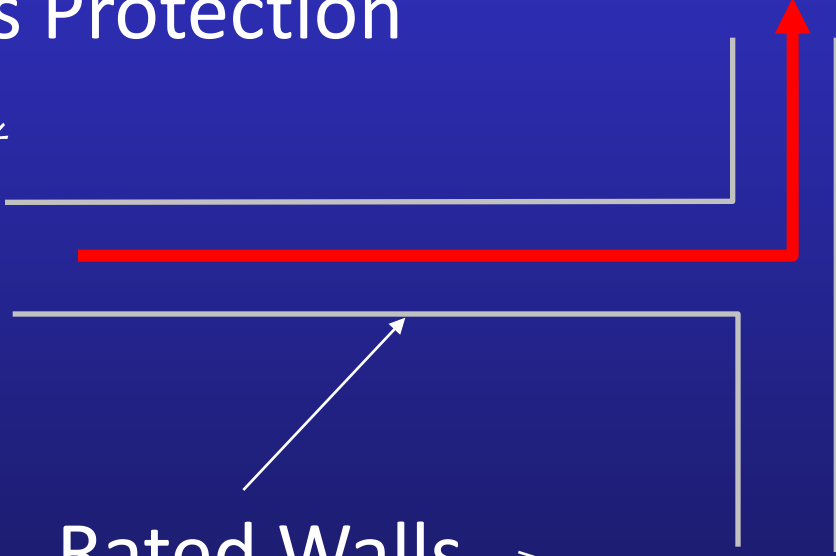
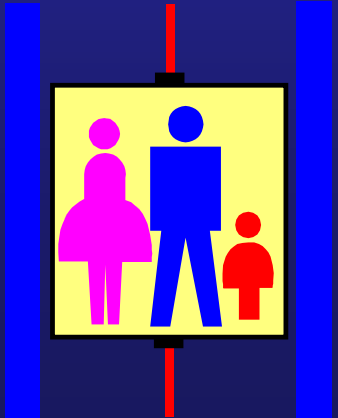


Egress Protection

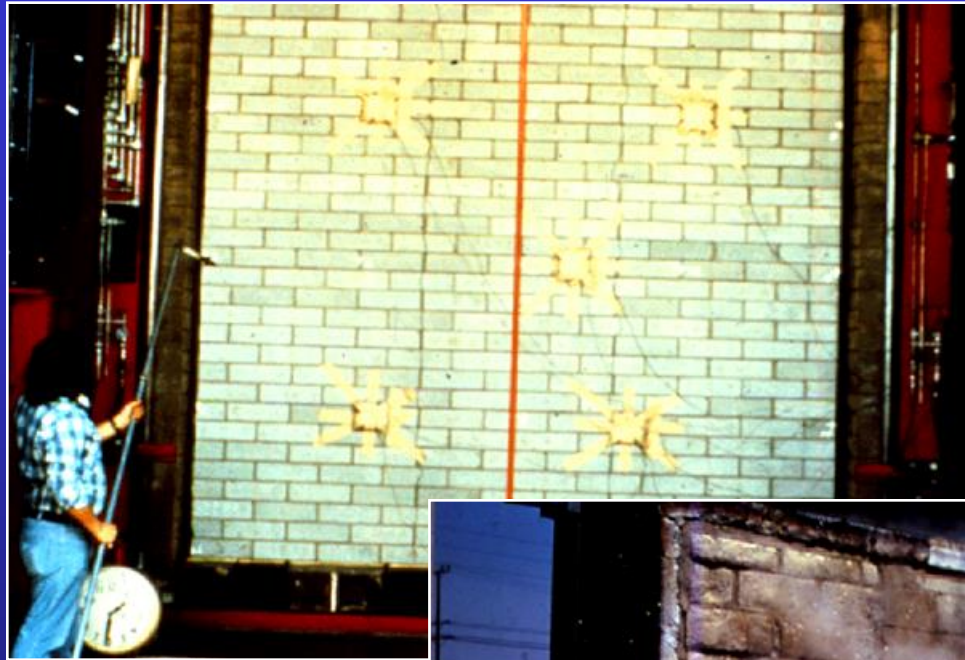


Rated Walls

Stair and Elevator Shafts



Concrete Fire Ratings Based on Fire Testing



ASTM E119 /
UL 263

Three methods for determining
fire-resistance ratings:

1. **Fire Testing**
2. Listing Service
3. Calculation/Other Methods



Concrete Fire Ratings Based on Listing Services



Underwriters Laboratories

Three methods for determining fire-resistance ratings:

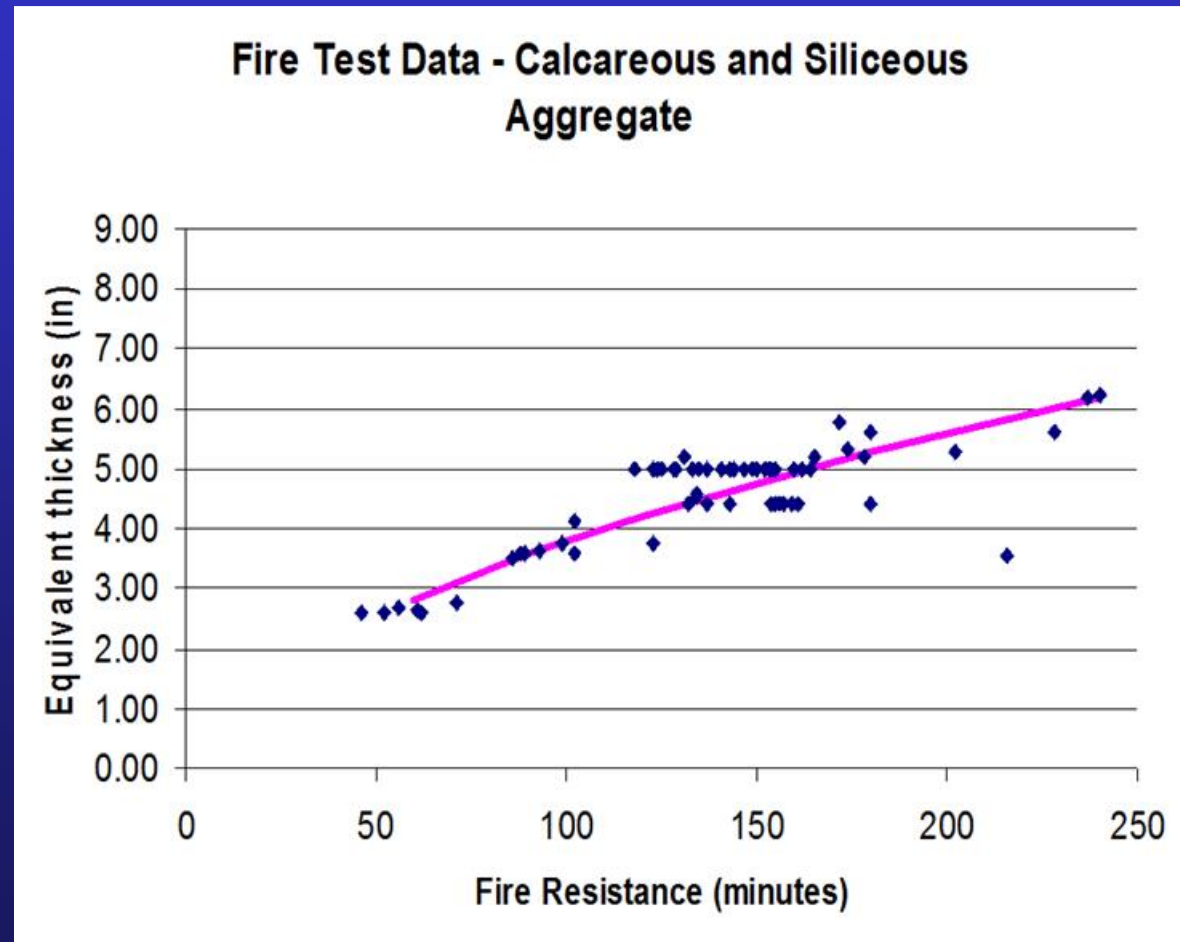
1. Fire Testing
2. Listing Service
3. Calculation/Other Methods

UL 618:
UL Standard
for Safety for
Concrete Masonry Units

Concrete Fire Ratings Based on Calculation Methods

Three methods for determining fire-resistance ratings:

1. Fire Testing
2. Listing Service
3. Calculation/Other Methods



Available Resources

- National Concrete Masonry Association – www.ncma.org
- American Concrete Institute – www.aci.org
- Portland Cement Association – www.cement.org
- The Masonry Society – www.masonrysociety.org

Available Resources Cont.

- International Building Code – Prescriptive Fire Resistance, Section 721
- International Building Code – Calculated Fire Resistance, Section 722
- International Existing Building Code – Resource A

Available Resources Cont.

- American Insurance Services Group, Inc.
(210) 469 – 3922 – Fire Resistance Ratings
- ACI 216.1 / TMS 0216 – Standard Method
for Determining Fire Resistance of Concrete
and Masonry Construction Assemblies

National Concrete Masonry Association

TEK Notes

- **TEK 5-8B:** Detailing Concrete Masonry Fire Walls
- **TEK 7-1C:** Fire Resistance Rating of Concrete Masonry Assemblies
- **TEK 7-2:** Balanced Design Fire Protection
- **TEK 7-3A:** Firestopping for Concrete Masonry Walls
- **TEK 7-4A:** Foam Plastic Insulation in Concrete Masonry Walls

All available free online – See www.ncma.org – Solutions Center – ETEK

Applicable NCMA TEK on Fire Resistance*

- **TEK 7-1C:** Fire Resistance Rating of Concrete Masonry Assemblies
- **TEK 7-3A** Firestopping for Concrete Masonry Walls
- **TEK 7-5B:** Evaluating Fire Exposed Concrete Masonry Walls
- **TEK 7-6:** Steel Column Fire Protection

All available free online – See www.ncma.org

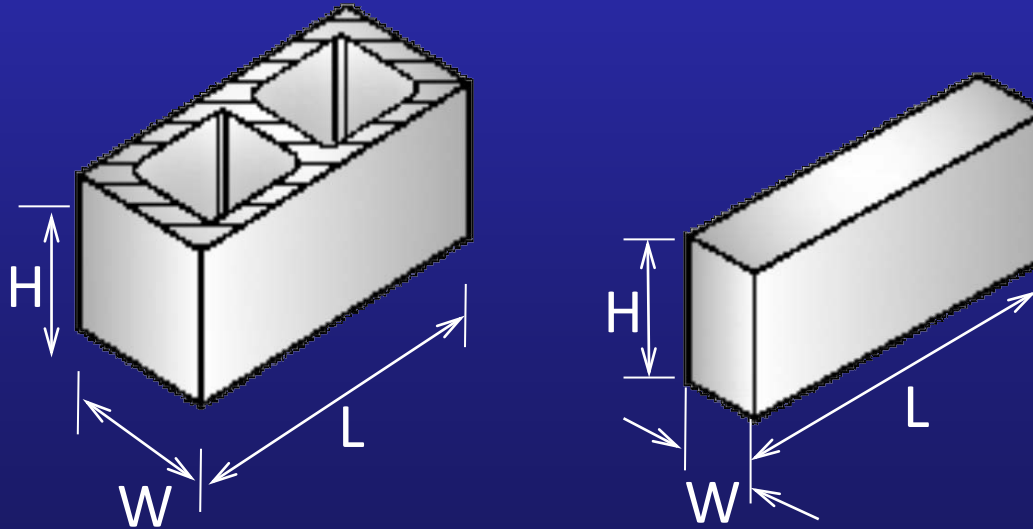
Calculated Fire Resistance Method

Fire ratings for concrete products are a function of:

- Aggregate type
- Equivalent thickness

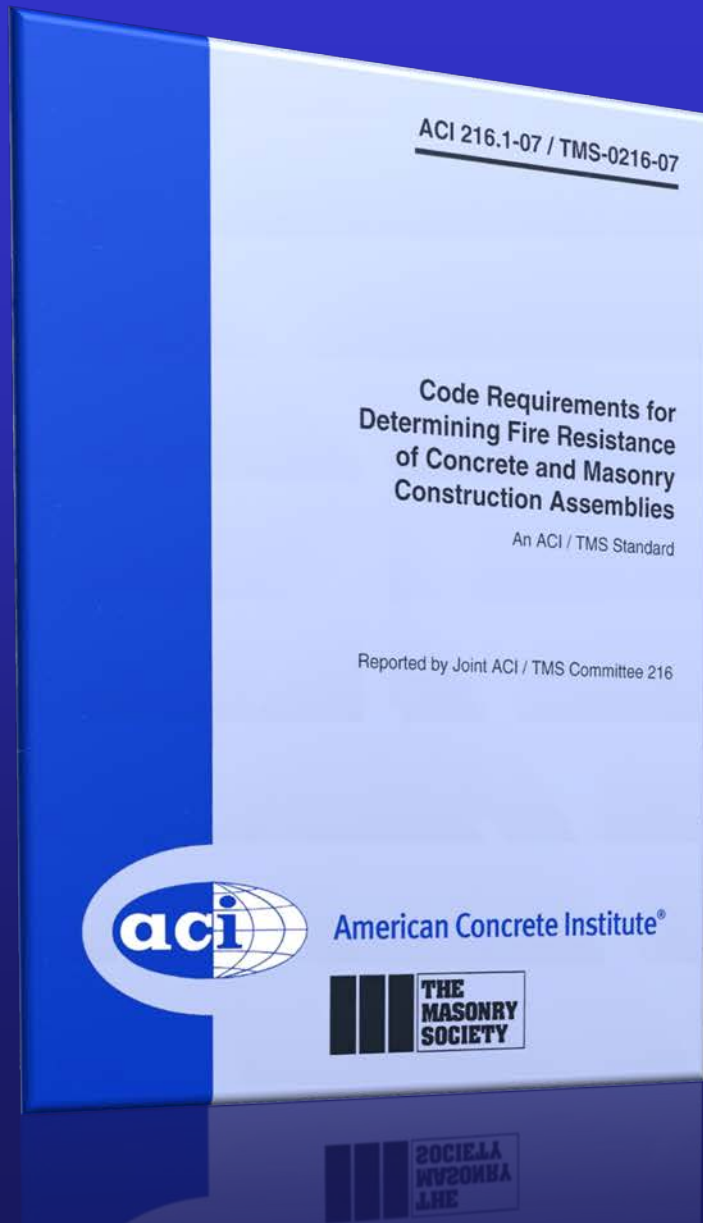
Equivalent Thickness

Equivalent Thickness, T_e , is the solid thickness that would be obtained from the same volume of concrete without cores



$$T_e = \% \text{ solid} \times \text{actual thickness}$$

ACI 216.1 / TMS 0216



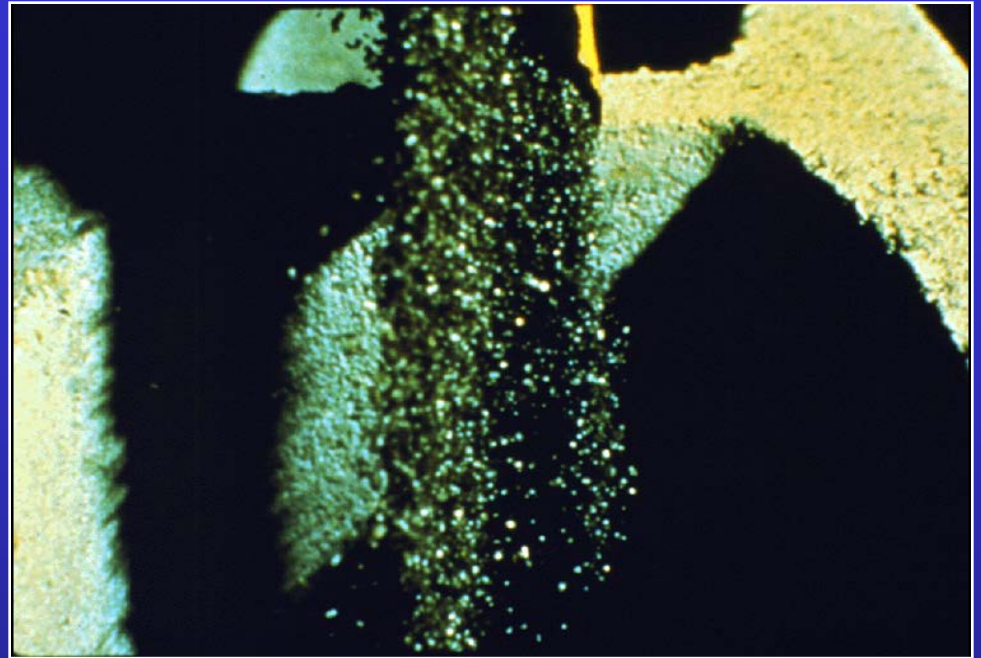
Applicable to:

- Concrete
- Concrete masonry
- Clay brick and tile masonry
- Effects of finish materials on fire resistance
- Incorporated into the I-Codes

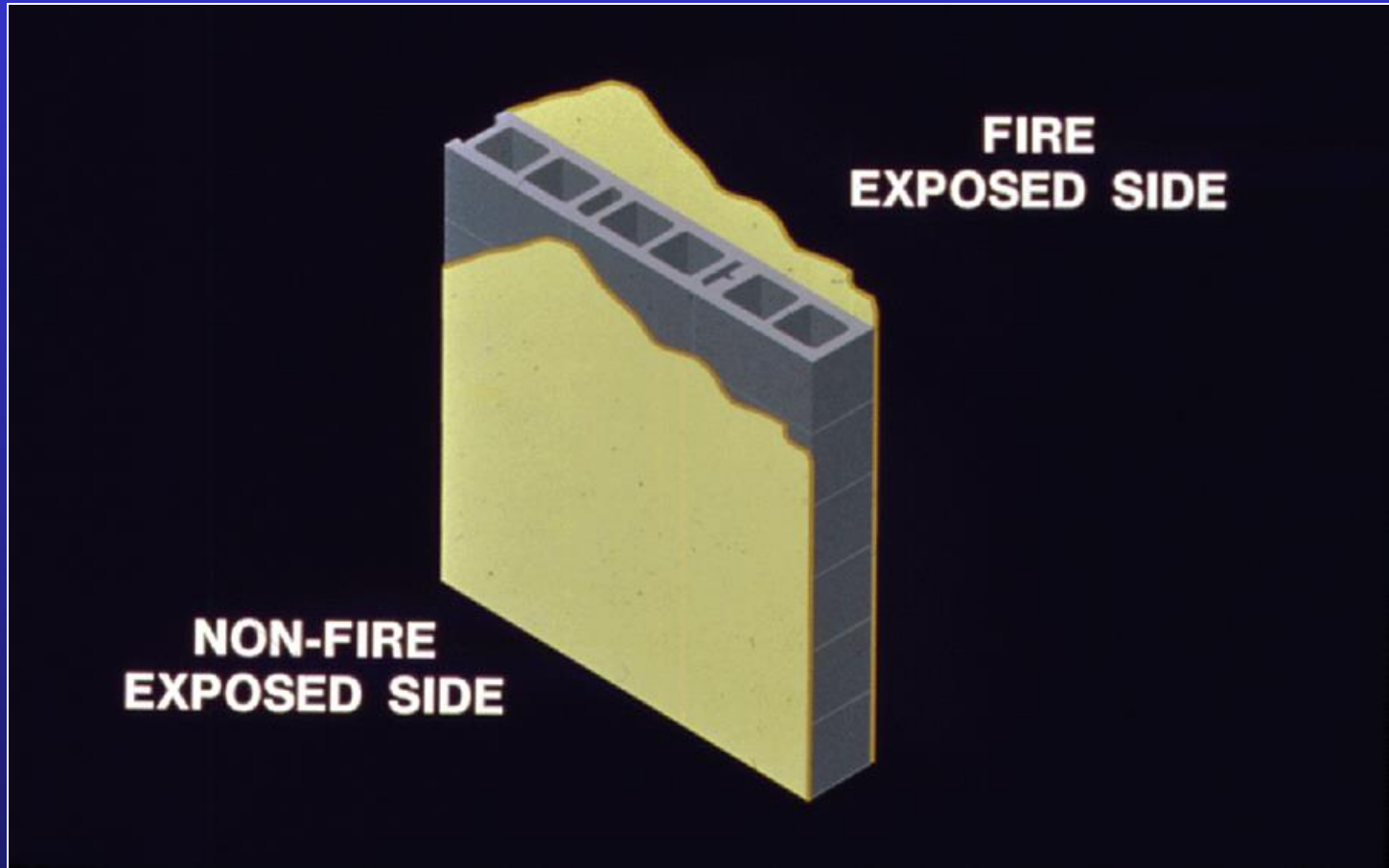
Filling Cores

When the hollow cores of concrete masonry are filled, the equivalent thickness is considered to be the actual thickness of the concrete masonry unit

Thus all filled 8-inch and many 6-inch CMU have 4 hour ratings



Finishes



Finishes are an excellent way of increasing the fire resistance rating of existing assemblies

Glazed Units

The calculated fire-resistance rating procedure for a glazed unit is the same as for conventional units-
Same charts based on equivalent thickness and aggregate type



Beams, Lintels, Columns, and Floors

The IBC and ACI/TMS 216 Standard have tables for determining the calculated fire resistance rating for masonry and concrete lintels, beams and columns as well as for concrete floors

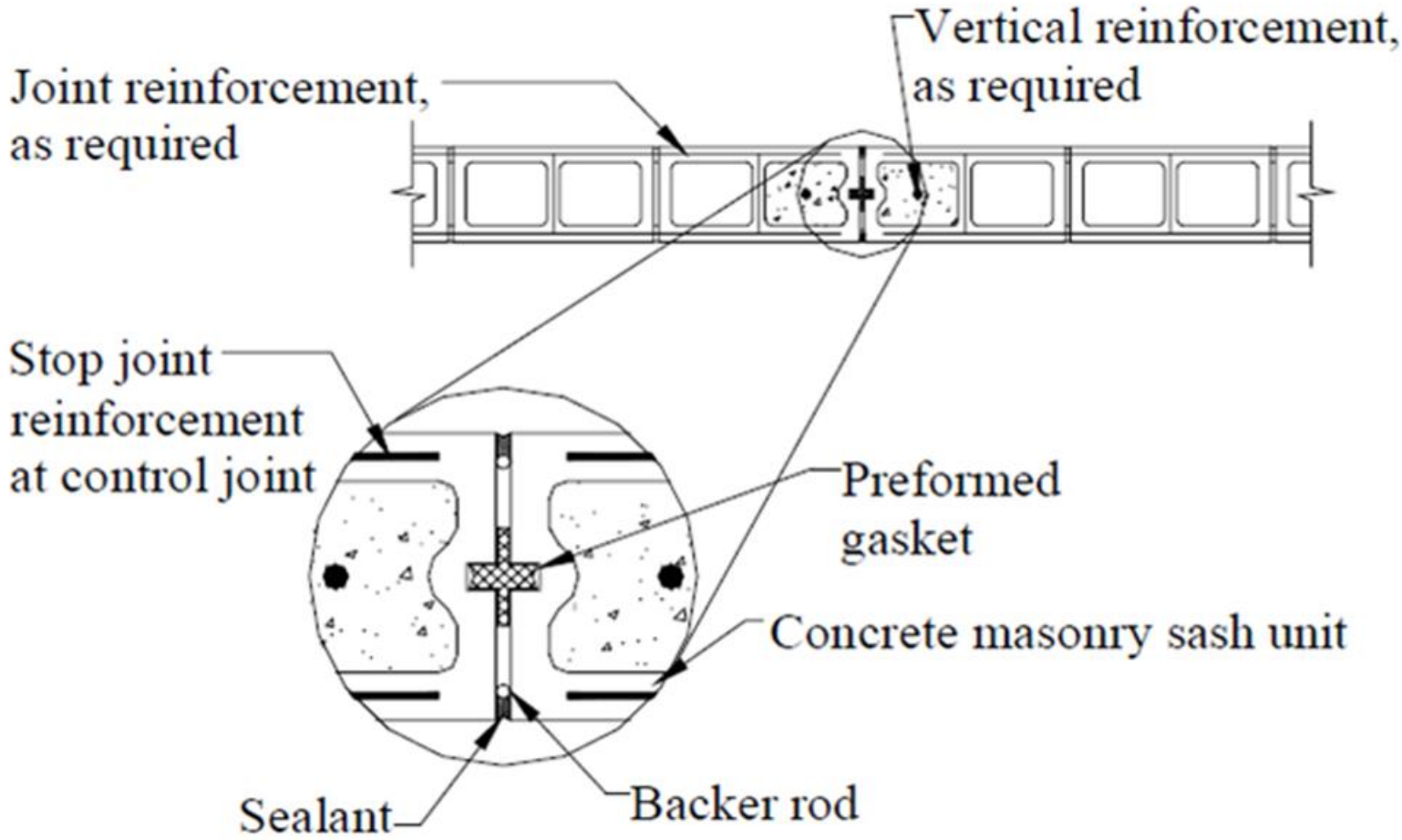


Clay Brick & Tile

The IBC and ACI/TMS 216 Standard also address calculated fire resistance rating for clay brick and tile masonry wall assemblies (very similar to the concrete masonry tables and procedures)



Control Joints



2-Hour Fire Resistance Rating

Summary

- Concrete products are inherently fire resistive
- Fire ratings are easily determined by the various methods available
- Compartmentation with concrete product is effective

Thank You for Attending

Rich Walke

Codes and Advisory Services Department

Underwriters Laboratories

333 Pfingsten Road

Northbrook, IL 60062

Richard.N.Walke@UL.com

(847) 664-3084

www.ul.com