

Fire Safety with Concrete Products



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UL Codes and Advisory Services

Fire Protection Triad



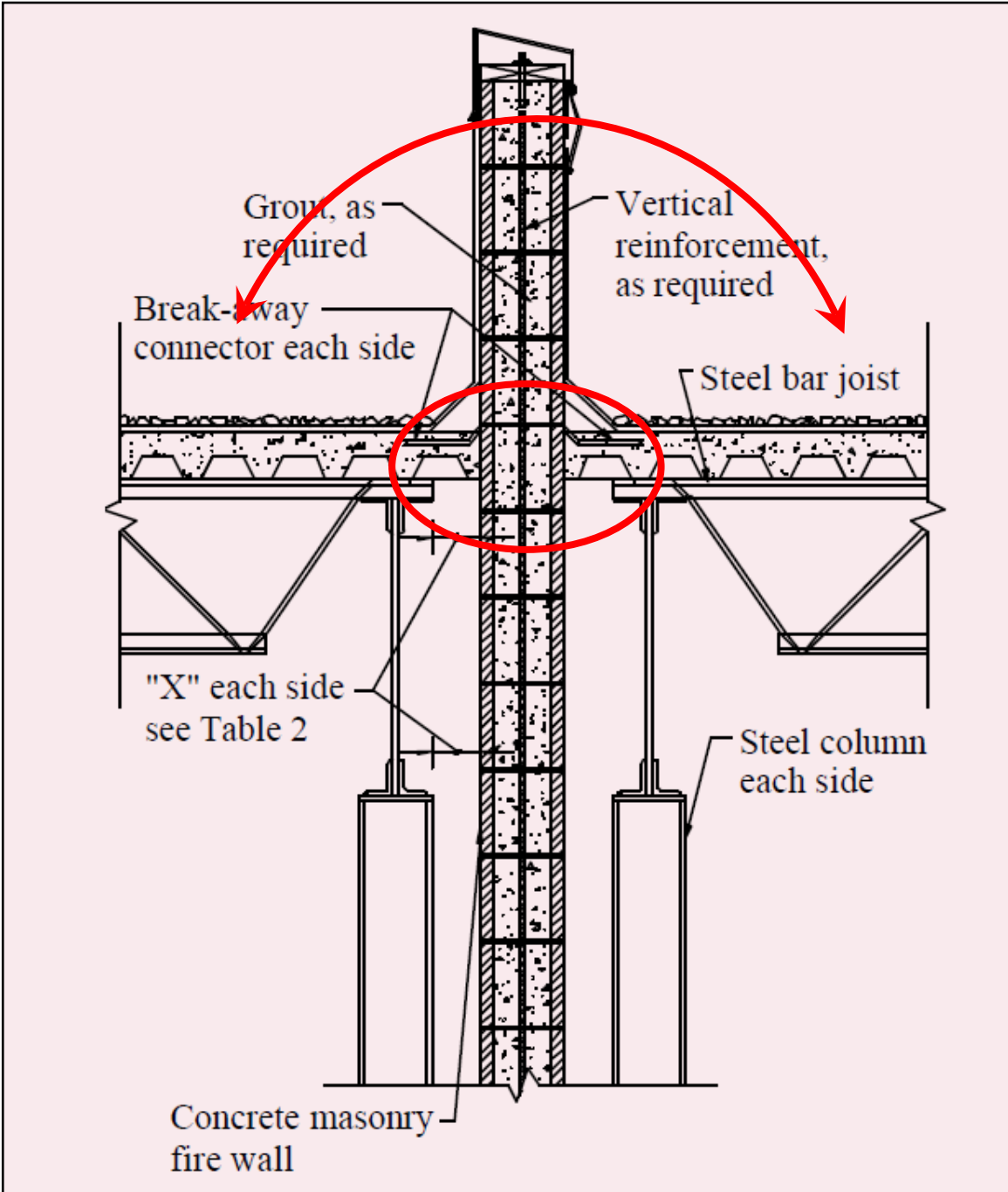
1 Automatic Detection Systems (Alarms)

2 Automatic Sprinkler Systems (Sprinklers)



3 Compartmentation - (Fire Resistive Construction)

Independent support and breakaway connectors to allow collapse of adjacent construction



Firewall Performance



Firewall Performance



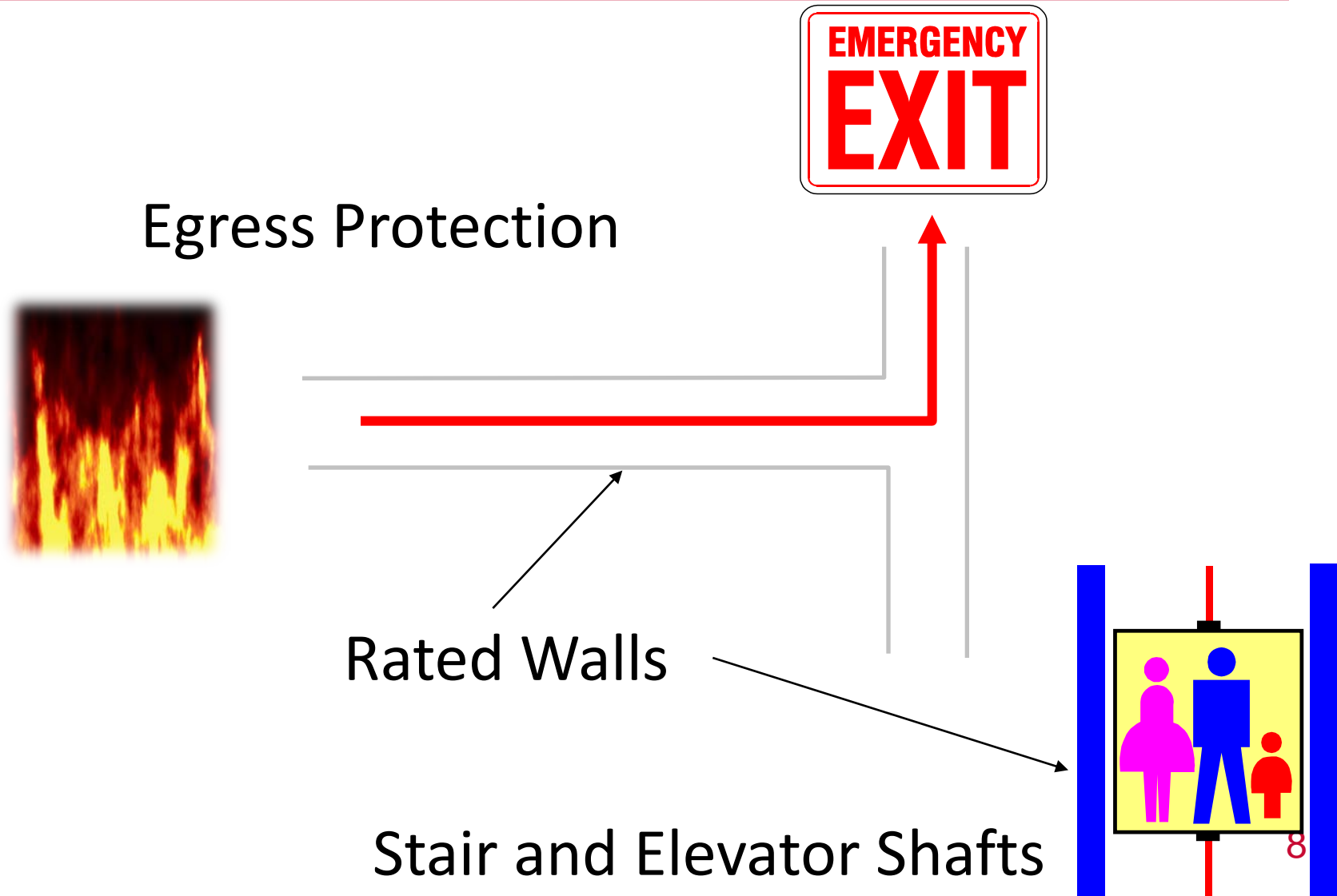
Firewall Performance



Consequence of No Fire Walls



Use of Masonry to Create Protected Means of Egress



Concrete Fire Ratings Based on Testing



ASTM E119 /
UL 263

Three methods for determining
fire-resistance ratings:

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



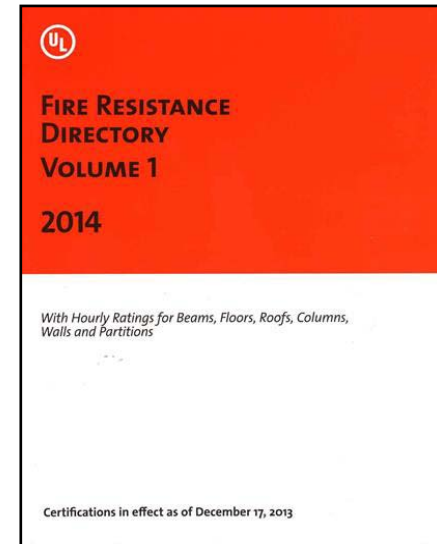
Concrete Fire Ratings Based on Listing Services

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

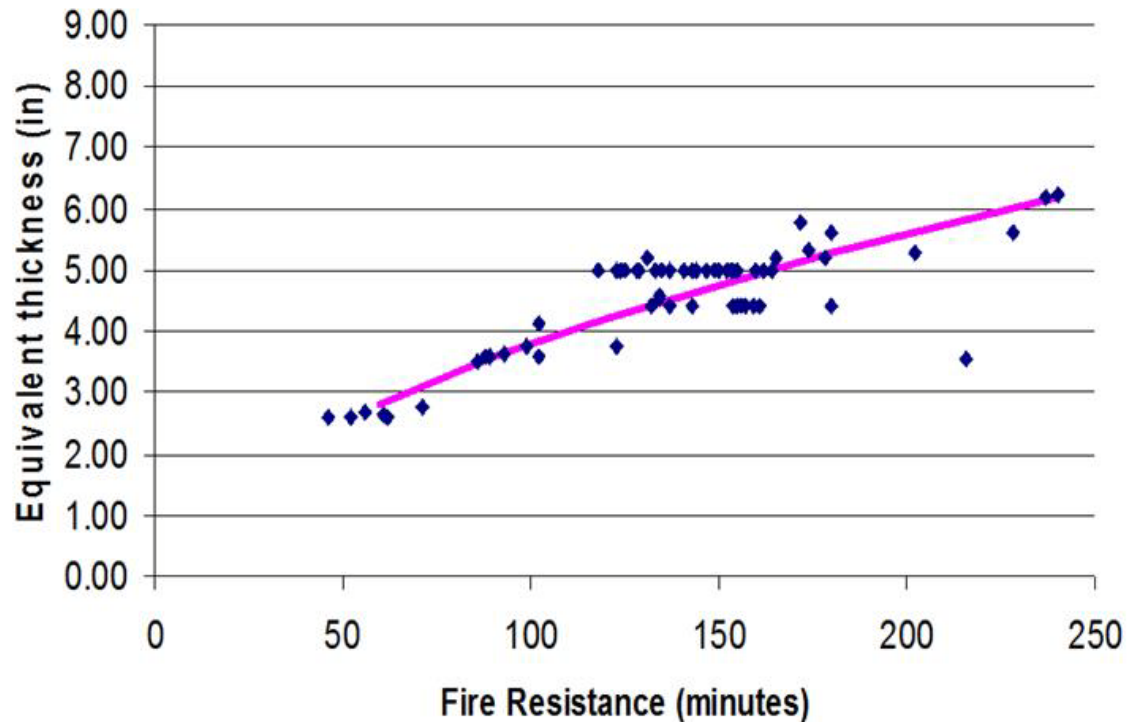


Concrete Fire Ratings Based on Calculation Methods

Three methods for
determining fire-
resistance ratings:

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

Fire Test Data - Calcareous and Siliceous
Aggregate



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 720
- International Building Code – Calculated Fire Resistance, Section 721
- 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

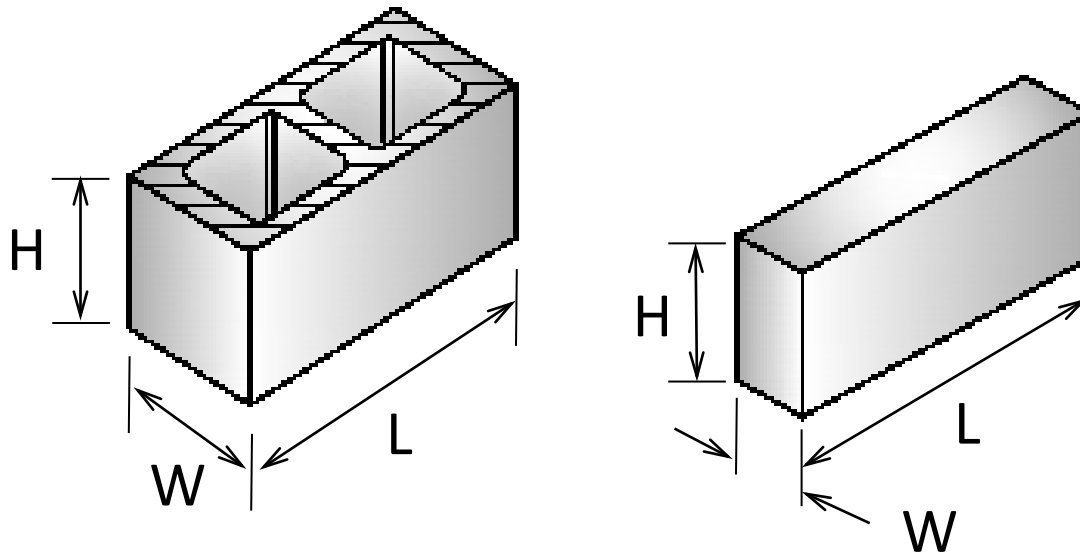


Calculated Fire Resistance Method

- 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

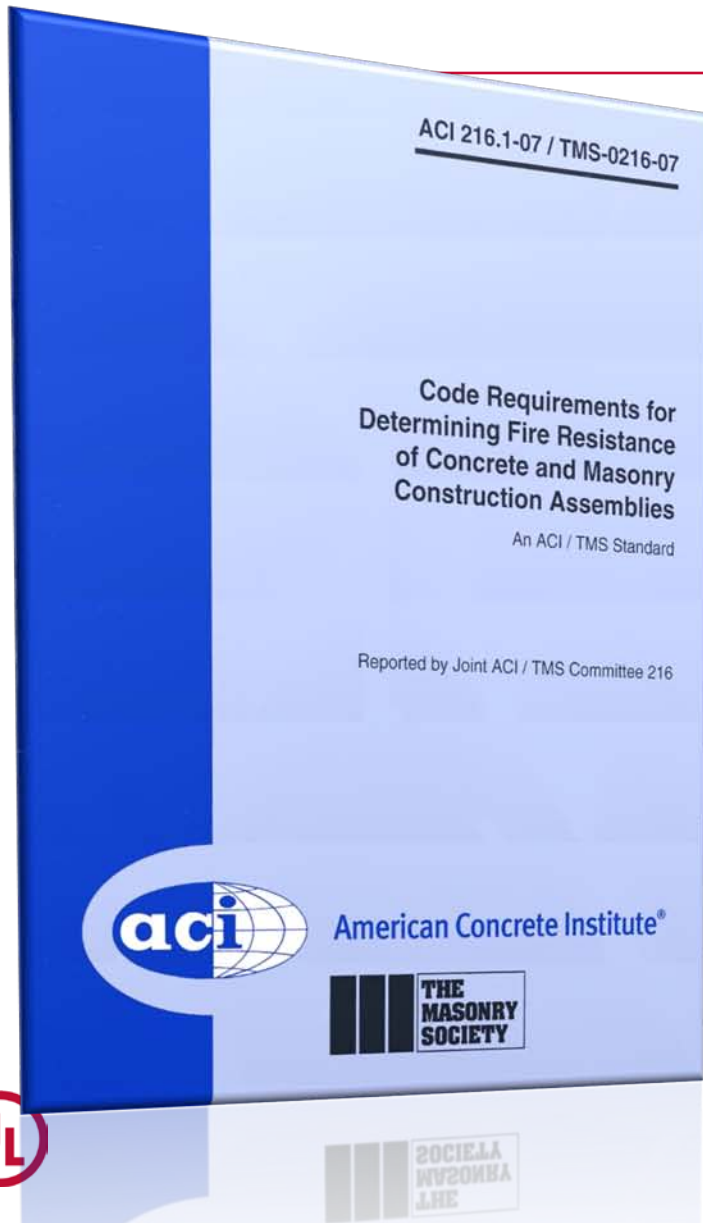


$$T_e = \% \text{ solid} \times \text{actual thickness}$$

ACI 216.1 / TMS 0216

Applicable to:

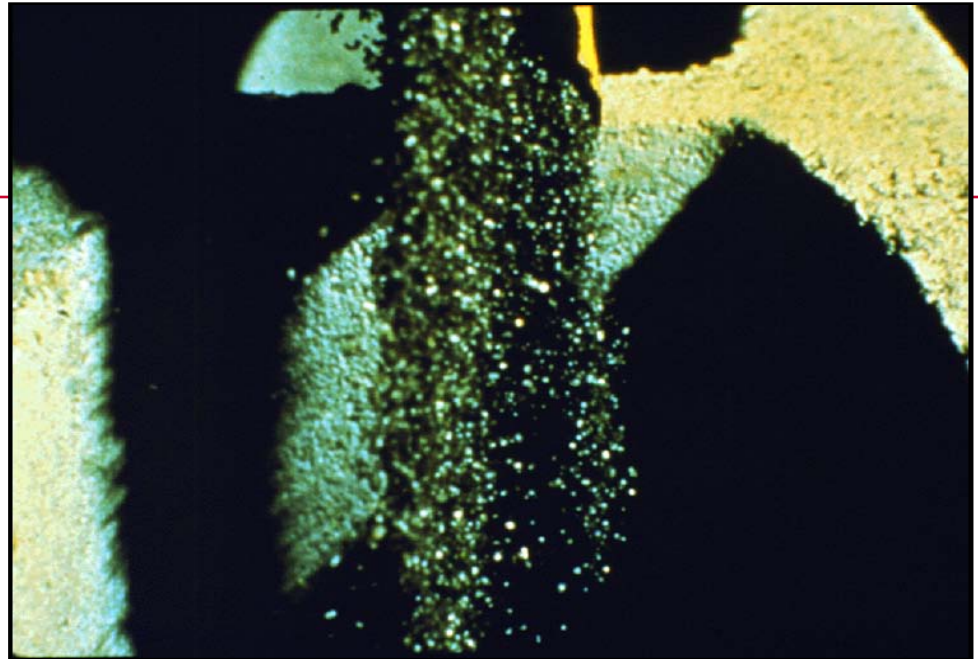
- Concrete
- Concrete masonry
- Clay brick and tile masonry
- Effects of finish materials on fire resistance
- Incorporated into the I-Codes



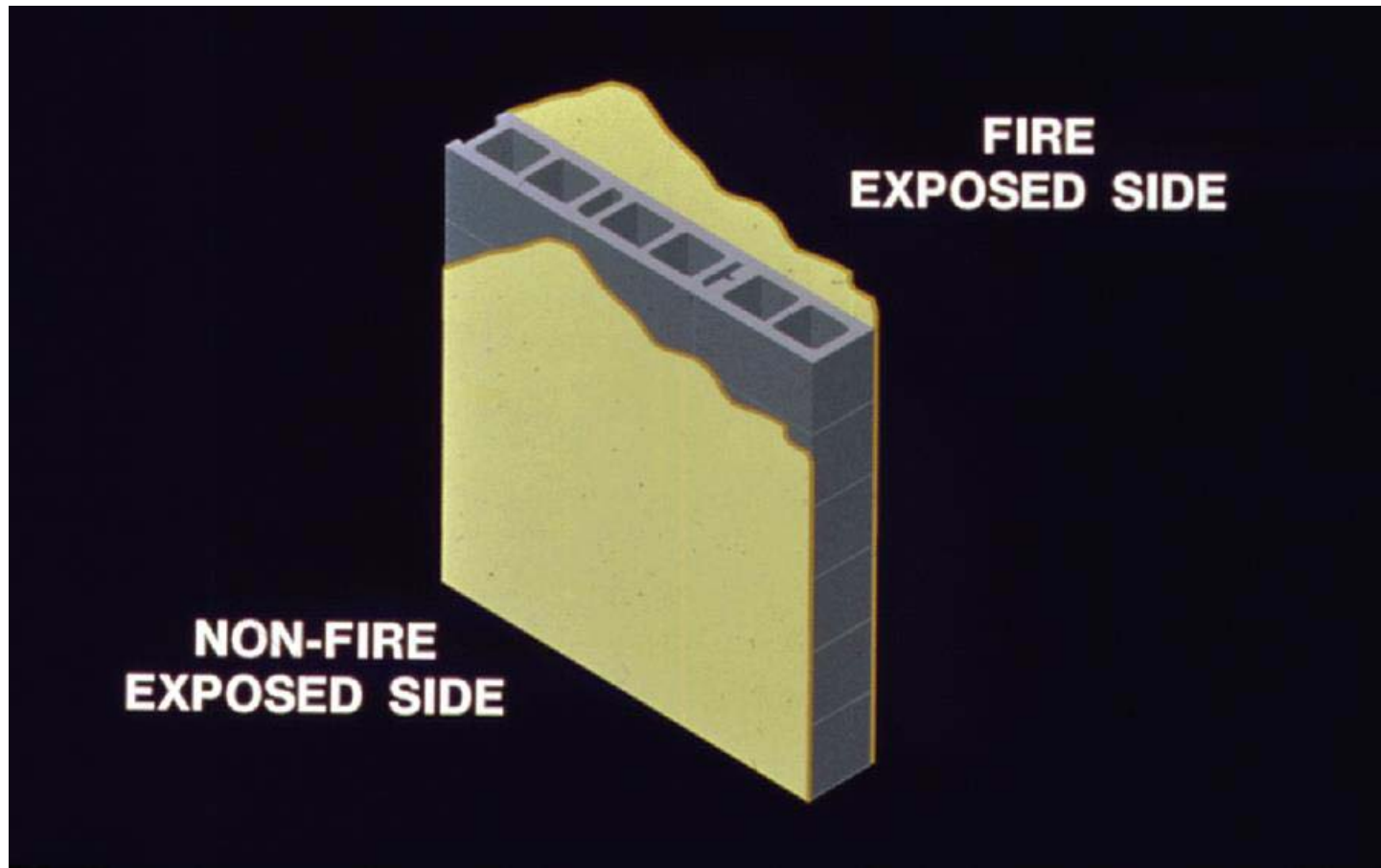
Filling Cores

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

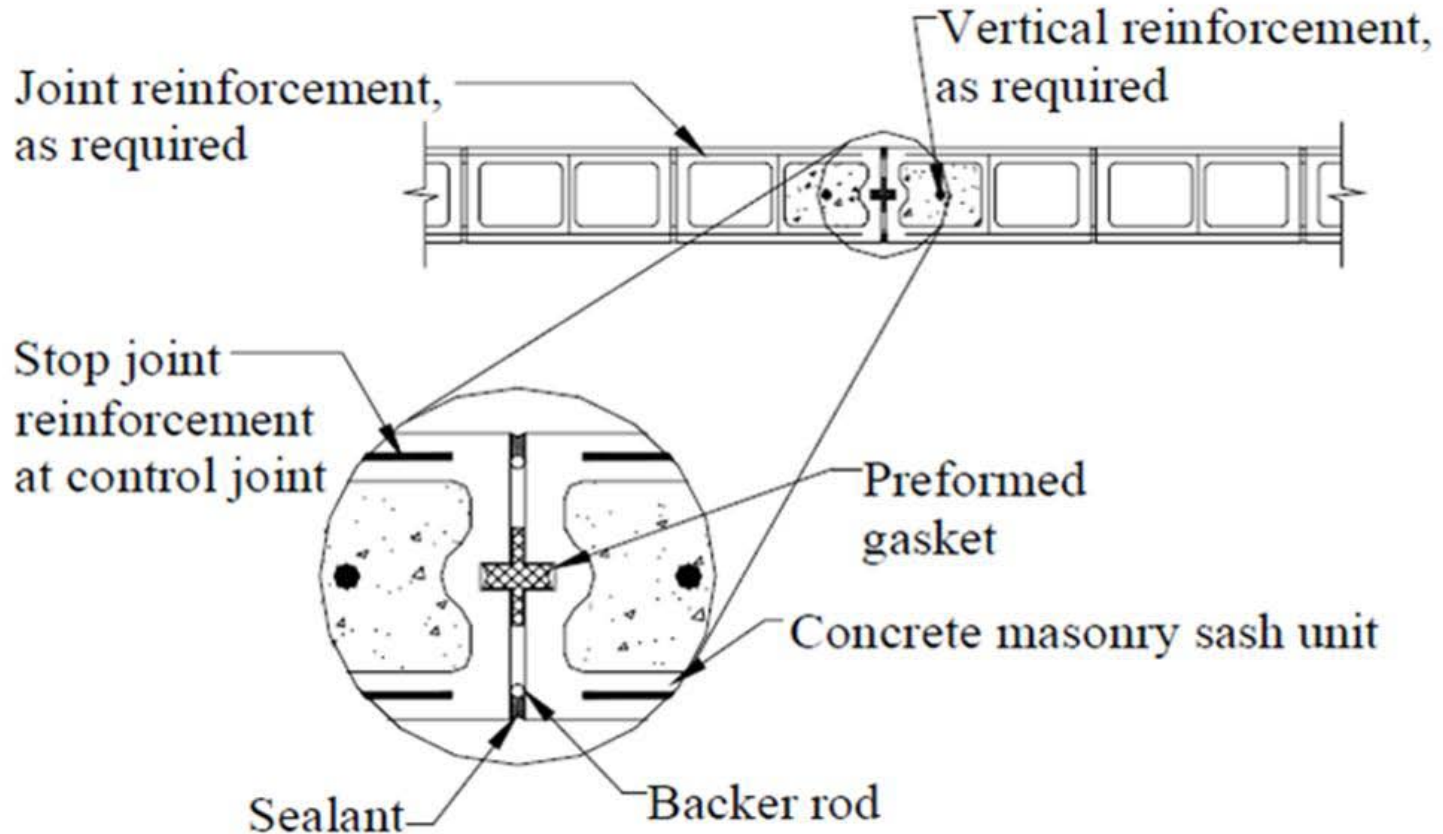


Clay Brick & Tile

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

Questions / Comments



Thank You for Attending!!!

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