“Is Your Cabling Getting ‘The Shaft’?”

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Agenda

- Background
- TR Cabling Disease
- The Fire-Rated Shaft Concept
- Codes & Standards
- Pros & Cons
- Review
- Questions & Answers

Acknowledgements

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  - Judy Jeske, P.Eng., Director Fire & Life Safety Group, Morrison Hershfield, Ottawa Canada
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  - Joan Olender, Morrison Hershfield, Seattle USA

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Q: Firestop – Where? What?

- What do I firestop?
- What is the F-Rating & how is it applied?
- Are all walls that go from floor to ceiling required to be firestopped?
- What is an acceptable vertical firestop assembly?
- What is an acceptable horizontal assembly?

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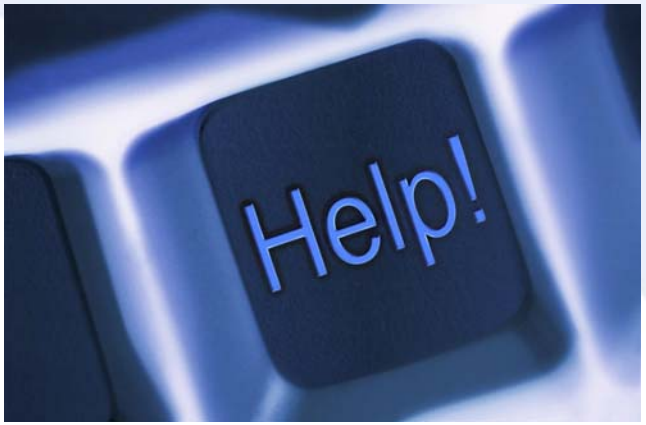
A: Ask for help



- Professional Engineer with codes experience
- Building operator or property manager
- AHJ: e.g. Fire Marshall
- Limit your liability by getting it in writing
- Are you qualified and insured to give the answer?
  - Get training and educate yourself

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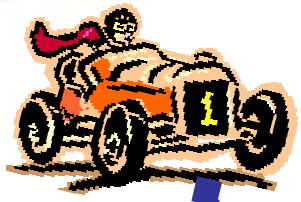

- Recognize times have changed
  - Deregulation of market
    - Stability of the cable infrastructure is a thing of the past
  - Multiple carriers in each building due to
    - Demand for new services
    - Choice
    - Redundancy/robustness of networks
  - Backbones are not stable, but changing constantly
    - New fiber types and quality

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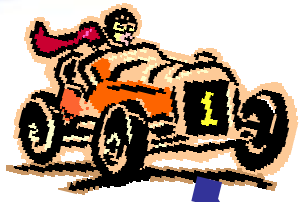

- Recognize times have changed
  - Security requirements in TRs and buildings has been increased due to higher level of risk
    - Increased requests for conduit in backbone and through risers with eats space at a high rate
    - Multi tenants don't like to share common spaces
  - Maintaining firestop is a constant risk and worry to all interested parties
    - Building owners, property managers & facility managers
    - IT Managers and their staff
    - Contractors

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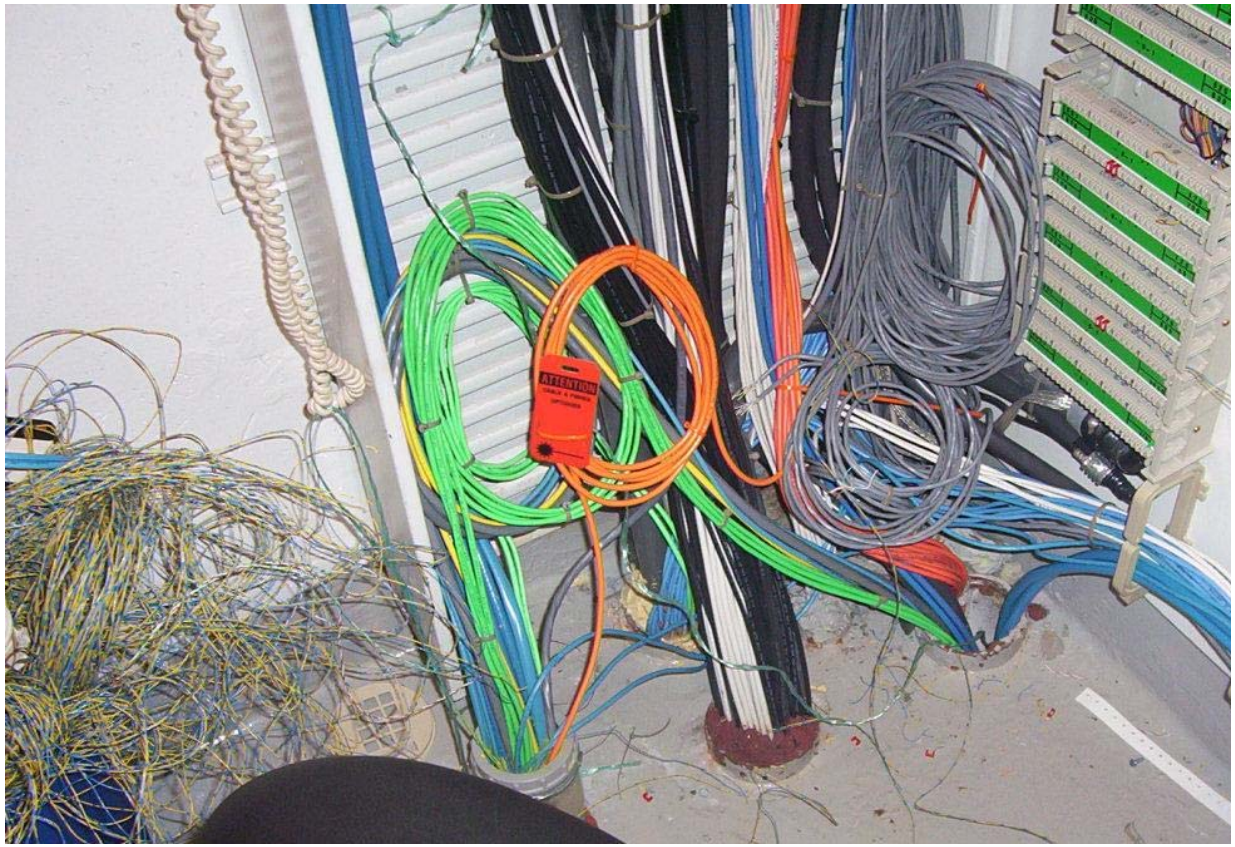

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Call the doctor...your TR's dying...

- Symptoms of cabling disease in your TR…
  - High cable counts and multiple media in risers (massive infection)
    - Multipair voice copper
    - Singlemode & multimode fiber
    - Air-blown fiber
    - Coax backbone and drop cables
  - Overfilled sleeves (clogged arteries)
    - Difficult or impossible to properly firestop with a rated system
  - No more capacity to install new sleeves due to structural concerns (call the undertaker…)

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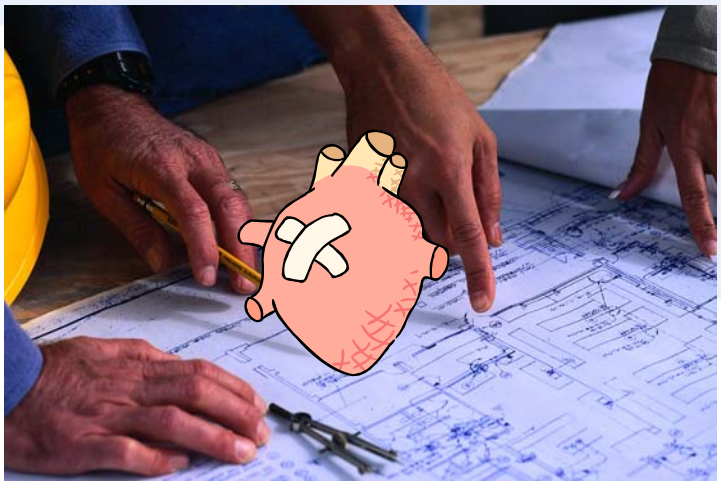
Diagnosis?



- Are we treating the symptoms and not the cause?
- Are we designing spaces based on out-of-date assumptions?
- Would better design eliminate some of the symptoms?
- Is there a better way?

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Challenge complacency

- When we get comfortable, we make mistakes…
- What is a TR for and should it be part of the core?
- On multi-tenant floors, are we wasting valuable space?
    - Tenants don’t want their equipment in a common space
- Why put the vertical riser in our TRs when most cables in a TR are for horizontal distribution?

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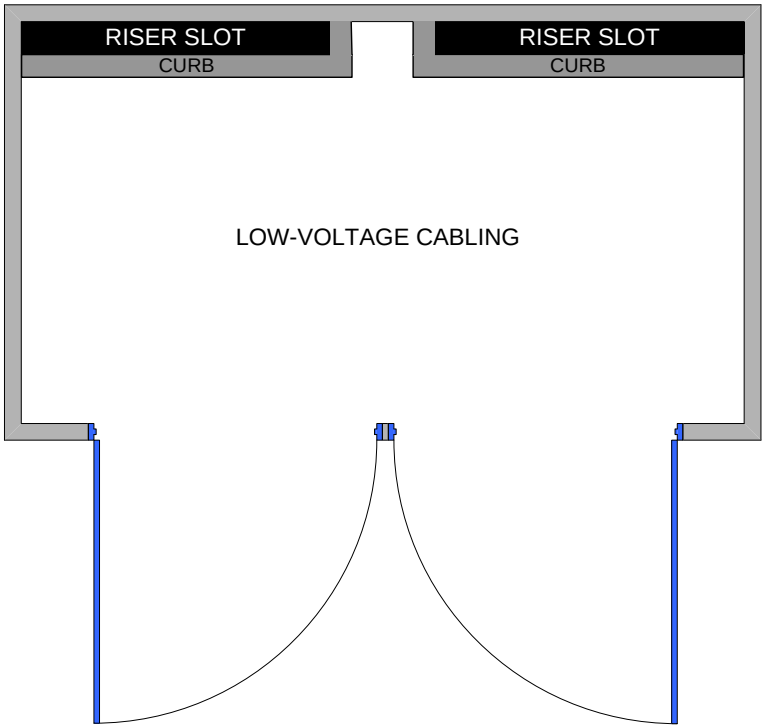
The Concept – Part 1

- A vertical shaft for the distribution of low-voltage cabling ONLY
- Not a TR
- TRs built in Tenant's space



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The Concept – Part 1 Cont'd

- Use a small footprint – e.g. Shallow TR or smaller
- Use large open slots at floor level
  - Making it easier to manage and allow for many cables and conduits to traverse floors
  - More & more conduits due to security requirements
- Put racking or tray on the wall to support/lash cable

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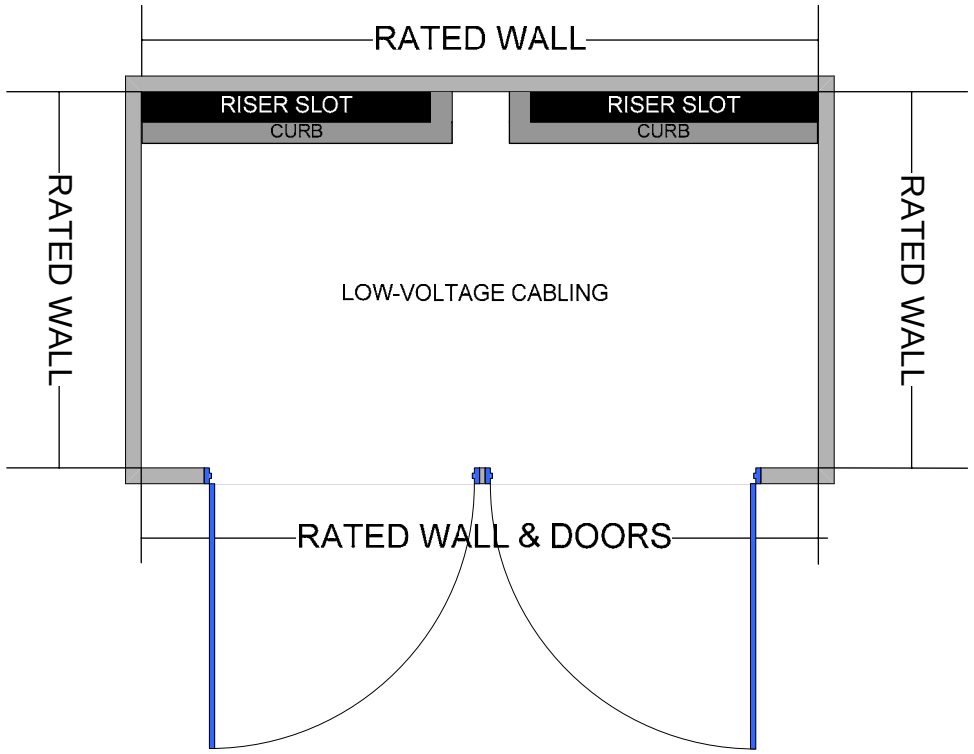
The Concept – Part 2

- Make it a fire-rated vertical shaft…WHY?
- No requirement for fire-stop slots…
- Fire-rate all penetrations through walls



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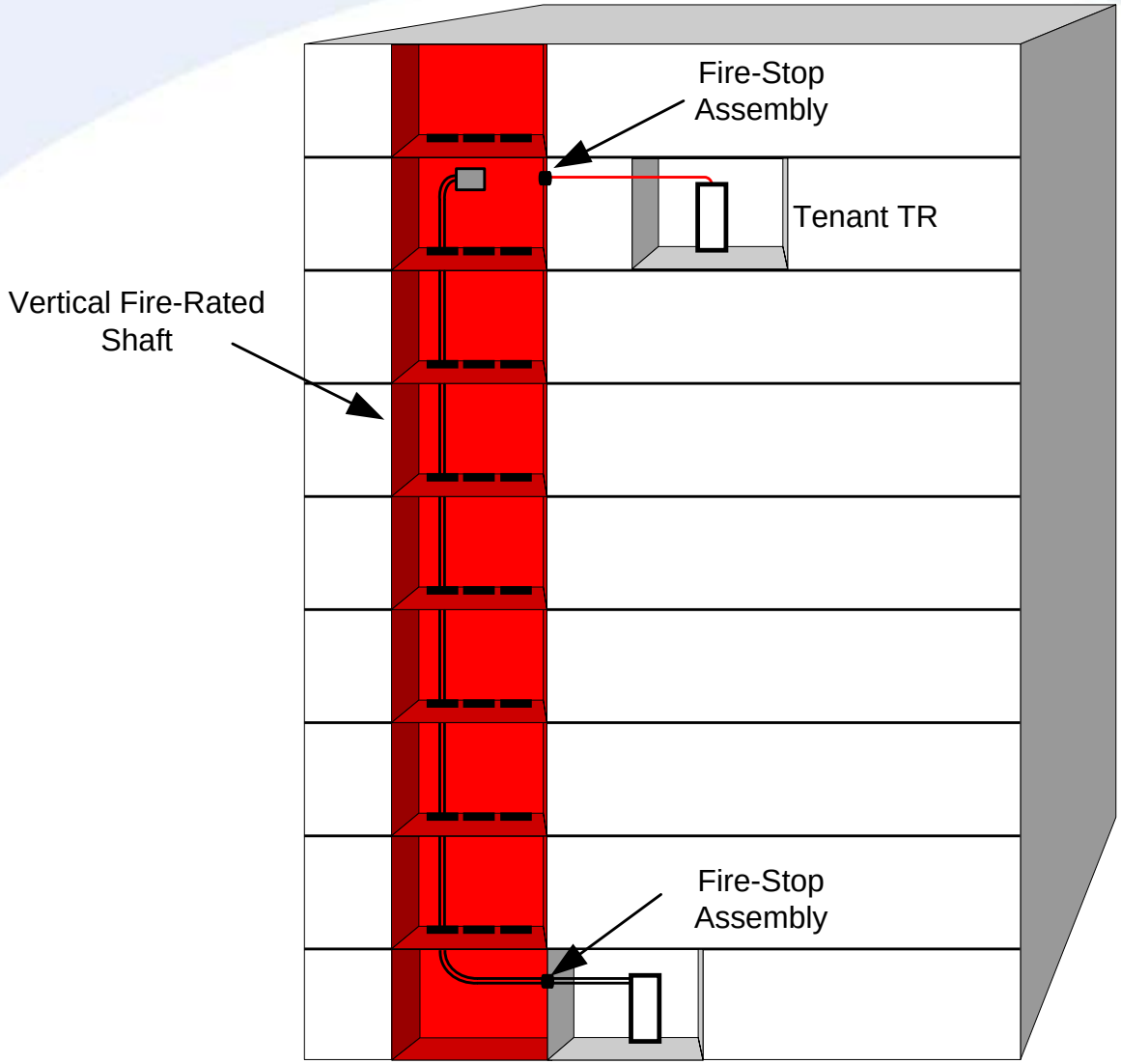
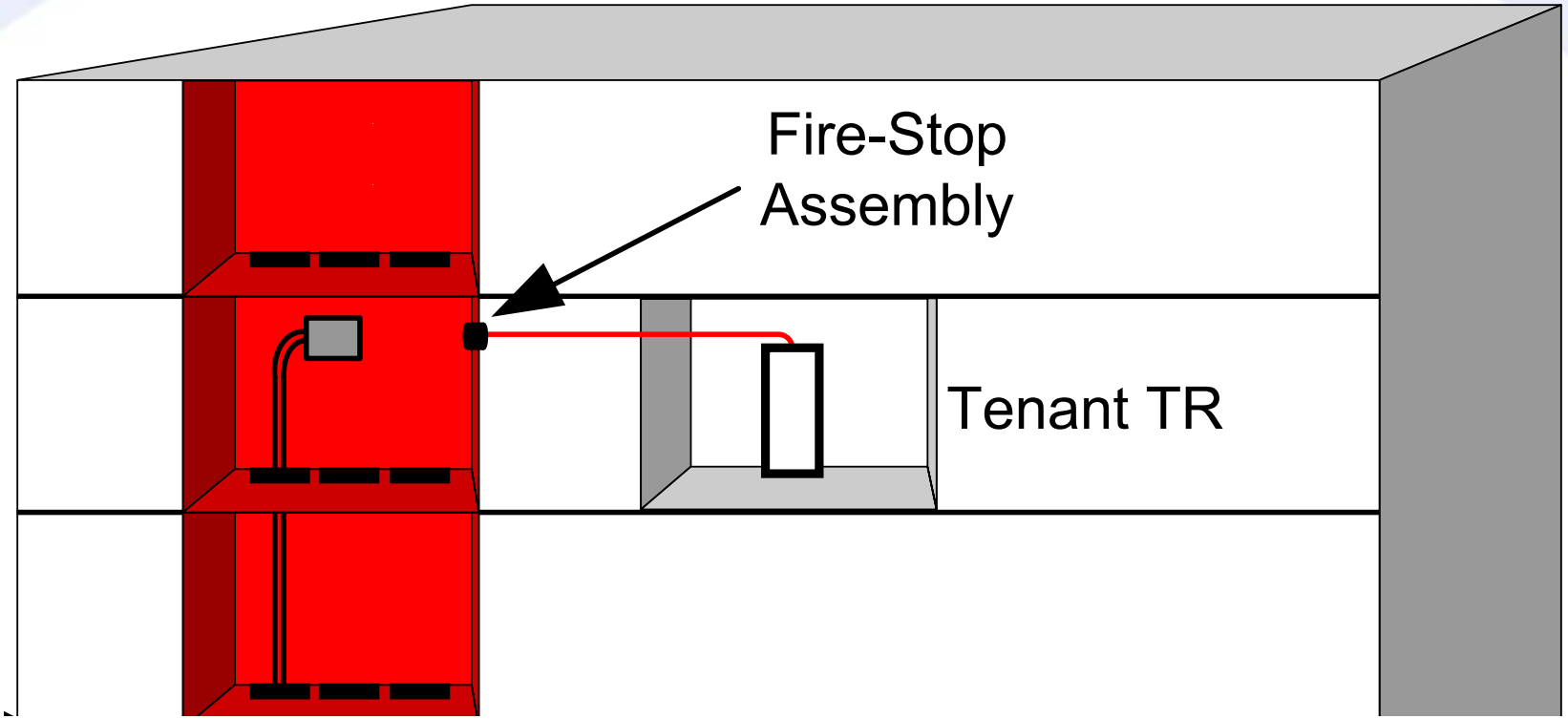

Fire-Stop
Assembly
Tenant TR
Vertical Fire-Rated
Shaft
Fire-Stop
Assembly


Fire-Stop
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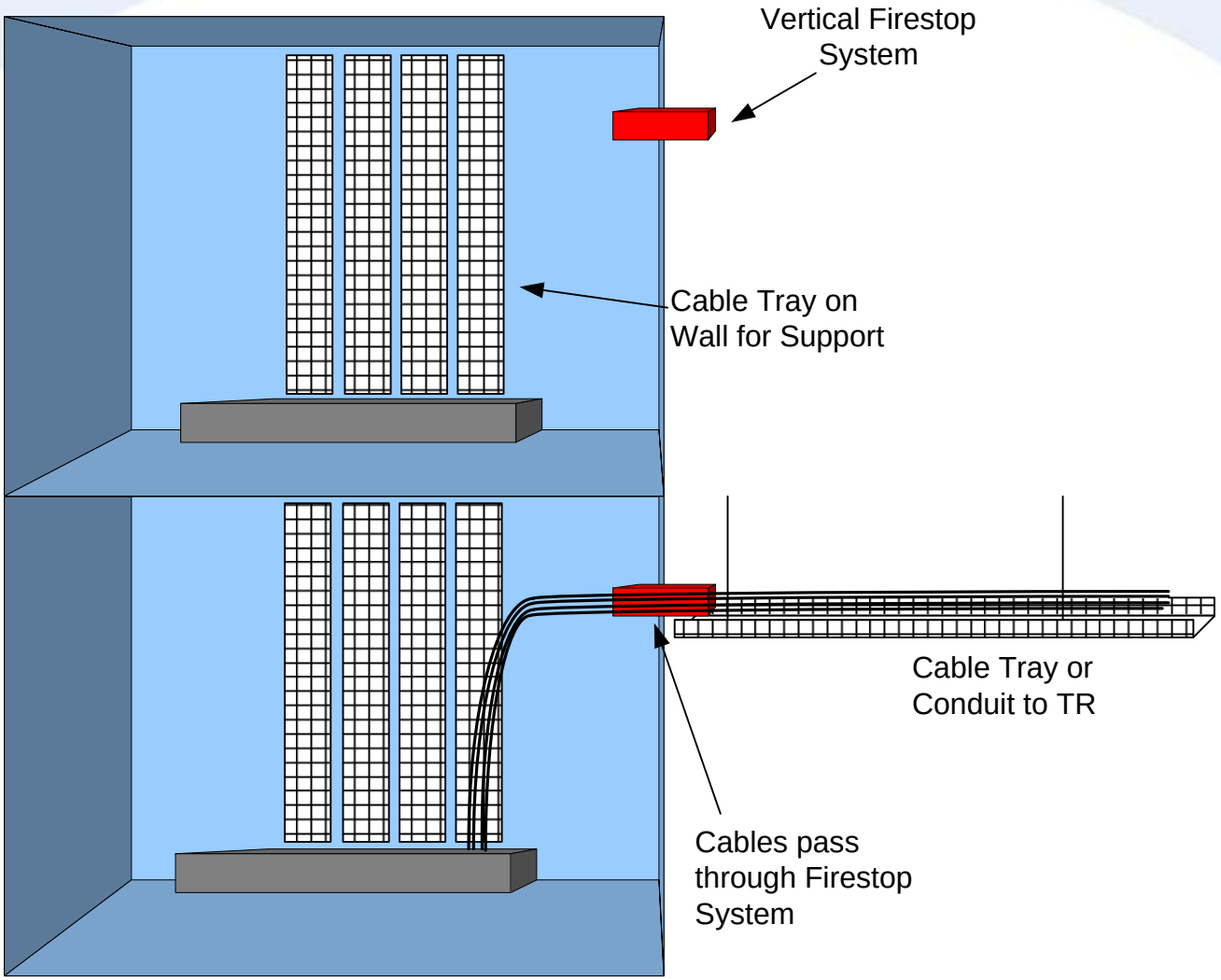
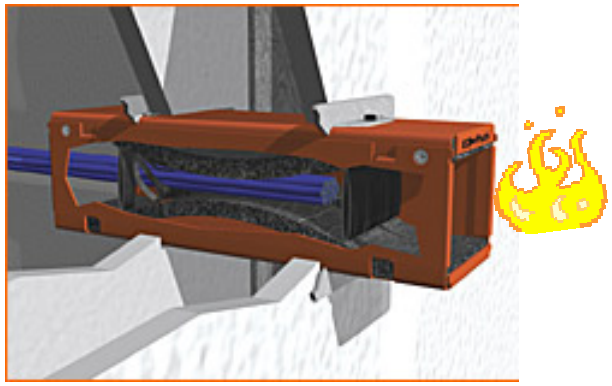
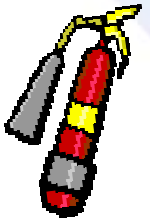

Vertical Firestop System
Cable Tray on Wall for Support
Cable Tray or Conduit to TR
Cables pass through Firestop System

Rated Wall System





- Vertical firestop system for the passage of all low-voltage through the rated walls
- Newer systems allow for 100% fill & easy changes
- Goal is to be safe first, but also easy to maintain integrity of the system

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Codes & Standards – U.S.

- What does NFPA 5000 say about vertical shafts?
  - **3.3.551 Shaft**: An enclosed space extending through one or more stories and connecting vertical openings through two or more successive floors of a building or through floors and roof.
  - **8.12.1.2*** Openings through floors shall be enclosed with fire barrier walls, shall be continuous from floor to floor or floor to roof, and shall be protected as appropriate for the fire resistance rating of the barrier.
    - A.8.12.1.2 Openings might include items such as stairways, hoistways for elevators, dumbwaiters, and inclined and vertical conveyors; ***and shaftways used for light, ventilation, or building services***.

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Codes & Standards – U.S.

- What does NFPA 5000 say about vertical shafts?
  - **8.12.1.4.1** Shafts shall be enclosed at the lowest or highest level of the shaft, respectively, with construction in accordance with 8.12.1.5 and Section 8.7.
  - **8.12.1.4.2** Shafts shall be permitted to terminate in a room or space having a use related to the purpose of the shaft, provided that the room or space is separated from the remainder of the building by construction having a fire resistance rating and opening protectives in accordance with 8.12.1.5 and Section 8.7.

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Codes & Standards – U.S.

- What does NFPA 5000 say about vertical shafts?
  - **8.12.1.5*** The fire resistance rating for the enclosure of floor openings shall be not less than as follows:
    - (1) Enclosures connecting four stories or more shall be 2-hour fire barriers.
    - (2) Enclosures connecting three stories or less shall be 1-hour fire barriers, but not less than the required fire resistance rating of the floor penetrated, and shall not be required to exceed 2 hours.

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Codes & Standards – U.S.

- What does the IBC 2006 say about vertical shafts?
  - **702.1 SHAFT**. An enclosed space extending through one or more stories of a building, connecting vertical openings in successive floors, or floors and roof.
  - **702.1 SHAFT ENCLOSURE**. The walls or construction forming the boundaries of a shaft.
  - **707.2** Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

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Codes & Standards – U.S.

- What does the IBC 2006 say about vertical shafts?
  - **707.4 Fire-resistance rating**.
    - Not less than 2 hours where connecting 4 stories or more
    - Not less than 1 hour where connecting less than 4 stories
    - Not less than floor assembly penetrated, but not more than 2 hours
  - **707.11 and 707.12** have requirements for shaft enclosure at top and bottom of shaft unless shafts extends to bottom of building or to roof

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Codes & Standards – Canada

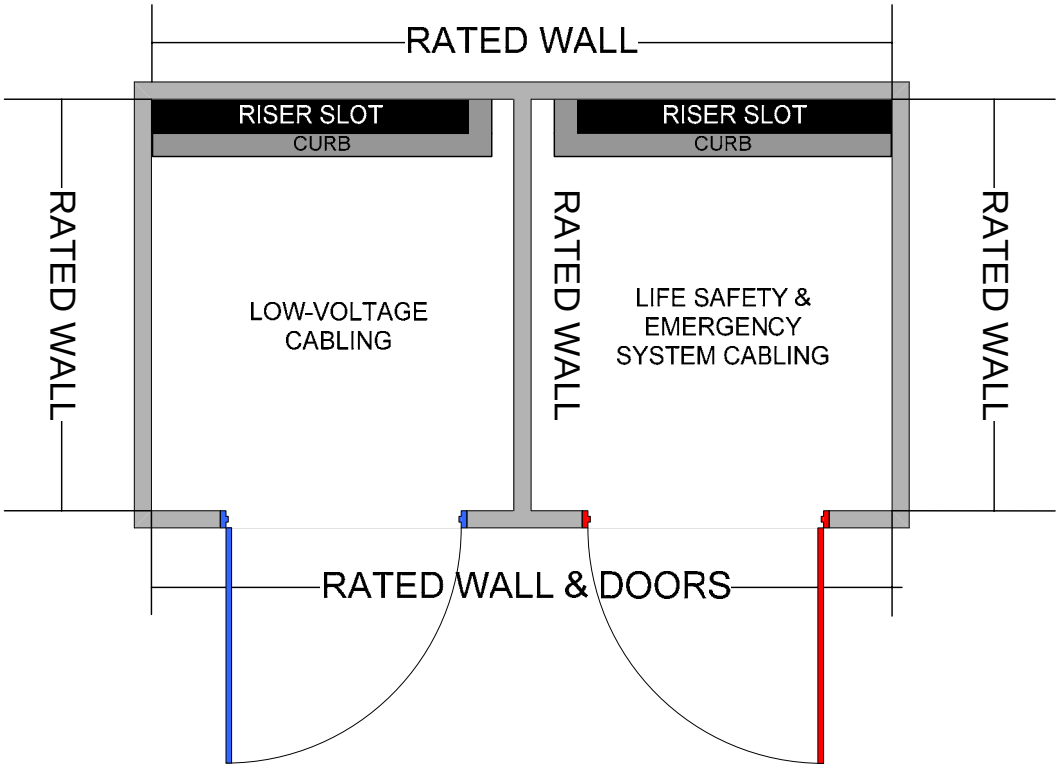
- What does the NBC 2005 say about vertical shafts?
  - Defined as spaces ***"…to facilitate the installation of building services…"***
  - Designed specifically for this type of purpose – installation of vertical telecommunications cabling
  - Vertical spaces required to be fire separated from adjacent floors AND at the top and bottom (if they don't extend to the roof or foundation)

Codes & Standards – Canada

- What does the NBC 2005 say about vertical shafts?
  - Vertical service spaces for electrical conductors for fire alarm and other emergency equipment required to be fire separated from service spaces containing conductors for other services (e.g. communication, control cables etc…)

Separation of Critical System Cables

- Create a fire-rated separation between standard low-voltage cables and those for life-safety and emergency systems.



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Pros

- A small footprint Riser increases leasable space on the floor
  - Build the TR per tenants specs, not to requirements set at time of building construction
- No firestop at the floor level allows for more cables in the same area
  - Minimizes risk of damage when adding or removing cables
  - Speeds installation time
  - Reduces worry & liability of improperly applied firestop or incorrect assembly

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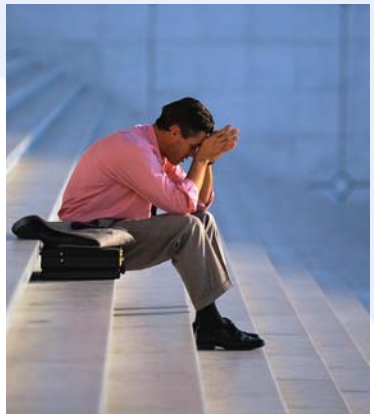
Pros

- Generally, firestop assemblies through walls are easier to install, add, and maintain
  - Adding an assembly through a wall is significantly easier than through a floor slab
  - Vertical sleeves fill quickly and are difficult to firestop
  - Adding more vertical sleeves involves scanning/x-raying and core drilling which is costly– there is also some risk to services and building structure

Cons



- Limited to new buildings or major refits only
- Change can be met with resistance
- Will require work to educate and change design habits of Architects, Engineers, end users and cabling industry

Review

- Be aware of the risk: Arm yourself with expert help and knowledge
- Be open to new ideas and concepts
- Times have changed and continue at a high rate
- Are we using Band-Aids instead of fixing the problem?
- Fire Rated Vertical Shaft may solve a number of problems
- Should TRs be used as riser spaces?
- Be open to new ideas and possible change
- Could solve ongoing operational issues

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Questions & Answers

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