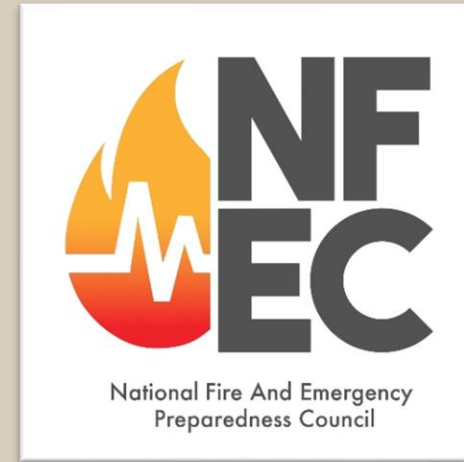


1 FIRE 1 LOCATION

PASSIVE FIRESTOPPING

Terrence Teo

✉ teoter@hilti.com



Fire Safety Seminar 2024

LEARN: APPLY: SHARE

The accepted assumption in building design for **safe evacuation** and asset protection during a fire emergency.

**“Only one fire
at one location
at a time.”**

MANY FIRES, SPREAD OUT TO MANY LOCATIONS...

Smoke and gas : Kills, hinders evacuation and rescue. Main cause of death.

Flame and heat : Kills, destroys assets (including the building!).



Smoke hindered rescue efforts as fires continued to burn with families trapped throughout the building Credit: Getty Images



Emergency becomes a disaster

GOLDEN RULE → ONE FIRE AT ONE LOCATION AT A TIME

What

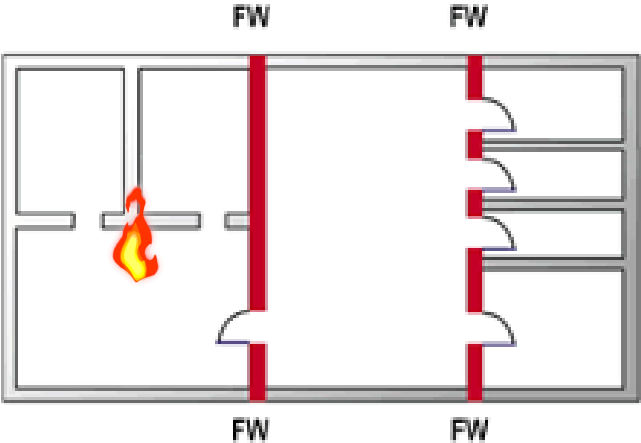
- Flames
- Heat
- Smoke / Gas

For a period of time

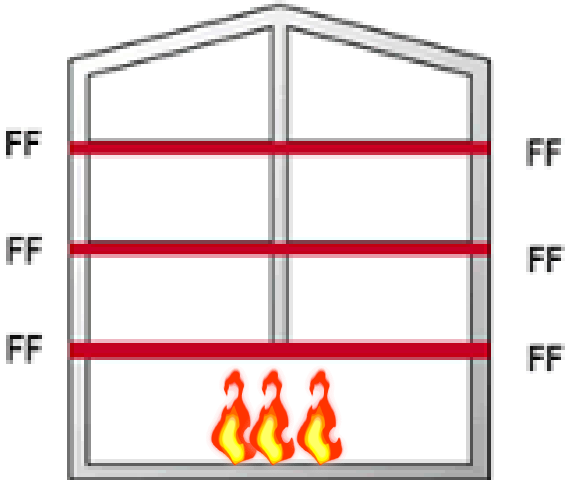
‘Fire Resistance Period’

Where

Walls



Floors

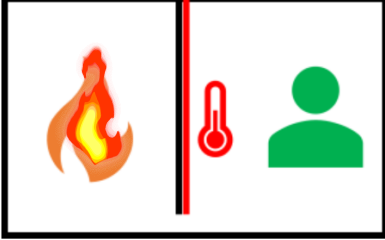
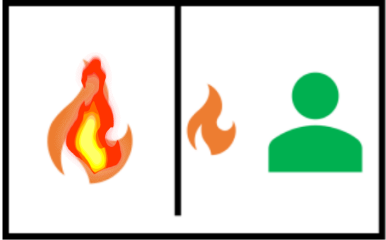


Compartmentation

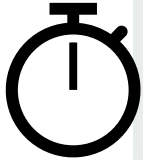
“To contain that one fire within that one location for a period of time”

COMPARTMENTATION

→ FIRE RESISTANCE RATING (eg, 1hr, 2hr, 4hr)



Flames, Smoke, Heat



Compartment fails when a wall or floor fails to achieve the required fire-resistance rating during a fire

Picture credit : Walraven

ENSURE THAT COMPARTMENTS HAVE REQUIRED 'FIRE RESISTANCE' RIGHT?



WHERE ARE THE OPENINGS OR GAPS?

Joints

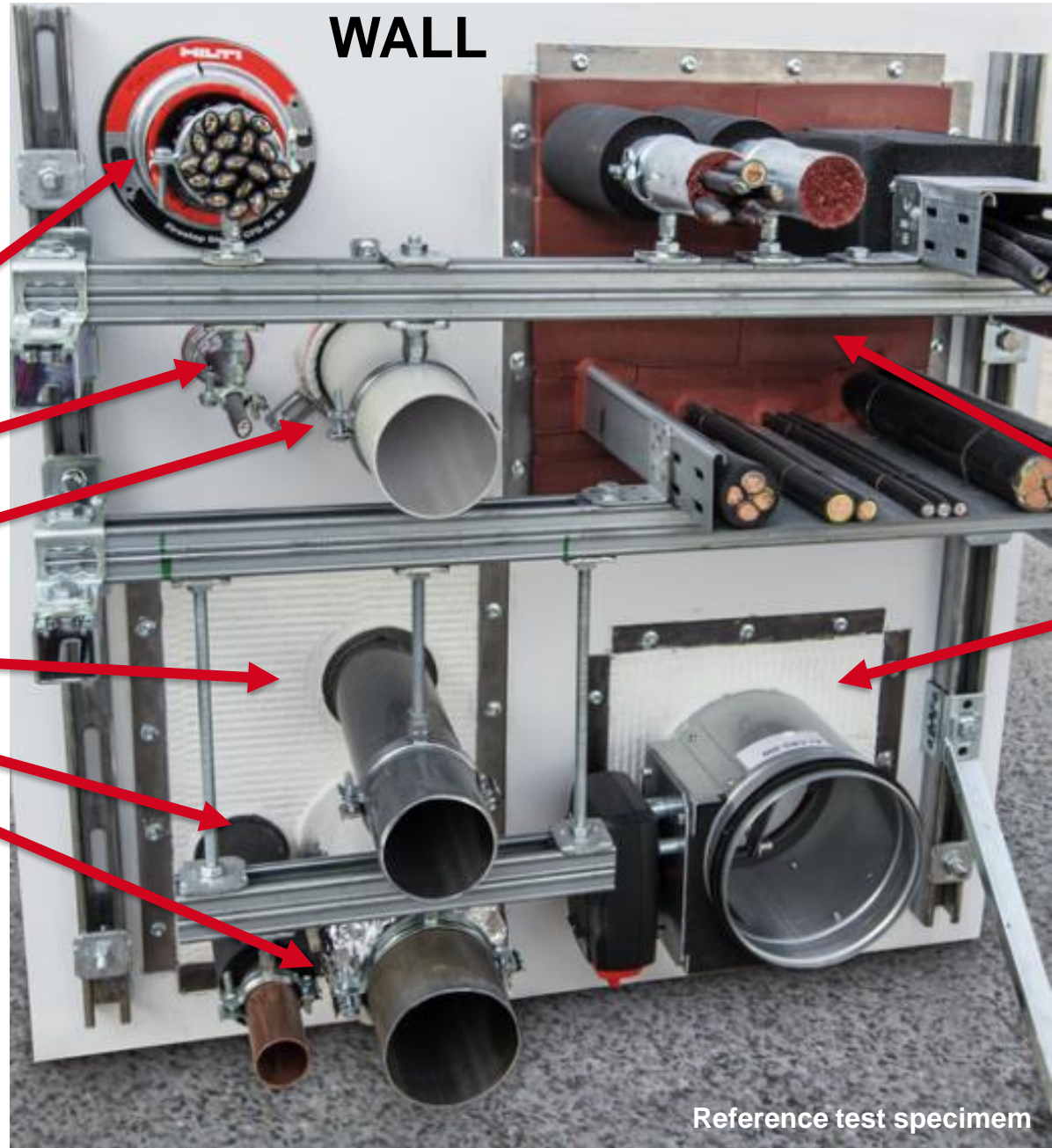
- If a compartment wall or floor has an opening or any gaps, it has no fire resistance.
- So, openings and gaps must be sealed and remain sealed during a fire....

Service penetration

**Q : Sealed with what?
And to what criteria?**

Doors

gaps



WALL

PASSIVE
FIRESTOPPING

PASSIVE
FIRESTOPPING

Reference test specimen

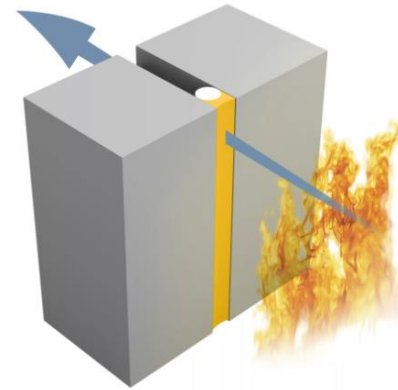
PASSIVE FIRESTOPPING – TESTED AND RATED

Types of applications requiring passive firestopping

OPENINGS FOR SERVICE PENETRATIONS



JOINT GAPS (Linear Joint)



PERIMETER GAPS (Curtain Wall)



Specific test standards

- EN 1366-3
- ASTM E814
- UL 1479*

- EN 1366-4
- ASTM E1966*
- UL 2079*

- EN 1364-3 / 1364-4*
- ASTM E2307

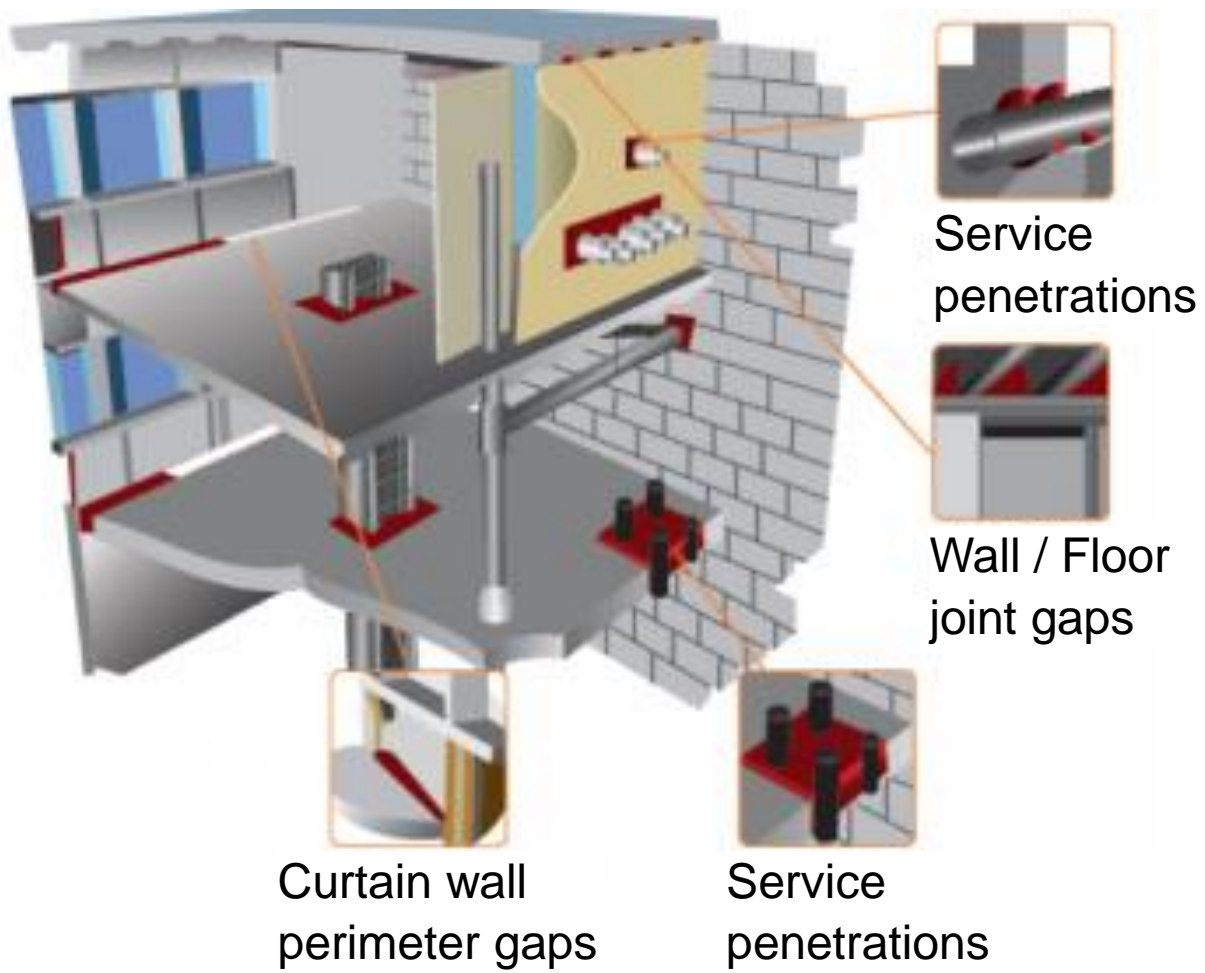
* Applicable overseas

IMPORTANT : Fire-rating is for the whole assembly as a system → not the individual materials

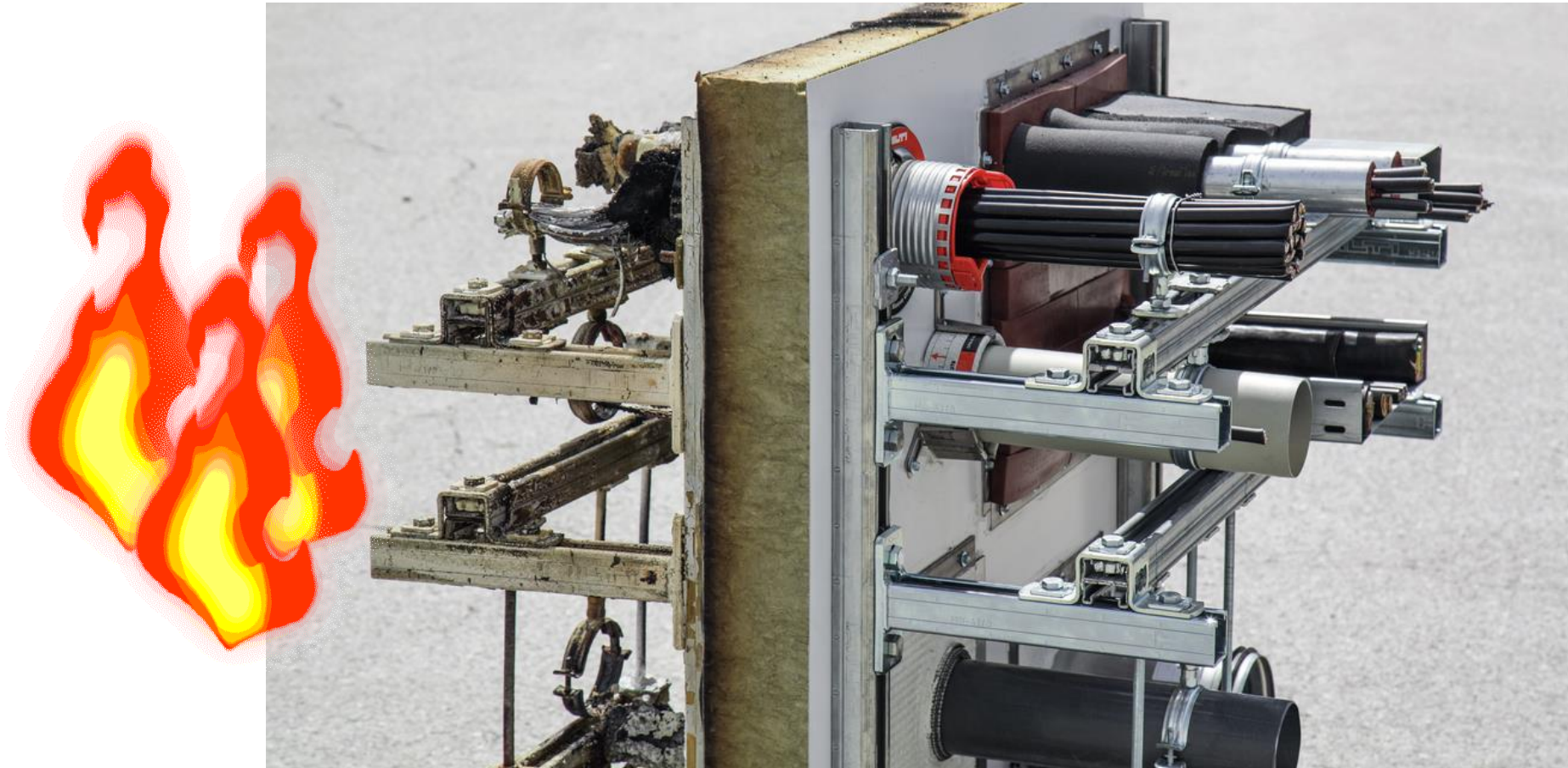


<https://youtu.be/NMk4L9Nm1JA?feature=shared>

MAINTAIN COMPARTMENTATION DURING A FIRE → CLOSE ALL GAPS AND OPENINGS

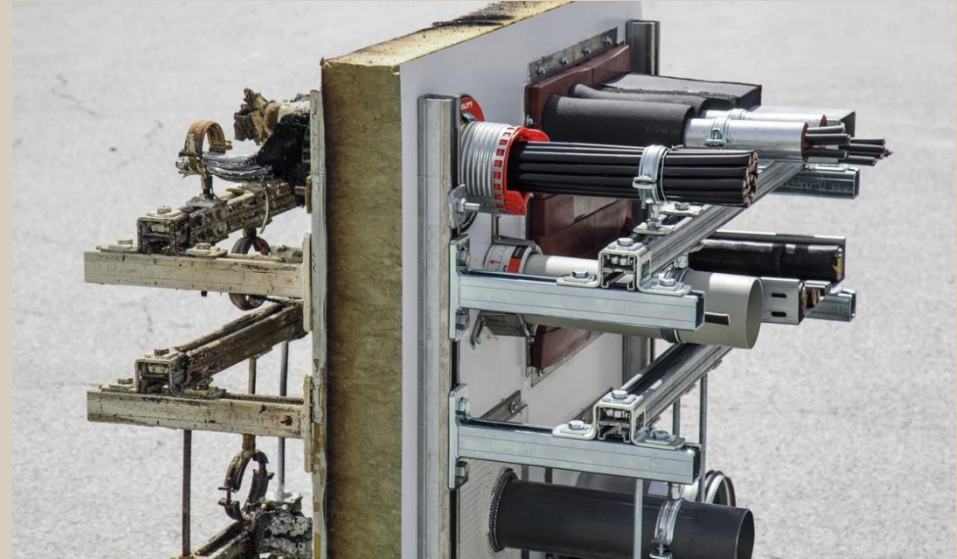


TESTED, PROPERLY INSTALLED FIRESTOPPING SYSTEMS



Actual fire test specimen – penetration seals

PASSIVE FIRESTOPPING
1 FIRE
1 LOCATION



THANK YOU

Terrence Teo

✉ teoter@hilti.com

HILTI Saving lives thru innovation and education