Fire protection & Fire safety in large, complex health projects: lessons learned

Stantec

Who we are

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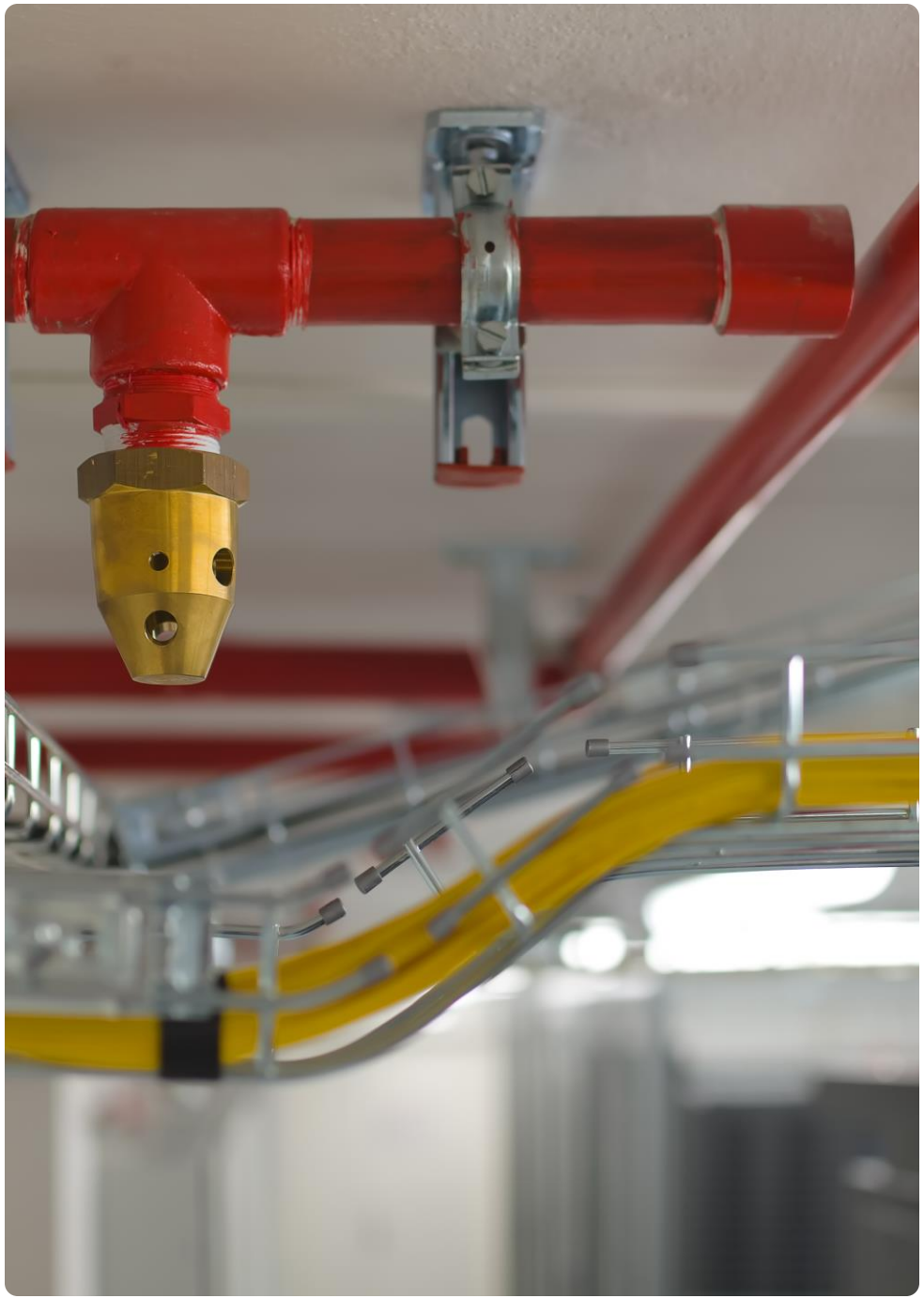


Agenda

1. Greenfield sites / projects
2. Brownfield sites / existing Sites
3. Collaboration between fire safety engineering and fire protection
4. Fire Engineering in the Real World
5. Knowledge Sharing

Greenfield sites / projects

Fire's involvement

- Fire and Life Safety Engineering Overview
- Approach to the Fire and Life Safety Solution
    a. Regulatory Framework
    b. Building Code of Australia (BCA)
- Objectives
    a. Fire Brigade Objectives
    b. Department of Health and Human Services Objectives
    c. Fire Safety Engineering Objectives (C01, D01, E01, E02, E04)
- Fire Engineering Analysis Performance Solution Compliance Process
- Role of Fire Safety Engineer
- Computer Models and Software
- Variations from Deemed-to-Satisfy-Provisions
- Summary of Initiatives and Benefits of the Fire and Life Safety Engineering
    a. Risk Management and Mitigation Measures
    b. Fire and Life Safety Systems
    c. Passive Fire and Smoke Compartmentation
    d. Automatic Sprinkler System
    e. Fire Hydrant System
    f. Fire Detection and Emergency Warning and Intercommunication System
    g. Mechanical Pressurization and Zone Smoke Control System
    h. Building Management
    i. Staff Training
    j. Evacuation Procedures
    k. Futures Works

Suggestions

Collaborating with stakeholders to keep progress on track

→ Communicate in layman's terms and obtain understanding confirmation

→ Negotiation skills – agree on what can be installed whilst waiting for Regulation 129 / Stage Building Permit

→ Staged Building Permits – Fire Service Main Infrastructure only

→ Multiple Regulation 129 submissions

→ Review process from multiple project stakeholders – Follow ups / Proactive / Assist / Guide

Managing communication between consultants, authorities, and project teams

→ Upskill staff in software such as Teams to enhance digital collaboration

→ Identify FRV contacts & provide updates to ensure regular communication

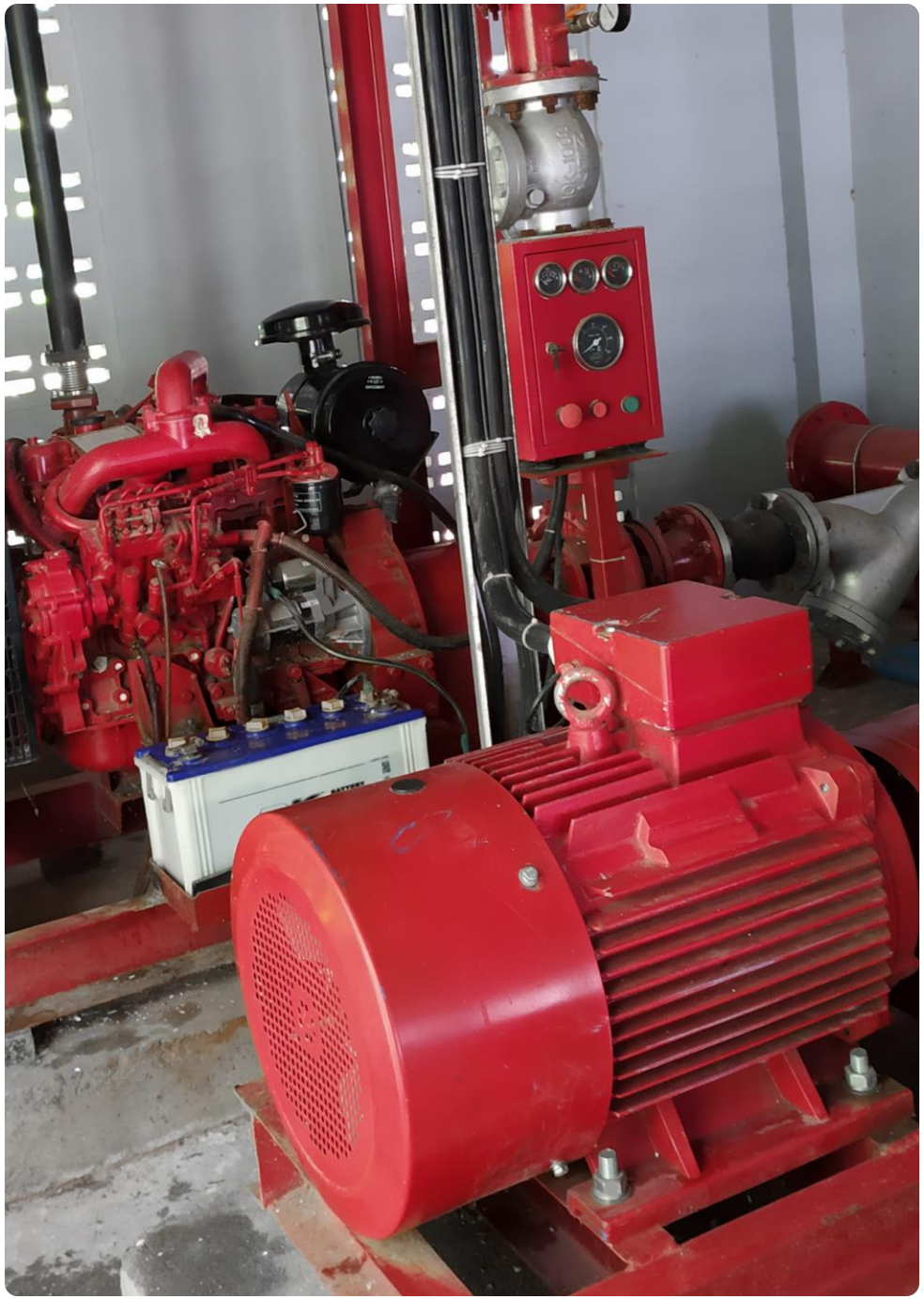
Brownfield Sites / Existing Sites

Brownfield sites / existing sites

- Project challenges
- Existing / additional infrastructure
- Outside scope of works area
- Capacity of existing fire services infrastructure
- Liaising with the Fire Authority
- Access to existing documentation and relevant approvals, Fire Engineering reports
- Quantity Surveyor

Project example A

- The use of window wetting sprinklers on brownfield projects can also be a fraught with danger as the capacity of the existing active fire systems is unknown.
- The fire brigade has not been supportive of relying on sprinkler protection of glazing where the system cannot cater for the hydraulic demand.



Project example B

Fire and Water Authority Liaison

- Water tapping arrangement
- Existing agreements with Water / Fire Authority
- Water Flow Availability
- Quantity of Fire Hydrants in operation
- Regulation 129 / 229 items
- Fire Tanks size / locations
- Fire Fighting Operation / Access

Collaboration between Fire Safety Engineering and Fire Protection

Communication, communication, communication

Regular catch ups

Ensure the FSE engages with the consulting team and stakeholders as early as possible

The first “coordination” with other engineering disciplines tends to be the first review of the PBDB which can be too late.

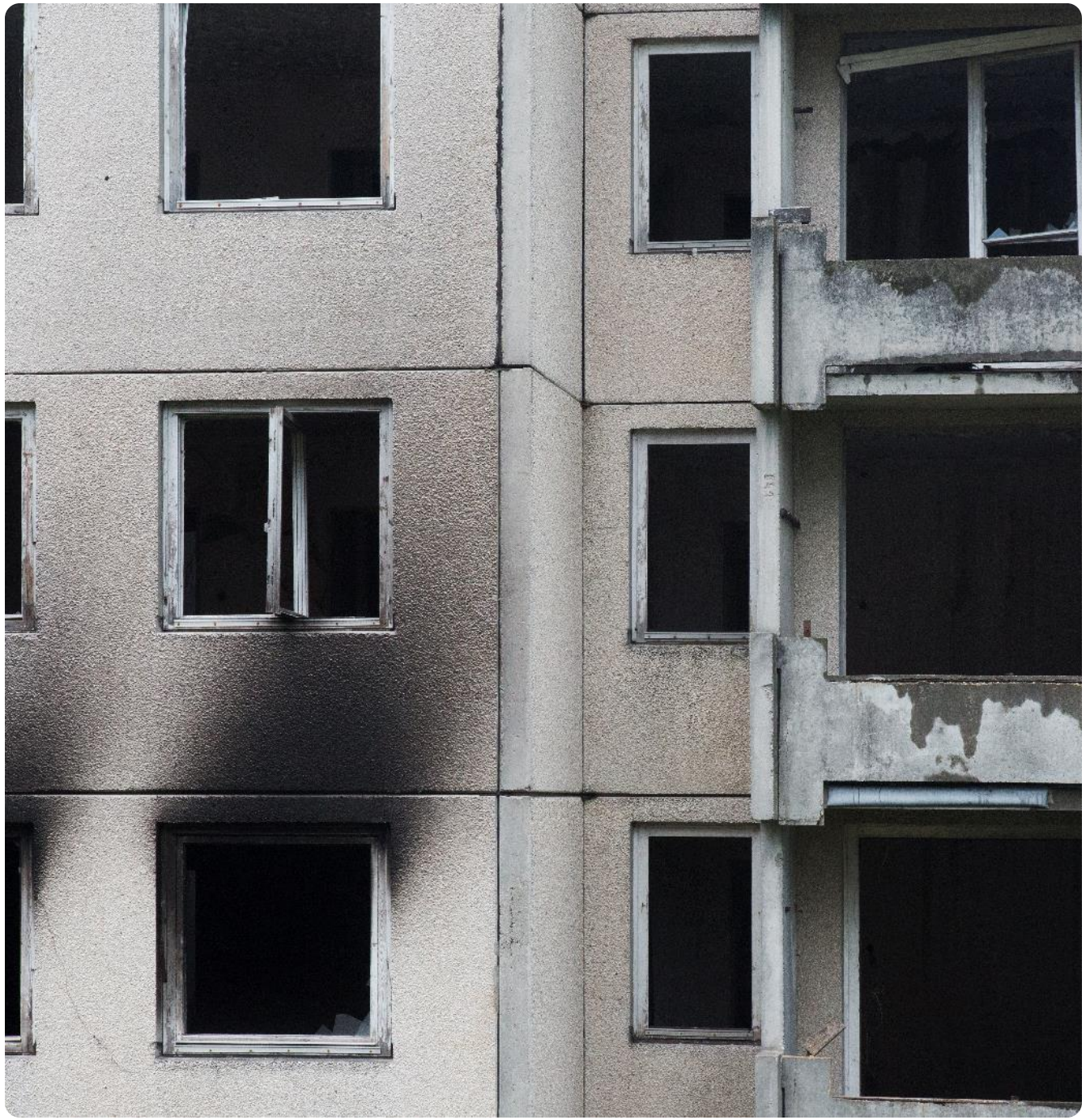
Communication

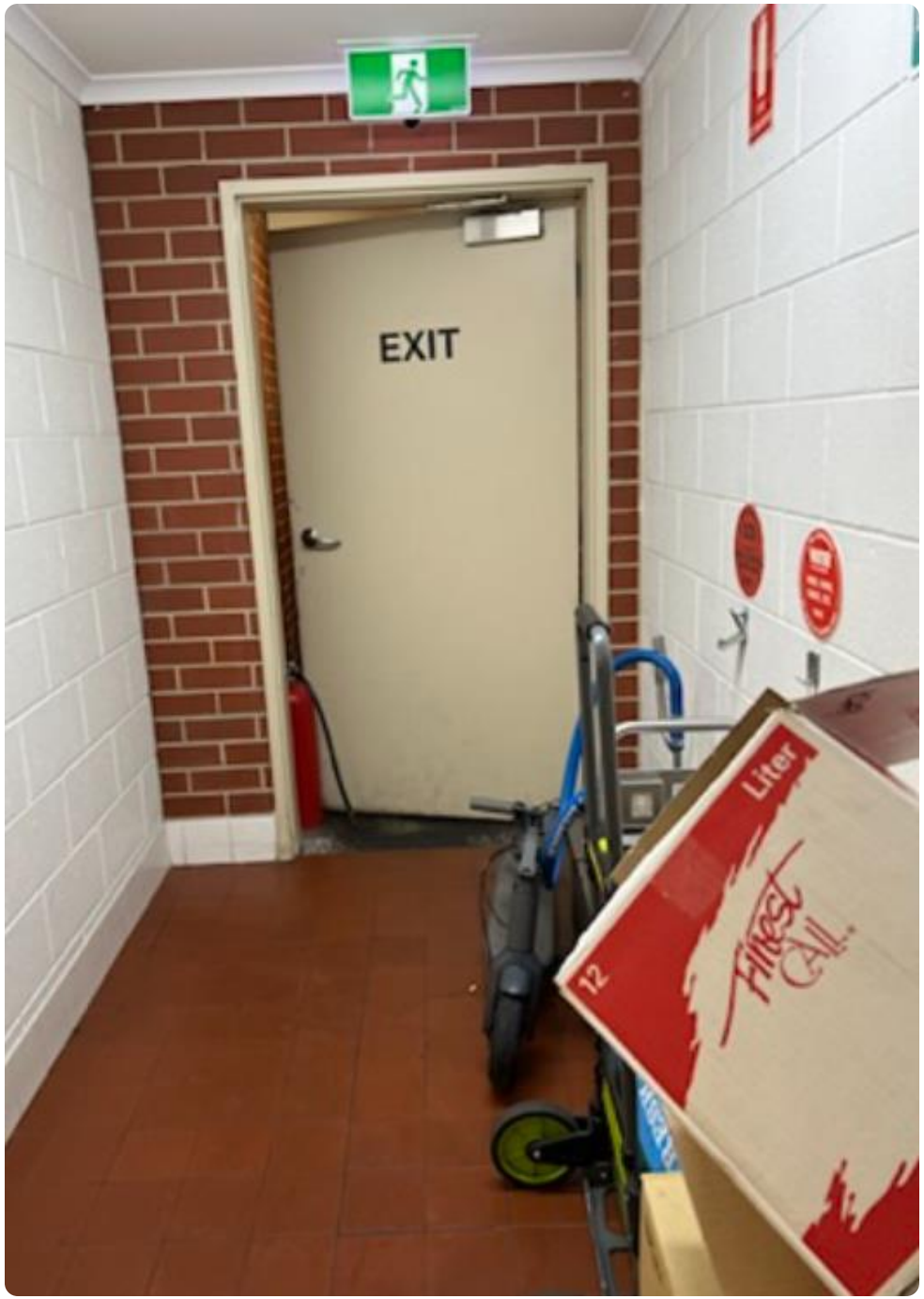
Workshops need to occur in order to discuss the fire safety strategy and the proposed or existing fire system in order to understand what is possible.

Understanding of system design

FSE need to have firm understanding of the design parameters when considering a performance solution relating to the relevant building services.

Fire Engineering in the Real World





Performance solutions in the real world

Omission / deletion of fire hose reels

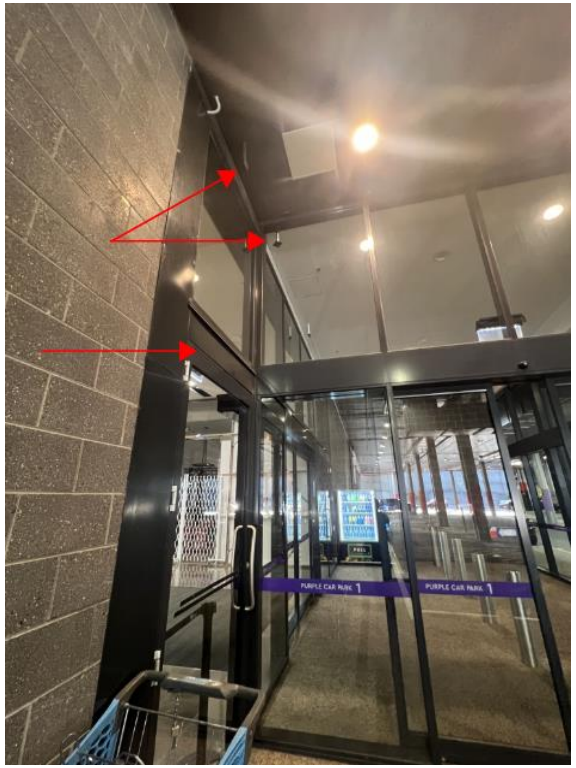
- Performance solutions never take into consider the use and/or misuse of a building.
- Extinguishers can go missing
- Fire extinguishers need to be replaced every 5 years – significant CAPEX cost
- Typically not appropriate to the fire risks as intended

As a fire fighter I have attended a fire that involved 2 wooden pallets where occupants has utilised circa 8 ABE extinguishers to battle a blaze. We extinguished it with the installed fire hose reel.

Deletion of sprinklers from top of lift shafts

- Alignment between the NCC and AS2118.1.
- Performance solution tends to include the replacement of the sprinkler with a thermal detector
- Updates to AS1670.1-2018 specifically articulates that point type detectors cannot be located the top of shafts due to maintenance.
- The performance solution generates additional non-compliances which are typically not addressed via performance solution.
- Safety in Design is commonly disregarded in relation to Performance Solutions. All designers have obligations in relation to the Work Health and Safety Act

Fire compartmentation – leads to fire hose reel shortfalls! Often gets missed by the Relevant Building Surveyor and FSE alike.



Performance solution examples

Sprinkler protection to glazed bounding construction typically between car park and adjacent building classifications.

- Incorrect application of standards – CL 3.1 of AS2118.1 which is for exposure hazards on boundary
- Differing requirements of sprinkler temperature ratings
- Coordination – Review and understand the architectural detailing
    - Sprinklers spray patterns impacted by transoms and/door frames – dry spots on glazing
    - Height of glazing below soffit – sprinklers may not activate
- Redundancy is not often considered – a fire wall will still operate of the sprinklers are turned off

Sprinkler protection to glazed sliding doors at fire compartment boundaries in Class 9a.

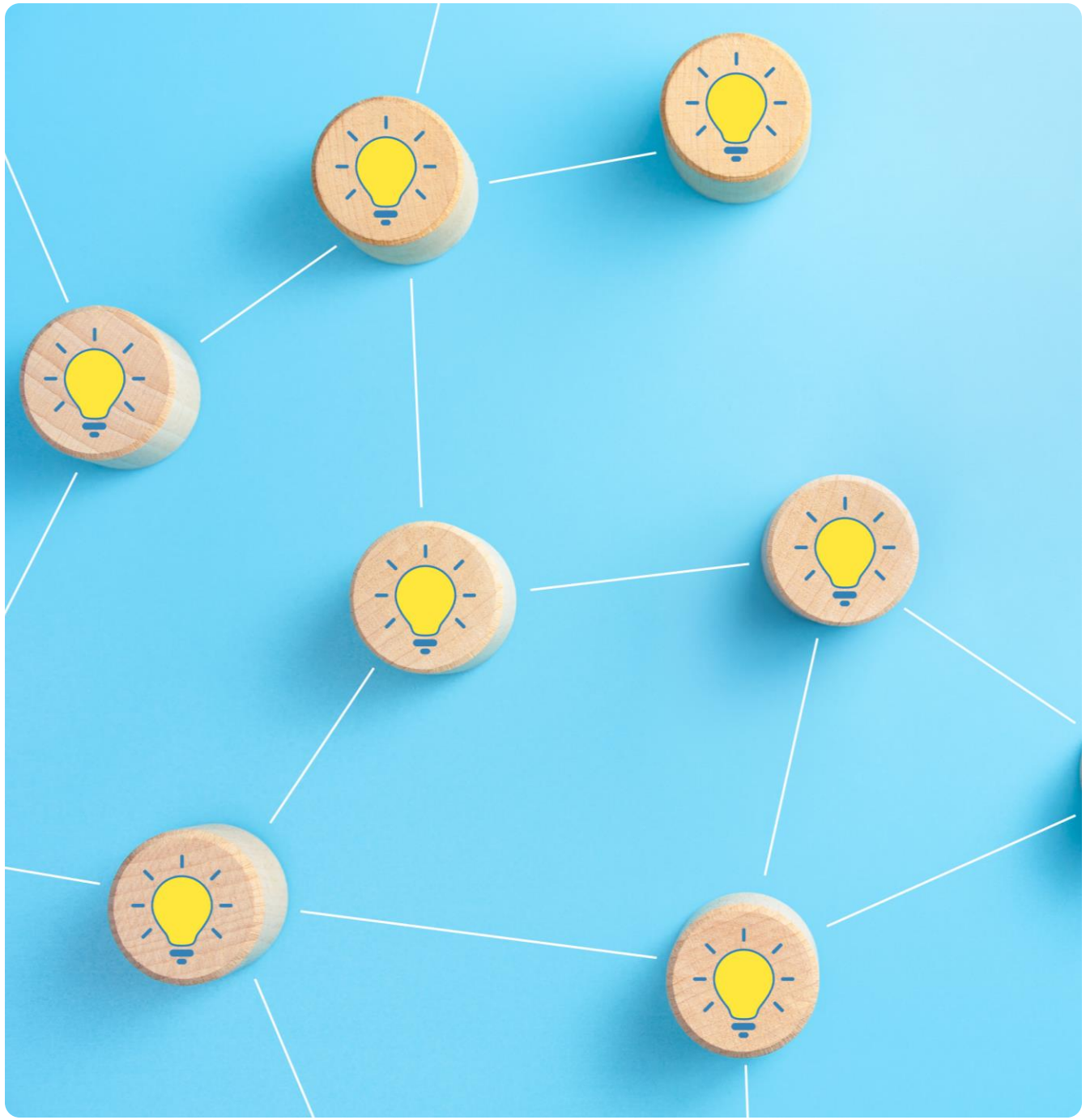
- Performance solutions requirements conflict one another
- Not a "quantum" door – cannot be both open and closed at the same time
    - An OPEN door addresses the sliding door in a Class 9a
    - A CLOSED door with sprinkler protection addresses the bounding construction to maintain compartmentation

Role of regulation

Regulation 129 part of FER in Victoria?

- We have seen Regulatory Advice on some projects that all non-compliances to the NCC and Australian Standards relating to Regulation 129 report and consent matters need to be detailed as a performance solution. This typically aligns with other States.
- Professional Engineers Registrations Act 2019 states that:
  A registered professional engineer must not provide professional engineering services unless—
  (a) the services are within their area or areas of competence
- In Victoria, a fire safety engineer MUST work within their area of competence to justify a performance solution relating to a fire hydrant shortfall, location of equipment etc
- There is a significant scope / education gap relating to R129 in the industry.
- Performance solutions for the omission of sprinklers to comms/electrical rooms with appropriate fire separation but by the same token undertake the same performance solution with vastly different safety outcomes in areas with higher risks.
- Performance solutions relating to the omission of sprinkler to areas such service cupboards and European laundries do not address the requirements of separating between sprinkler and non-sprinklered areas as in done in other Building classifications. The VBA has published a practice note in relation to this matter.

Knowledge Sharing



Knowledge sharing

Success

Challenge

Key takeaway

Knowledge sharing

Success

- Being engaged for Building Services / Fire Safety Engineering and Acoustics in one organisation
- Acceptance of alternative suppression systems (Victaulic Hybrid Water Mist System) within the electrical rooms
- Collaboration with various project stakeholders
- In-person meetings
- For precincts, separate Fire Engineering Reports (FER) for each building and additional for overall site strategy

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Challenge

- Remote working
- Shortage of Fire Service Officers at Fire Rescue Victoria
- Wearing multiple hats - No Consulting Building Surveyor
- Stakeholders' differing interests
- Document delivery process
- Rushed design process → Speculative design outcomes
- Use of BIM / 3D Model – drawings vs models

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Key takeaway

- Early discussions with relevant stakeholders including Fire Authority / Relevant Building Surveyors / Dedicated FRV person
- COMMUNICATION!