

Integrated Compliance for Intumescent Coating Solutions

A Systems Thinking Approach



Who We Are



Founded in 2017 in New Zealand

1

Supplier of state-of-the-art Passive Fire Protective Coating Systems

2

All solutions tested on locally sourced materials in accordance with the regulatory requirements of the New Zealand Building Code

3

NZGBC Member

4



**SHANE
WYATT**

Co-founder & Technical Director of Tech Coatings

Chairperson Coatings Working Group for FPANZ

Private Chef on Super Yachts

9th Fastest BMX in New Zealand

Our Vision



Tech Coatings is committed to transforming the industry and restoring trust in safe building practices

Our “Why”

The overall objective of this presentation is to offer IQPs

- **A new perspective** on compliance
- **Peace of mind** when inspecting intumescent coating systems
- **Confidence**, by adding a new tool to their “compliance” belt

01 The Importance of Passive Fire Protection

Brief overview of concept

02 A Systems Thinking Approach to Compliance

When Compliance meets Systems

03 Integrated Compliance of Intumescent Coating Systems

A compliance Framework for liquid fire protection

Recent events yet again show the important role passive fire safety plays in protecting buildings from fire

– *Loafers Lodge Wellington* –



– *Compliance* –

- 1 NZBC: No requirement to retrofit or upgrade passive fire systems in old buildings
- 2 Current BWOFF: Did not ensure occupants could exit safely in event of emergency

High occupancy buildings with transient occupation have special fire protection needs

Adequate fire safety strategy

The fire safety strategy of a building only works when fire prevention, active and passive fire protection work together

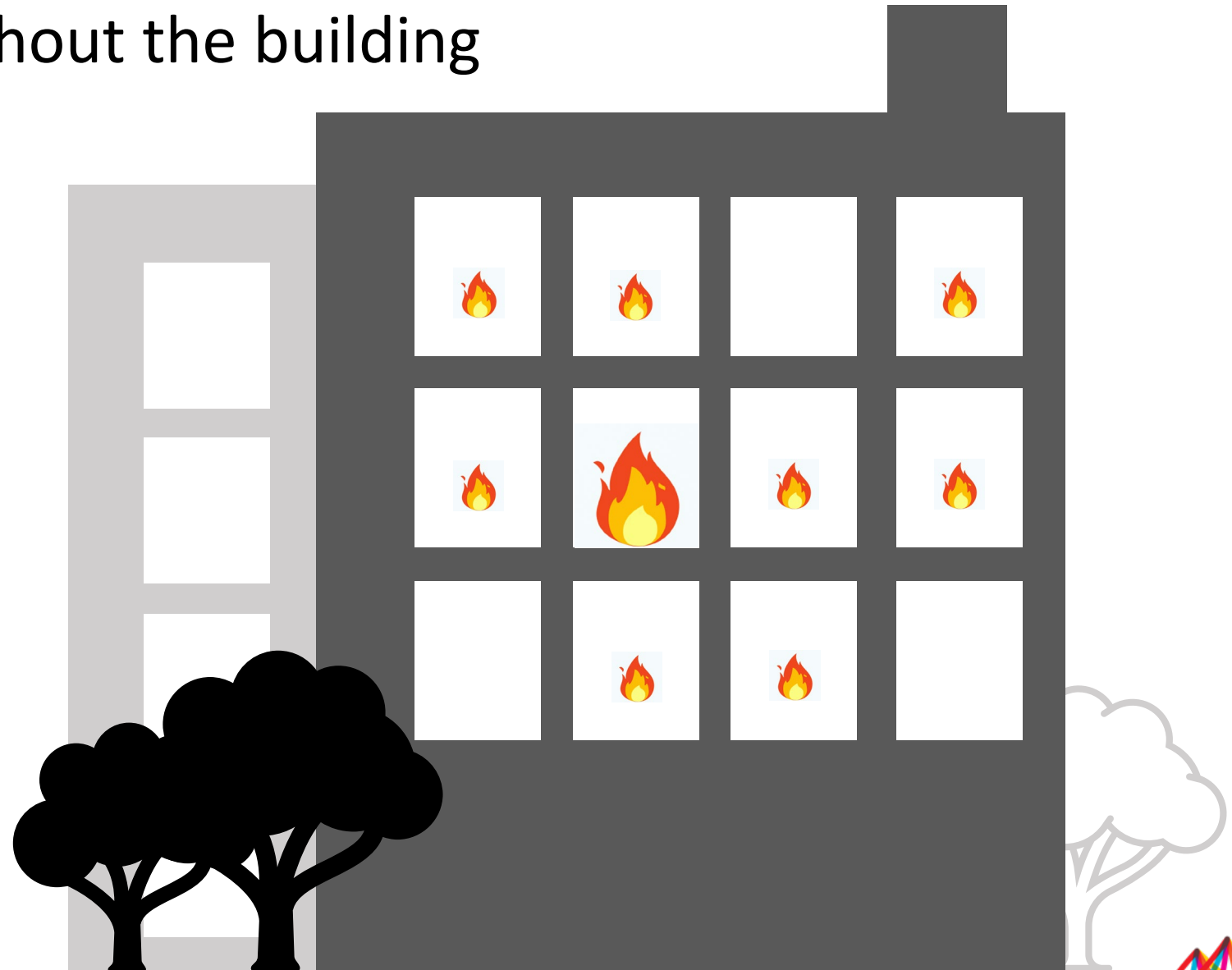


Fire Safety Strategy

What keeps a building safe during a fire?



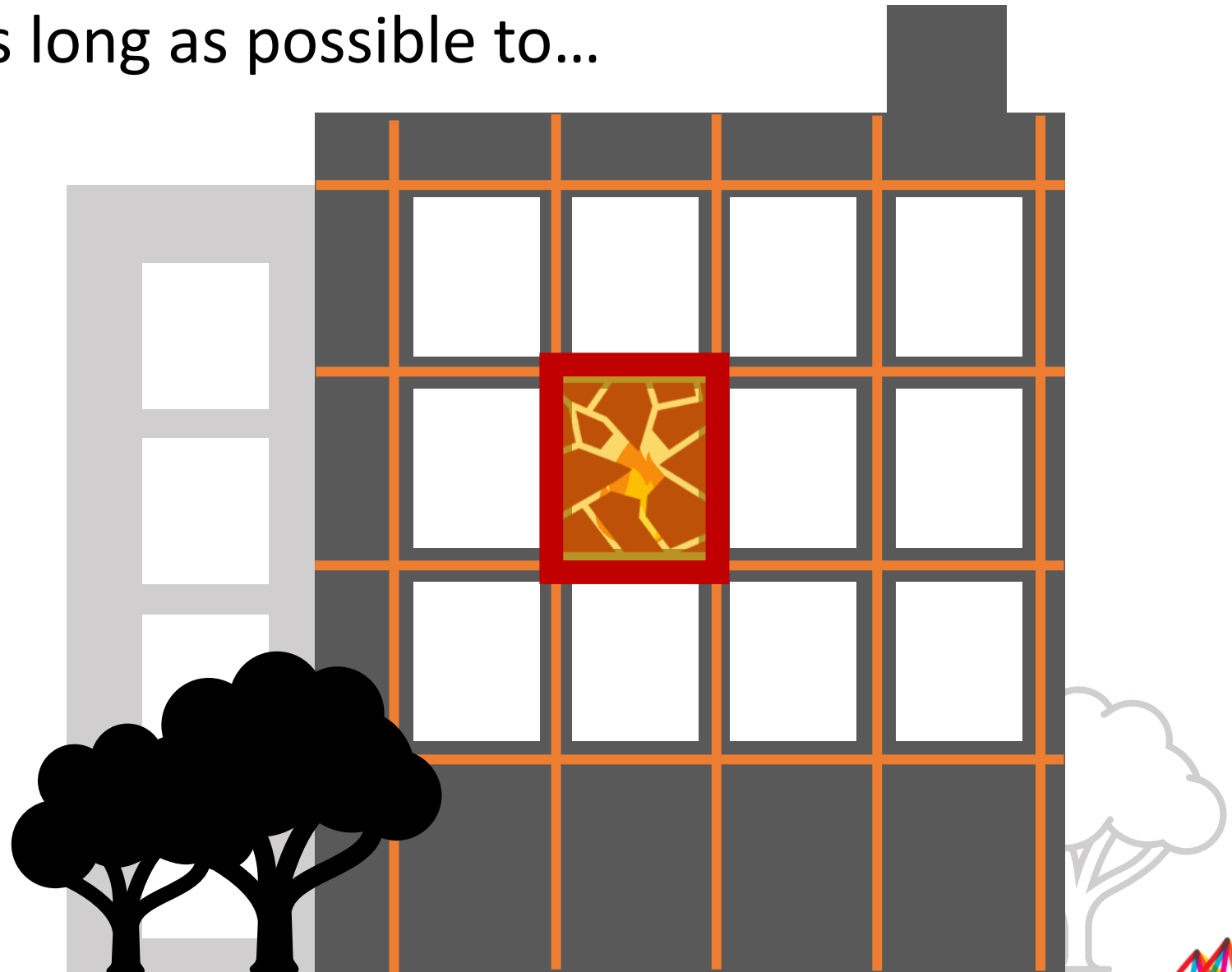
Without Passive Fire Protection there is nothing limiting the spread of fire throughout the building



Fire Compartmentation

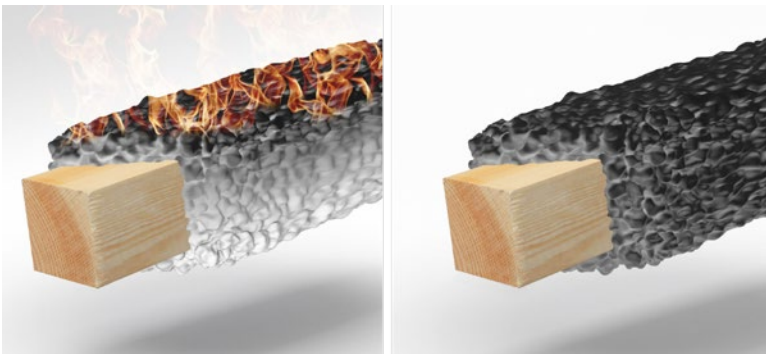
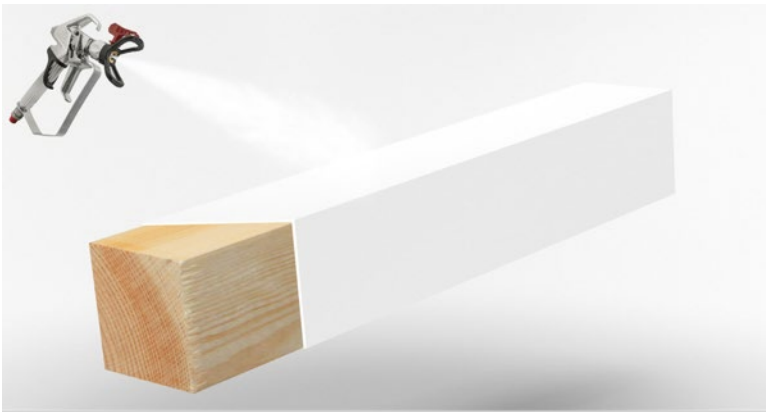
The purpose of Fire Compartmentation is to contain the fire in its area of origin as long as possible to...

..... in order to allow for fire
building to be safely
evacuate the building



Fire Compartmentation

Intumescent coatings are a highly specialised components...



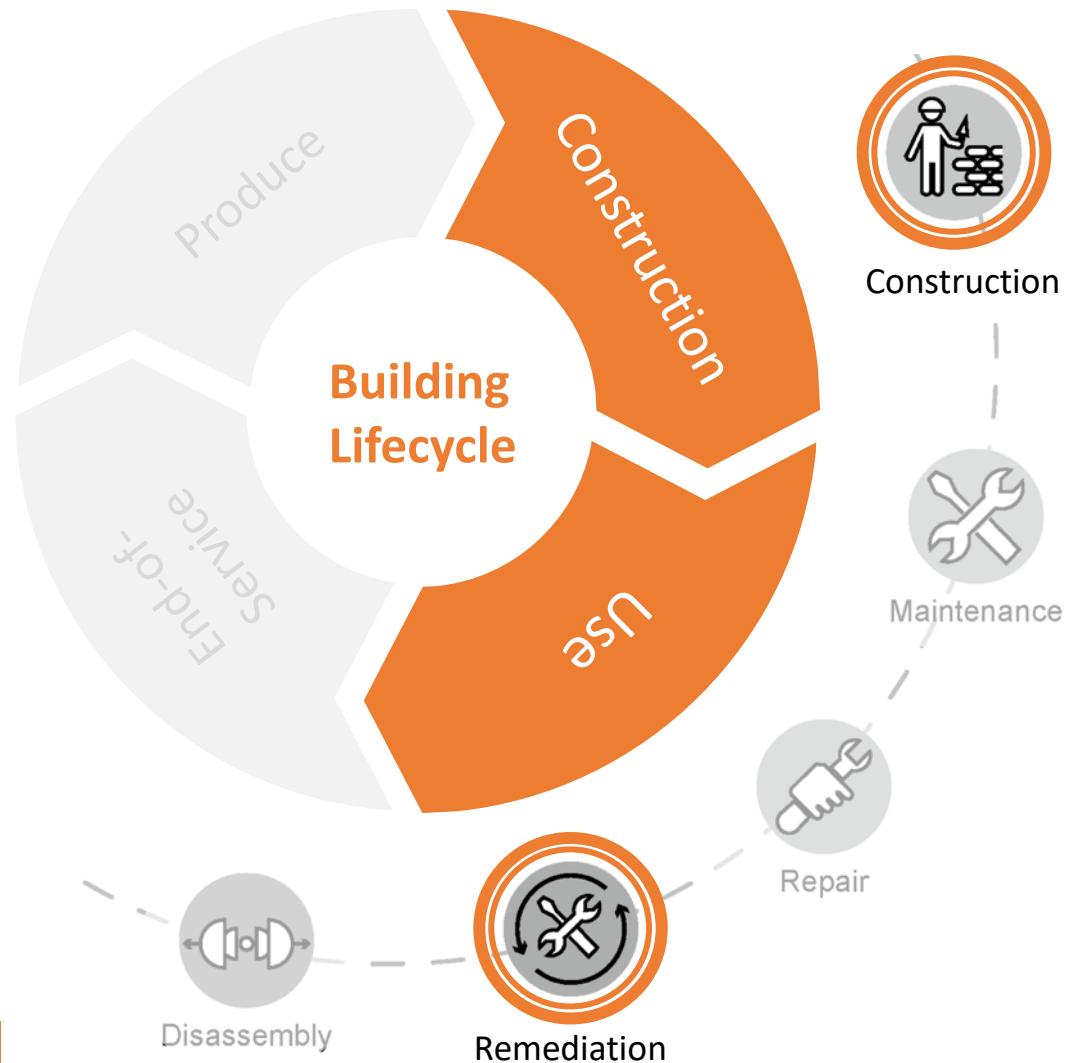
Definition

- A substance which swells as a result of heat exposure, increasing in volume, and decreasing in density
- Expansion of around 40-60 times the applied DFT
- Char of low thermal conductivity that reduces heat transfer to substrate
- Thermal insulation of substrate



Historically intumescent coatings used to be thick, gummy, toxic, carcinogenic, expensive, foul smelling with an ugly finish

Intumescent Coatings protect structural elements and limit the spread of fire through fire compartmentation



Fire Safety of Structural Members

Upgrading Fire Cells to Code

Intumescent Coatings

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A compliance Framework for liquid fire protection

The compliance of specified systems is defined in various regulations

But do these regulations enable us to deliver true...

Compliance

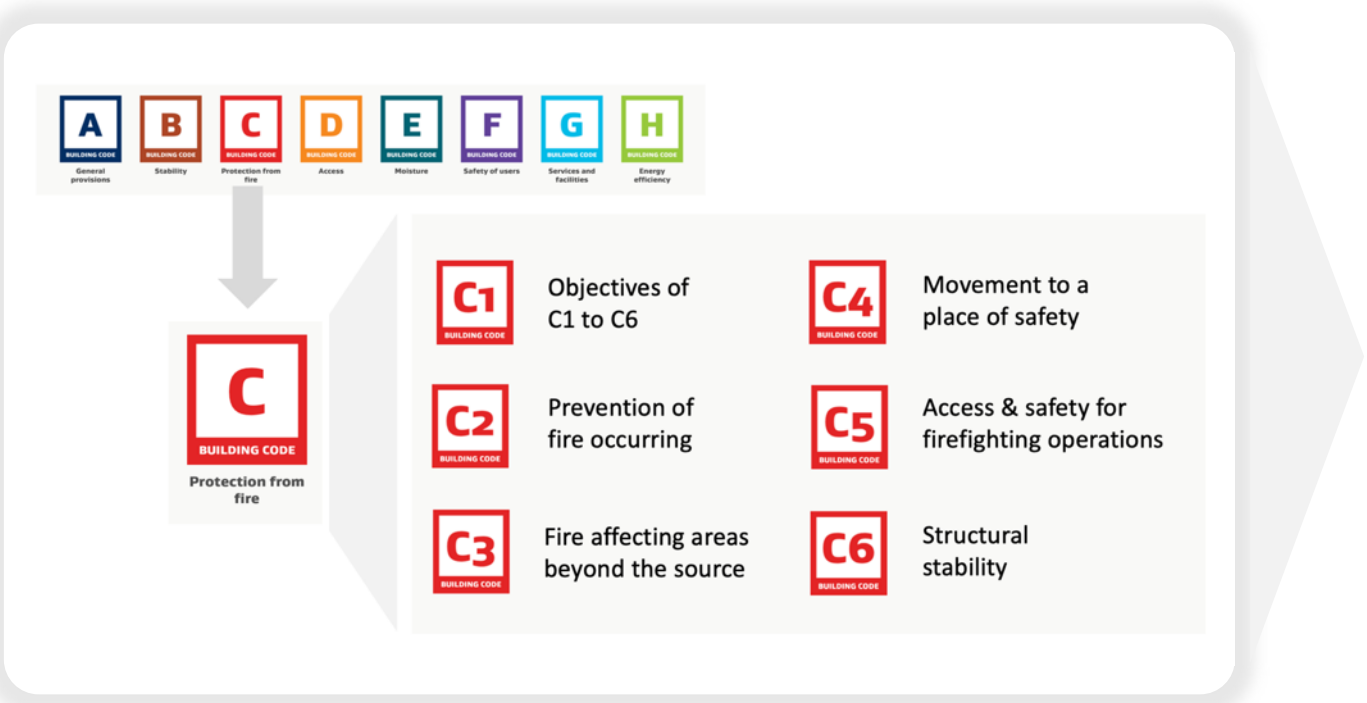
ensures buildings are safe, healthy and durable for everyone who may use them



Compliance

Regulations like the NZBC are only setting out minimal requirements and are based on a highly reductionist view

– *New Zealand Building Code* –



Stipulation:
Analysing the parts of a system & then putting them back together enables an appropriate view of the whole

Current approaches are based on the conception that everything is connected in a linear fashion

– Linear Connection –



Focussing on the performance of the parts in order to appreciate the whole



Optimising the parts in order to optimise the whole



Undesired change to the overall system

Compliance

We all have seen the tragic failure of this reductionist view pan out in real life — the ACP panels at Grenfell Towers

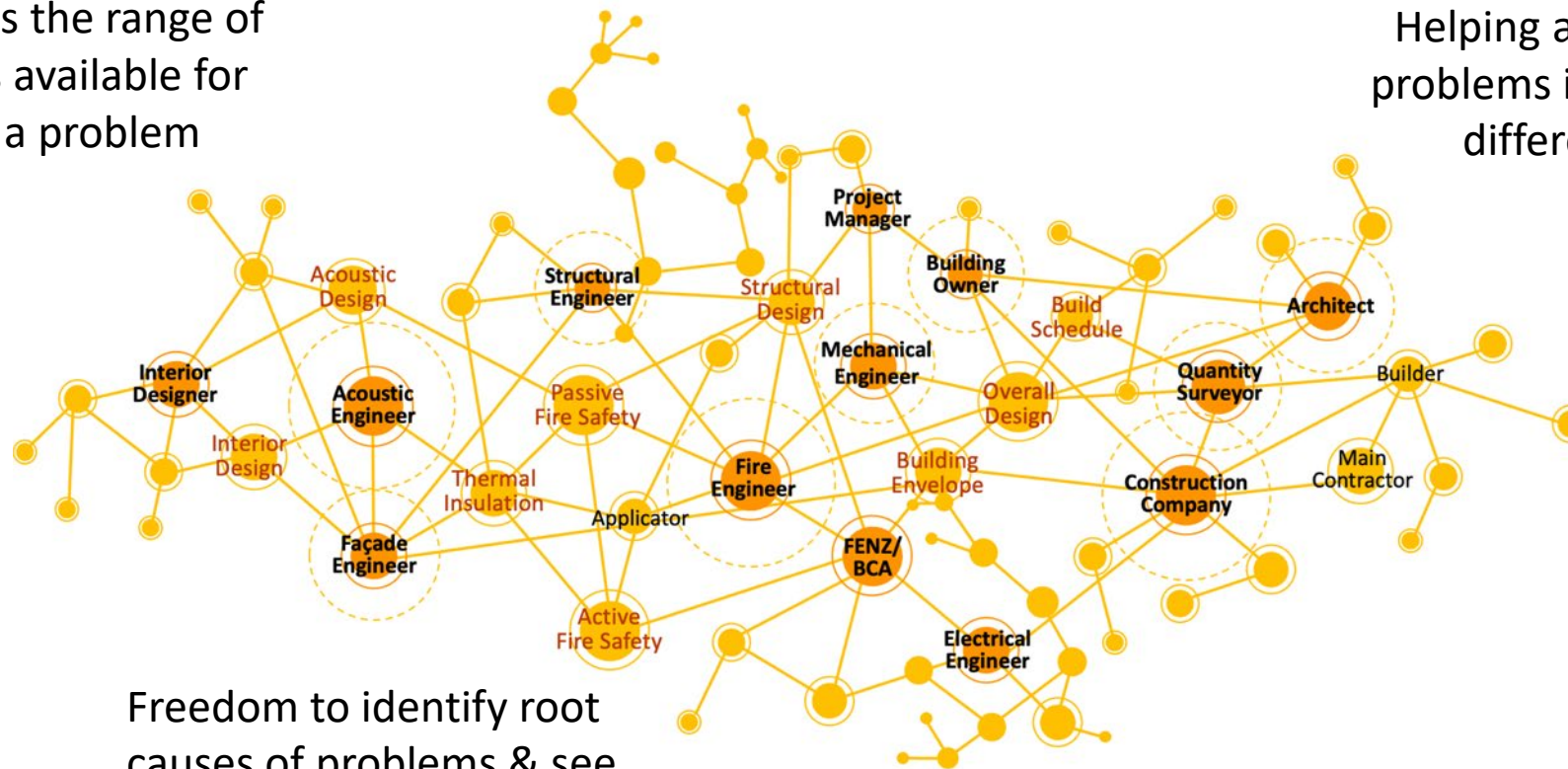


Compliance

Applying system thinking to compliance – optimising the whole by considering the global purpose as well as the details

Expands the range of choices available for solving a problem

Helping articulate problems in new & different ways

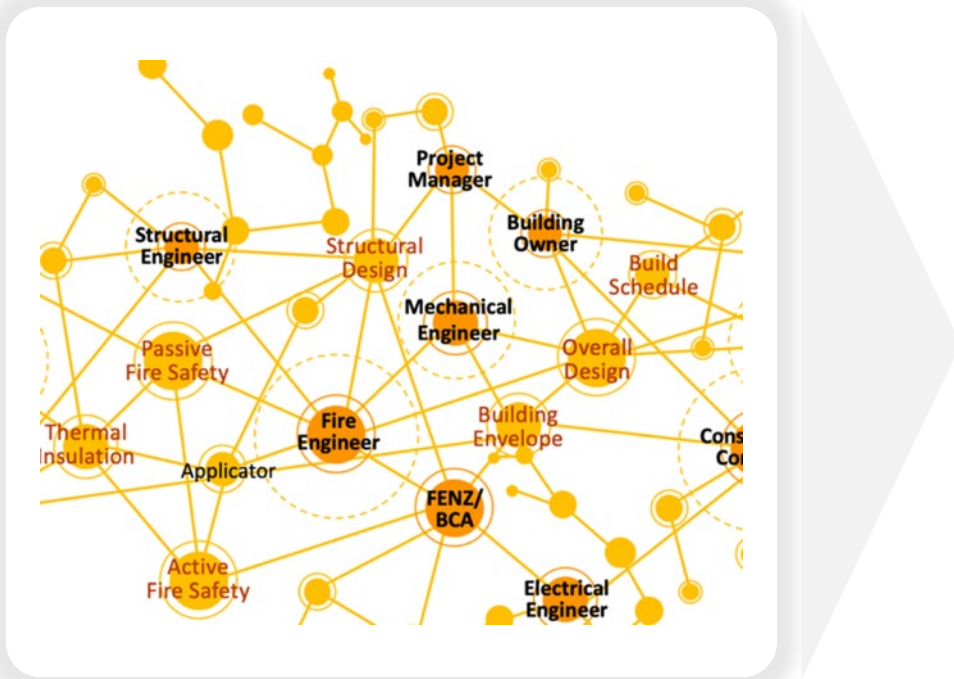


Freedom to identify root causes of problems & see new opportunities

A systems thinking approach aids in uncovering hidden obstacles, enabling seamless pathways to compliance

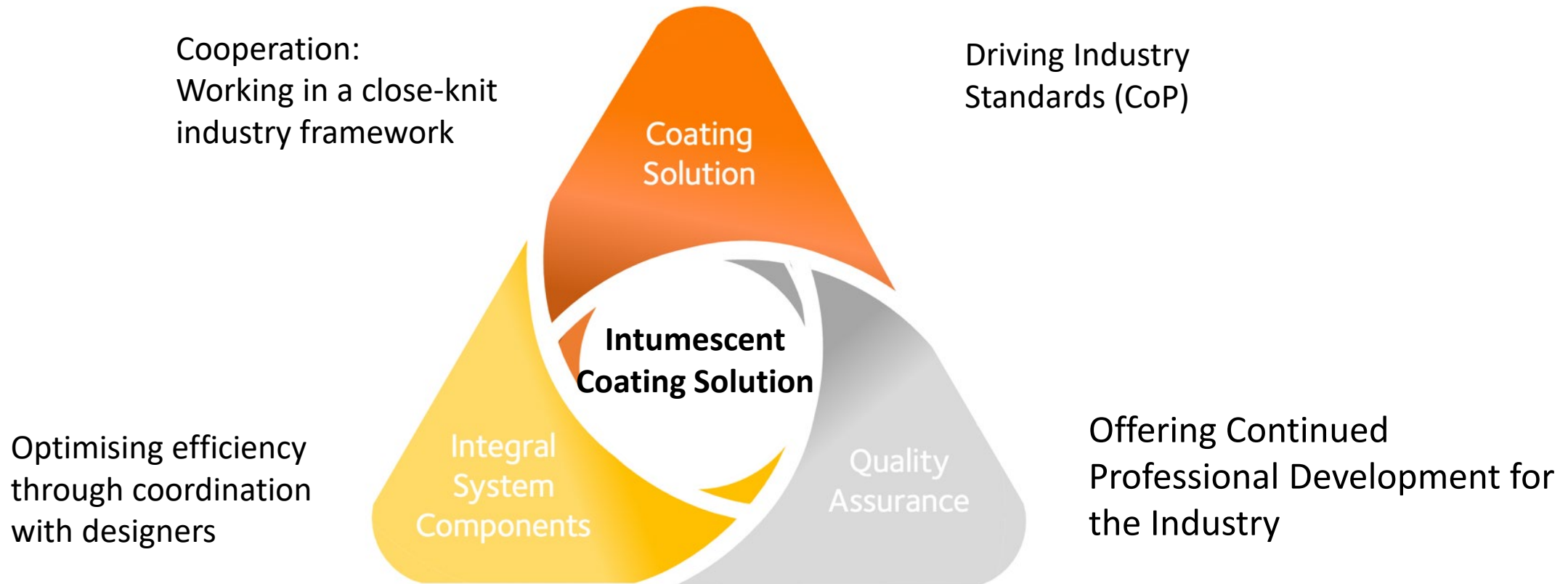
– System Thinking Approach –

– Helps to identify ... –



- ... the **aspects** of the proposed design **that fall outside of the scope** of acceptable solutions
- ... the **relevant Building Code clauses** for which performance needs to be demonstrated
- ... the **relevant performance criteria** that apply
- ... the relevant **compliance path(s)**
- ... what **kind of information is required** to demonstrate compliance

A systems approach ensures that all coating solutions are embedded into a holistic framework



Coating System

When applying a holistic approach to passive fire protection the overall system will benefit in the short- and long-term

– Approach –

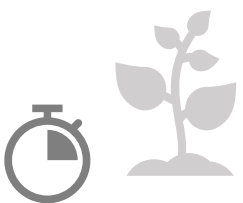
– Concept –



**Long-
Term**

Solution...

focussing on **preventing problems** and **addressing root causes** and systemic issues



**Short-
Term**

Solution...

focussing on **providing immediate relief** and/or temporary system **stabilisation**

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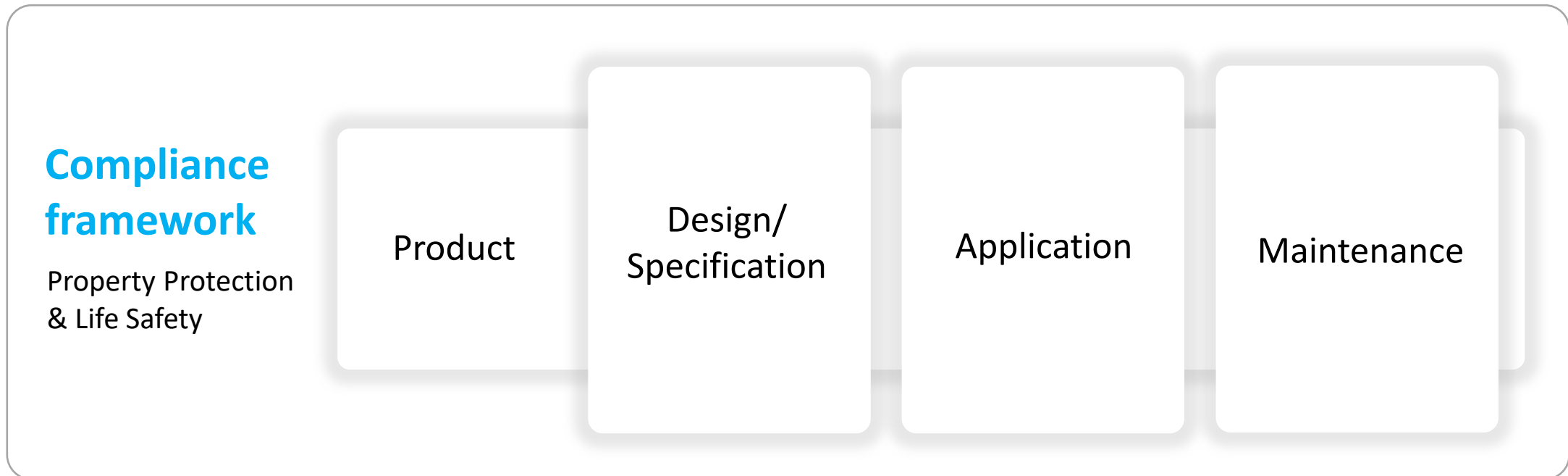
When Compliance meets Systems

03 Integrated Compliance of Intumescent Coating Systems

A compliance Framework for liquid fire protection

Systems thinking enables users to step down providing a truly interoperable technology coating system the products lifecycle

– Integrated Intumescent Coating System –



Compliance Framework

The criteria for product certification are the initial steps to ensure that compliance products are of consistent quality



Product Ce



Product Compliance

As a system, the approach stems from a design solution, supported by fire test results, to be fire tested



Product Ce

Intumescent coating test specimen...



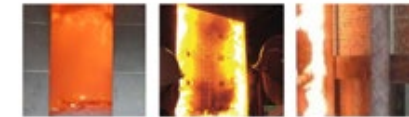
tested to...

AS1530.4:2014



ISO 9705
ISO 5660

at accredited fire labs



BRANZ Type Test

F110808-01

AS ISO 9705 AND ISO 9705 FIRE TEST OF FBL-100

CLIENT
Tech Coatings NZ Limited
12 Tokomaru Street
Wellbourn
New Plymouth, 4312
New Zealand

IANZ All tests and procedures reported herein, unless indicated, have been performed in accordance with the laboratory's scope of accreditation
ACCREDITED LABORATORY

REPORT NUMBER: F110808-01
ISSUE DATE: 9 November 2018
REVISION/ISSUE DATE: 9 November 2023
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Product Compliance

Quality Management Systems allow an integrated approach to product quality on every level

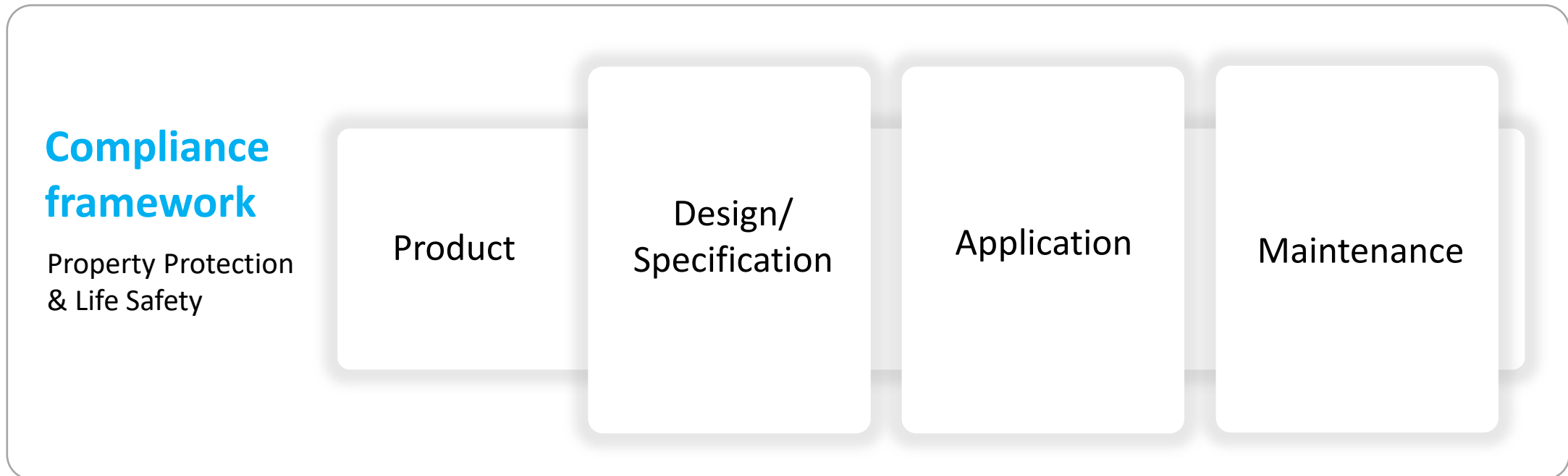


Product Ce

Product Compliance

At the stage of design/specification a systemic approach allows for different compliance pathways

– *Integrated Intumescent Coating System* –



Compliance Framework

Our approach at the design stage is aimed at decoding the system - using the 3 Cs

Deliver
CONTEXT

To attain the **system's inherent value** look at its purpose & ask the pertinent questions

Comprehension based on facts, not assumptions

Create
CLARITY

To reveal the **system's behaviour** pay close attention to details & crucial interactions

Evaluation based on dynamic, not static analysis

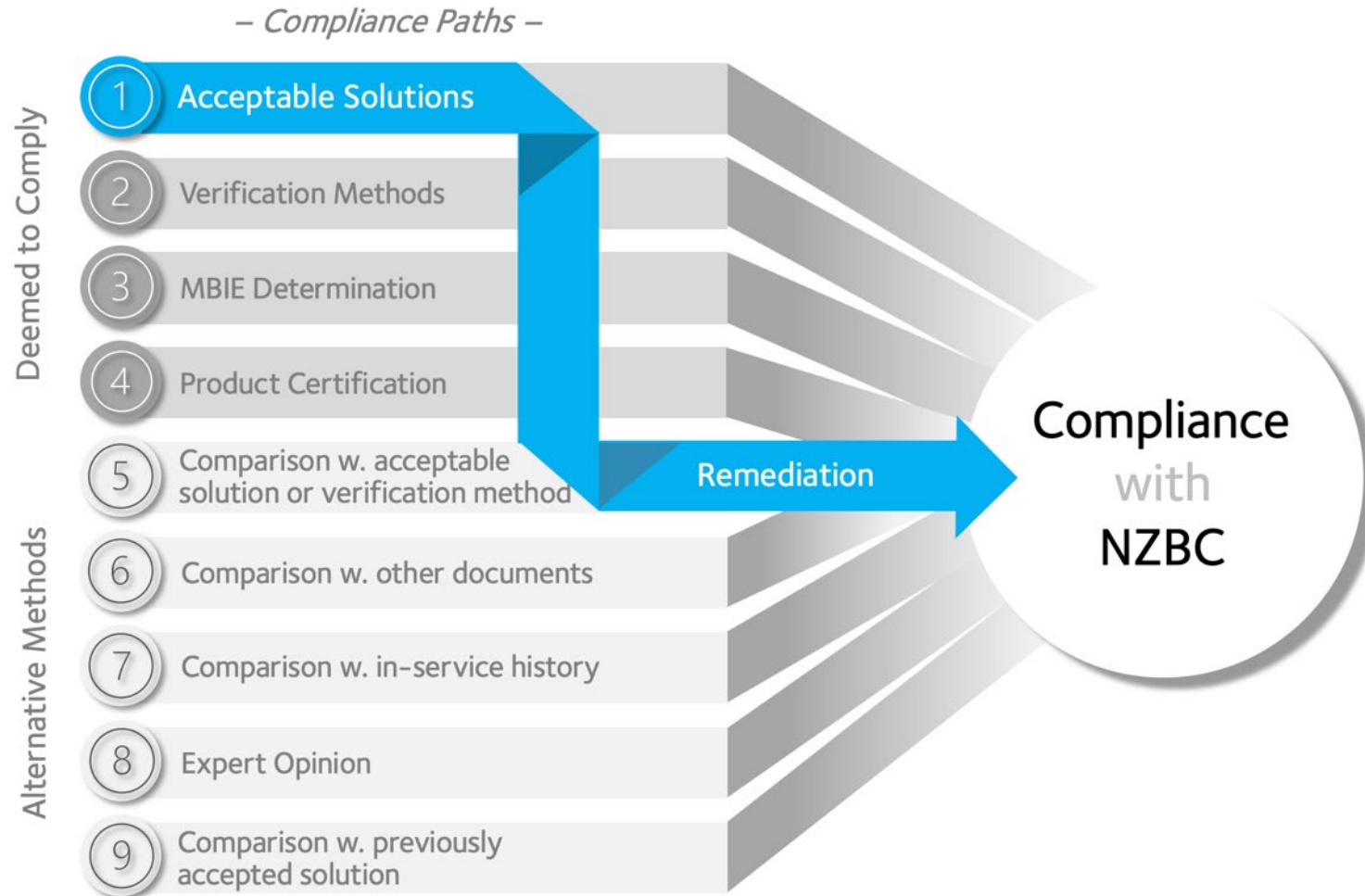
Provide
CONFIDENCE

To define **clear steps** to smart compliance use industry expertise and testing regimes

Design based on the whole, not the sub-parts

Design/Specification

Intumescent coating systems for the remediation of fire separating elements use an Acceptable Solution path

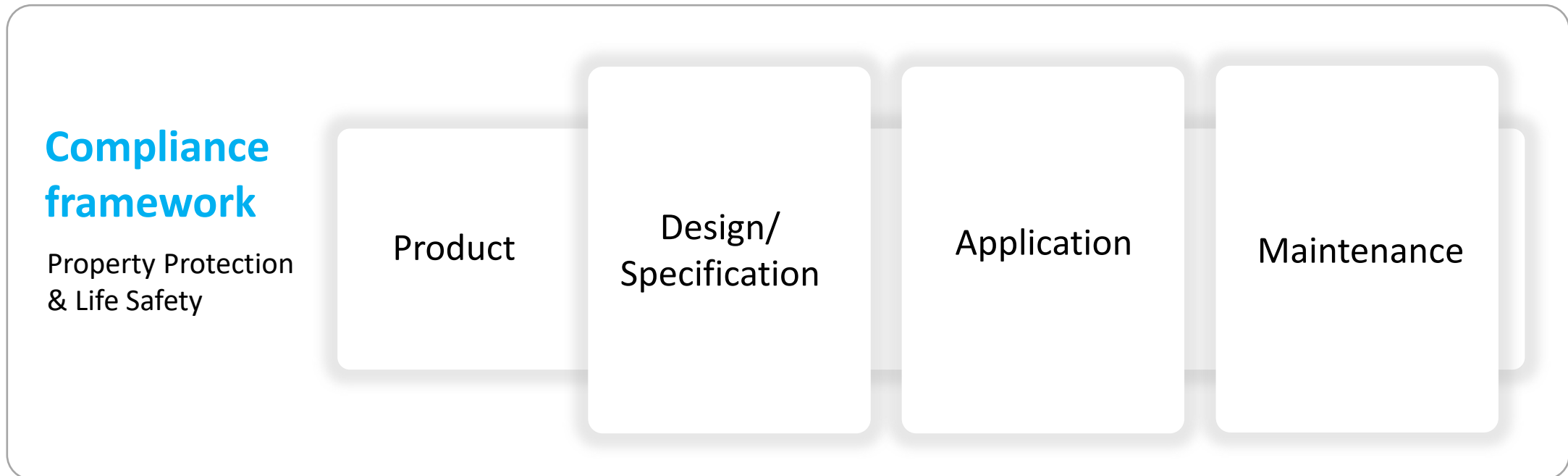


System Design

At the stage of application (construction), it is crucial to work with experienced & trained applicators



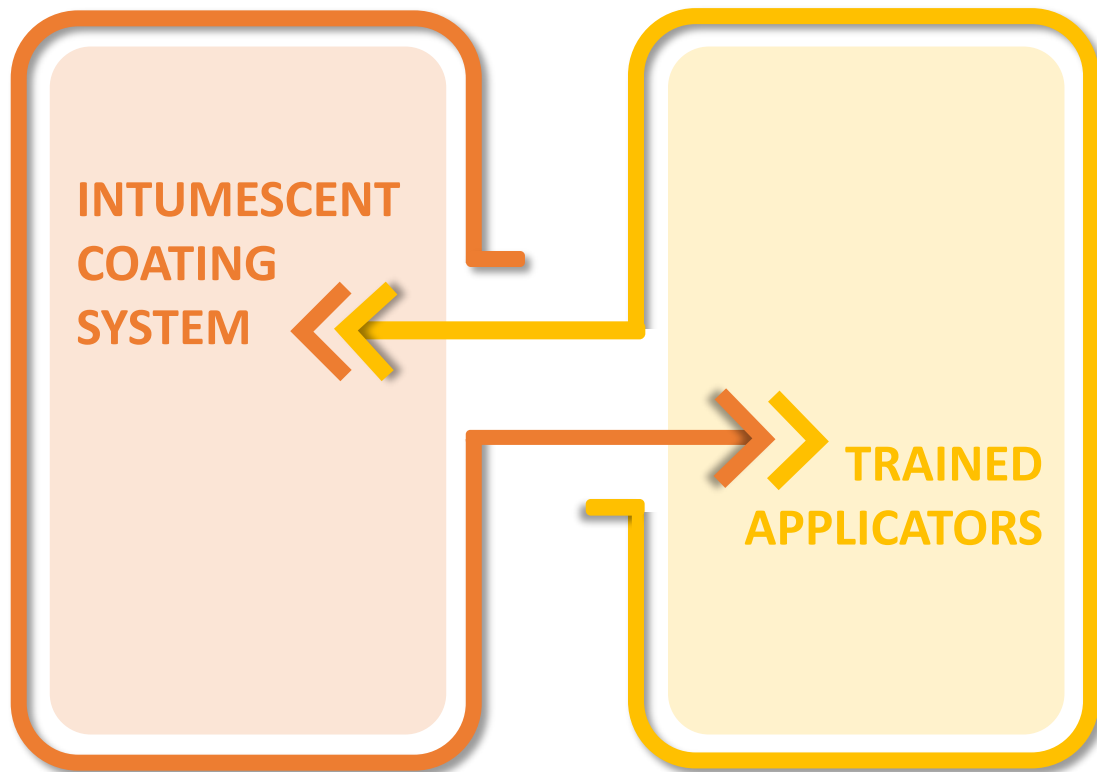
– *Integrated Intumescent Coating System* –



Compliance Framework

Trained applicators are an integral part of the system approach ensuring compliant installation

– Interconnected Elements –



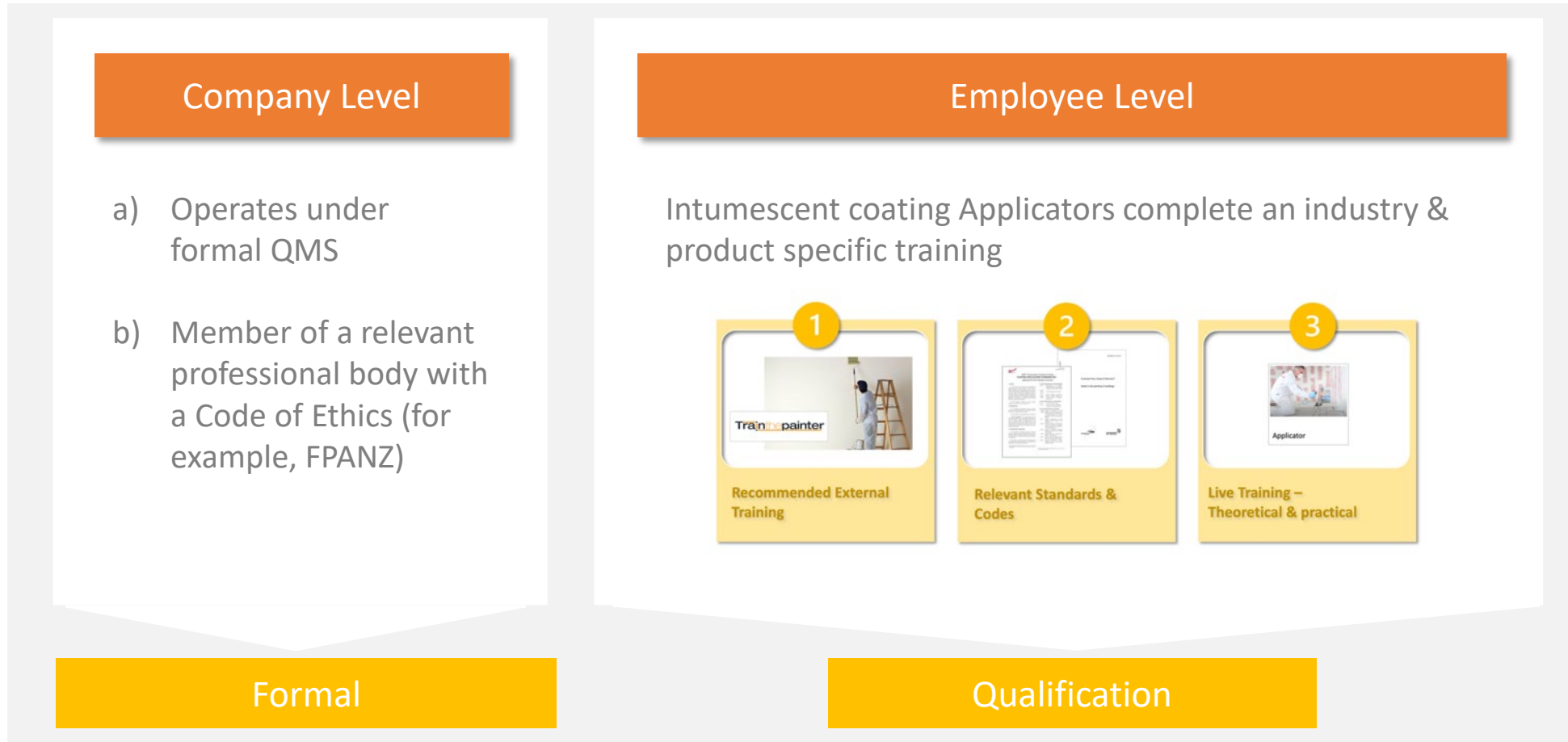
Intumescent Coatings should only be applied by **applicators** who know and understand

- the **practicalities** of coatings and their application
- provide the **necessary attention to detail**
- are **supported by a robust quality management** system

Application

Competency is important on two levels - the overall company and the employee level

– Competency Levels –



Application

Various professionals can contribute to accurate record keeping - an essential part of compliant installation work

– *Qualified Record Keeping* –

Coating work can

- extend over a lengthy period of time
- include several locations
- involve more than one applicator
- **be hidden** behind other building components

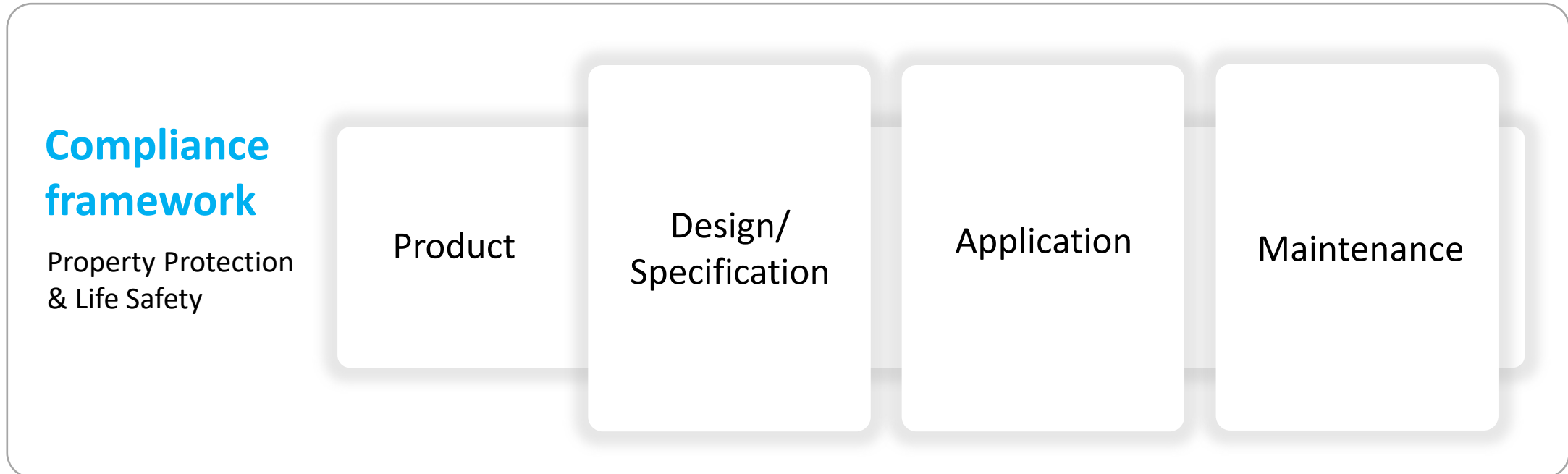


- Modern record-keeping apps
- Construction monitoring
- Third-party inspection

Application

Compliance during maintenance ensures that the system is also functioning as required after several years

– *Integrated Intumescent Coating System* –



Compliance Framework

Product & system inherent properties support the ease of maintenance compliance

– Product & System Properties –

– Objective –

Specified systems are designed **with the safety of building occupants in mind**

Product Properties

- **Inherent properties** like scrub & impact resistance, ease of repair etc.
- **Durability:** Impact of long-term environmental exposure tests

System Properties

- **Inspectors trained on the system** & adequate tools (ultrasonic gauge)
- **Modern app record keeping** (incl. maintenance & repairs)

Compliance during
Maintenance

Maintenance standards are an additional layer to regulate specified coating systems performance

– Focus –

Continual maintenance and inspections are of the highest priority

– Standard maintenance practices –

Certificates/ Statements

- Code Compliance Certificate
- Producer Statements (PS3 & PS4)

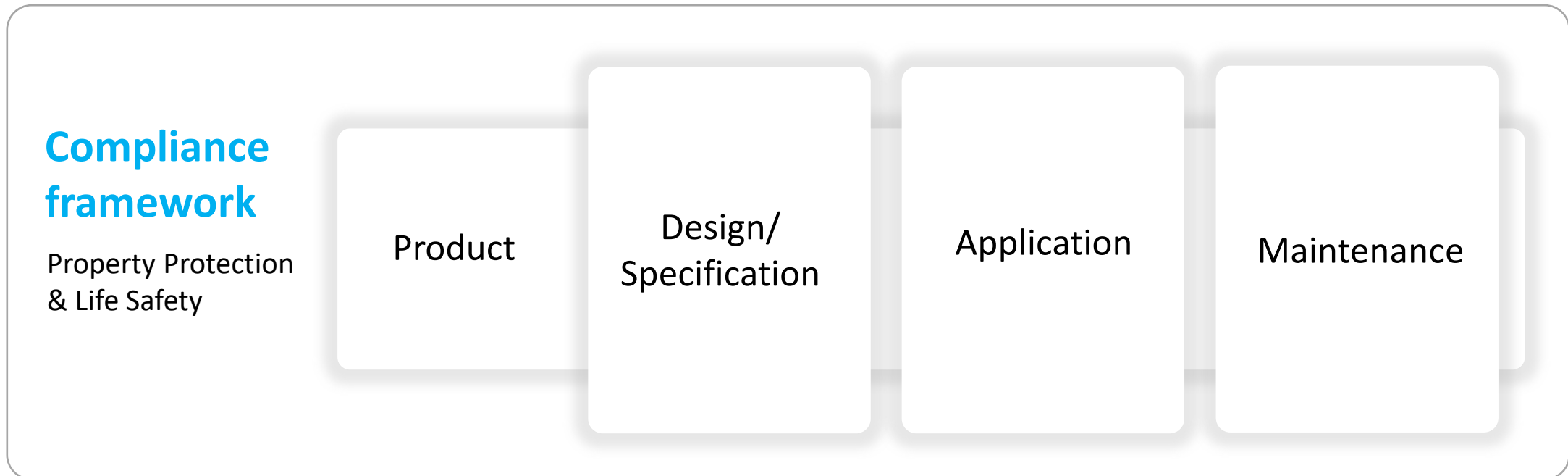
Maintenance Records

- **Owner's record keeping**
- **BWOF inspections**
(according to building compliance schedule)

Compliance during
Maintenance

A compliance framework based on system thinking ensures compliance that saves lives

– *Integrated Intumescent Coating System* –



Compliance Framework

Thank you for your attendance!



Overview: Compliance for our Intumescent Coating System

Product

Technical Information

- Technical Data Sheet
- Safety Data Sheet
- Product Data Sheet

Product Certification

- UL Certification
- ISO 10005

Independent Tests & Assessments

- By recognized IANZ accredited test labs

Quality Management System

System Design

System Thinking & 3C Approach

Compliance Pathways

- Research fire tests

Specification

(e.g., Fire Engineer)

Building Consent

COP for FPANZ

Possible:
construction monitoring

Application (Construction)

Licensing Applicator Company

Applicator Certification

- Application Manual & relevant standards
- Training

Quality Control App

- Clarinspect

Random third-party inspection

Construction monitoring

Maintenance

Code Compliance Certificate

Producer Statements

- PS3, PS4

Inherent System Properties

Performance/ Maintenance standards

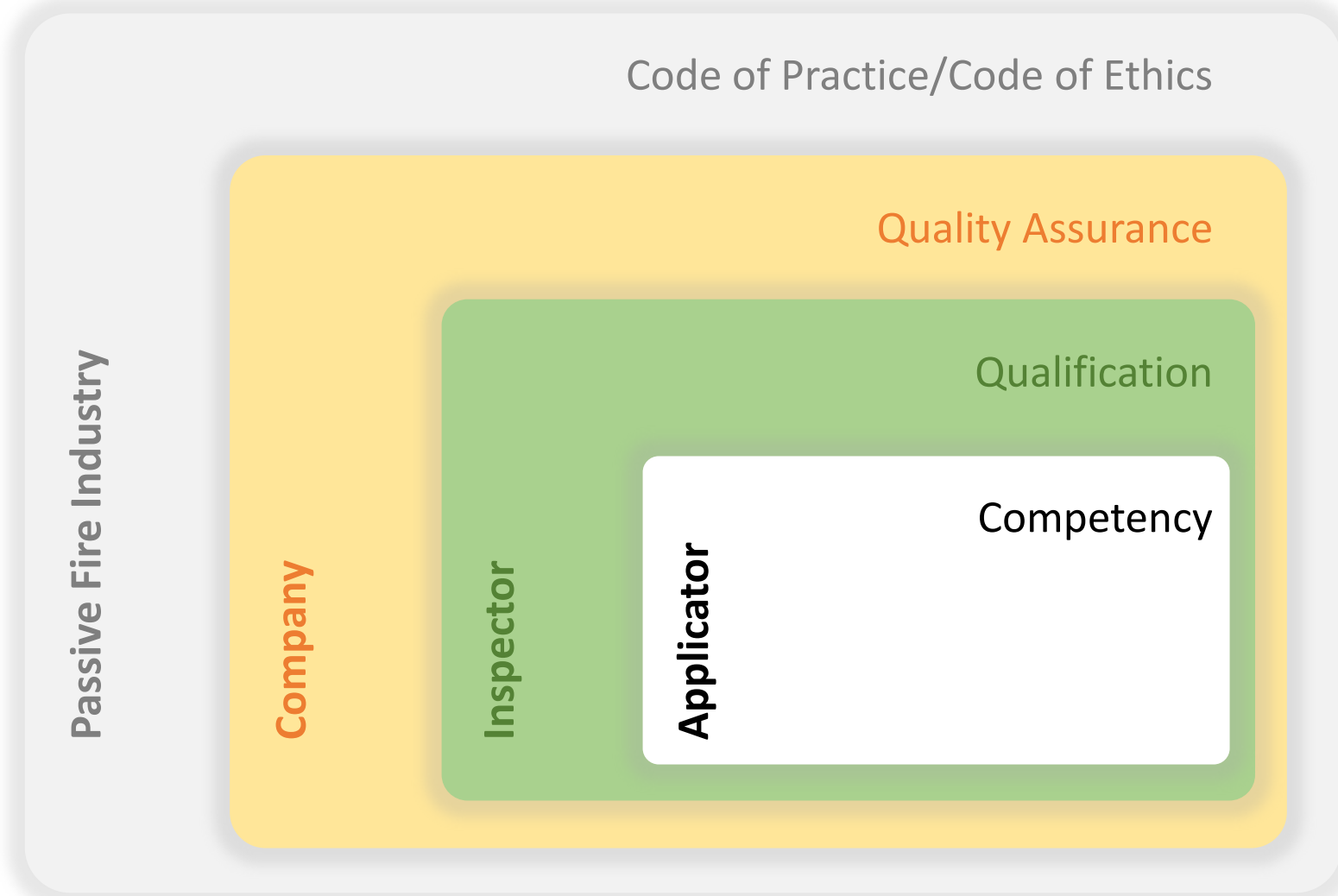
BWOF inspections
(according to building compliance schedule)

Record Keeping

- Clarinspect

Quality Assurance & Quality Control procedures

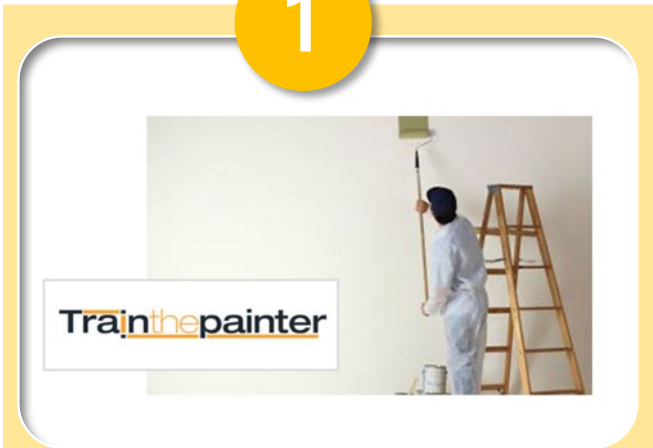
It is important to understand any applicator training as one part of a overall quality driven framework



Application

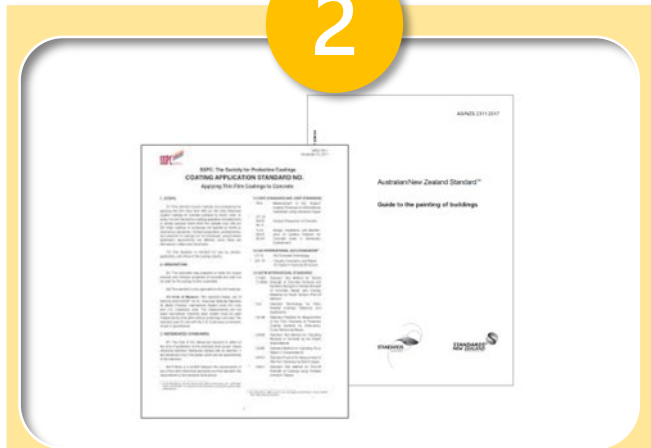
This approach includes external study & training prerequisites as well as live trainings

1



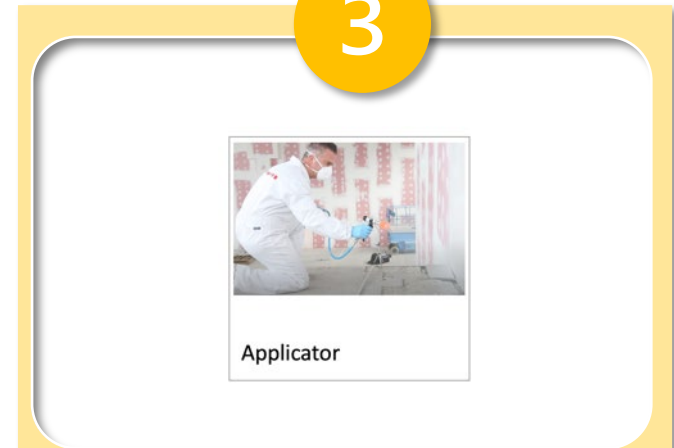
Recommended External Training

2



Relevant Standards & Codes

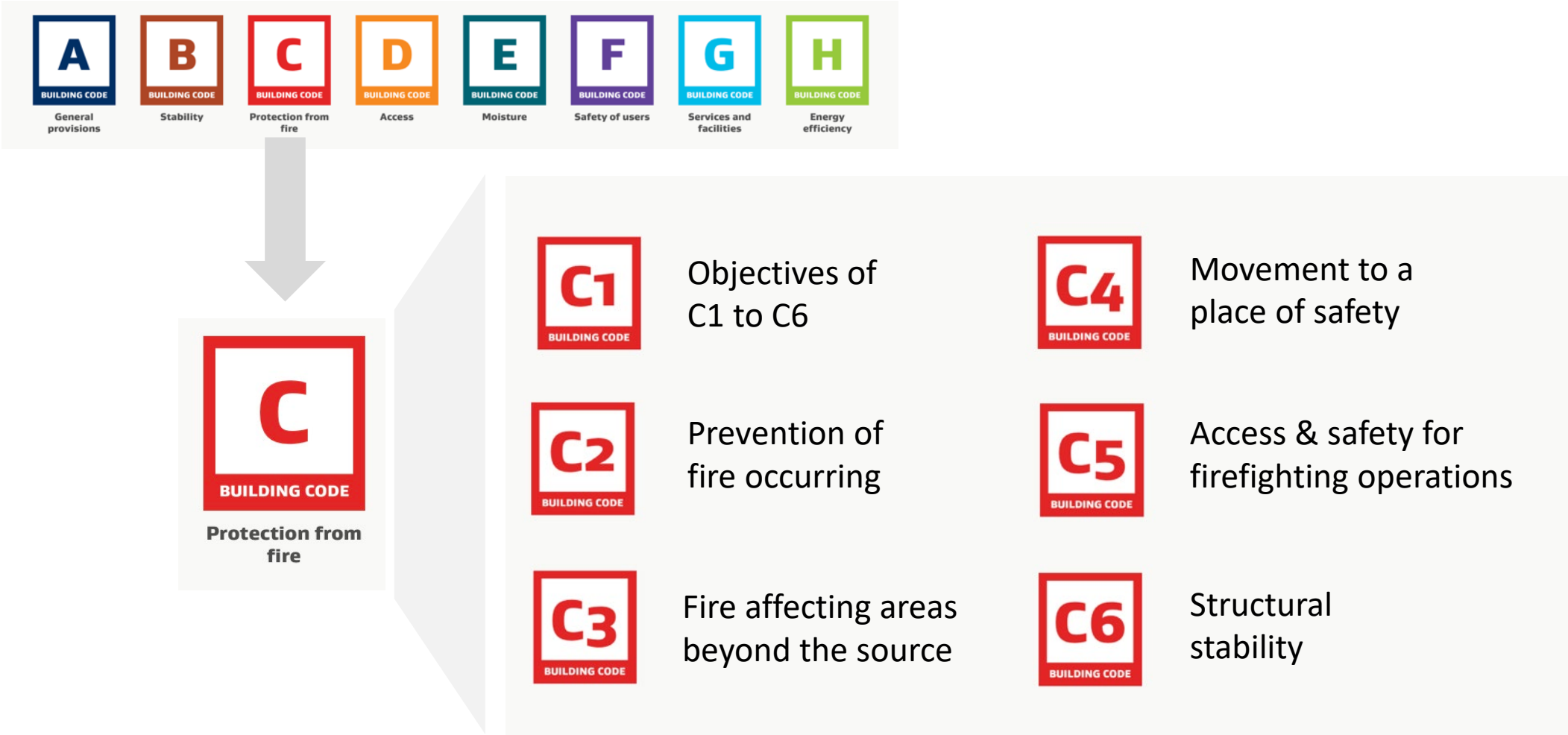
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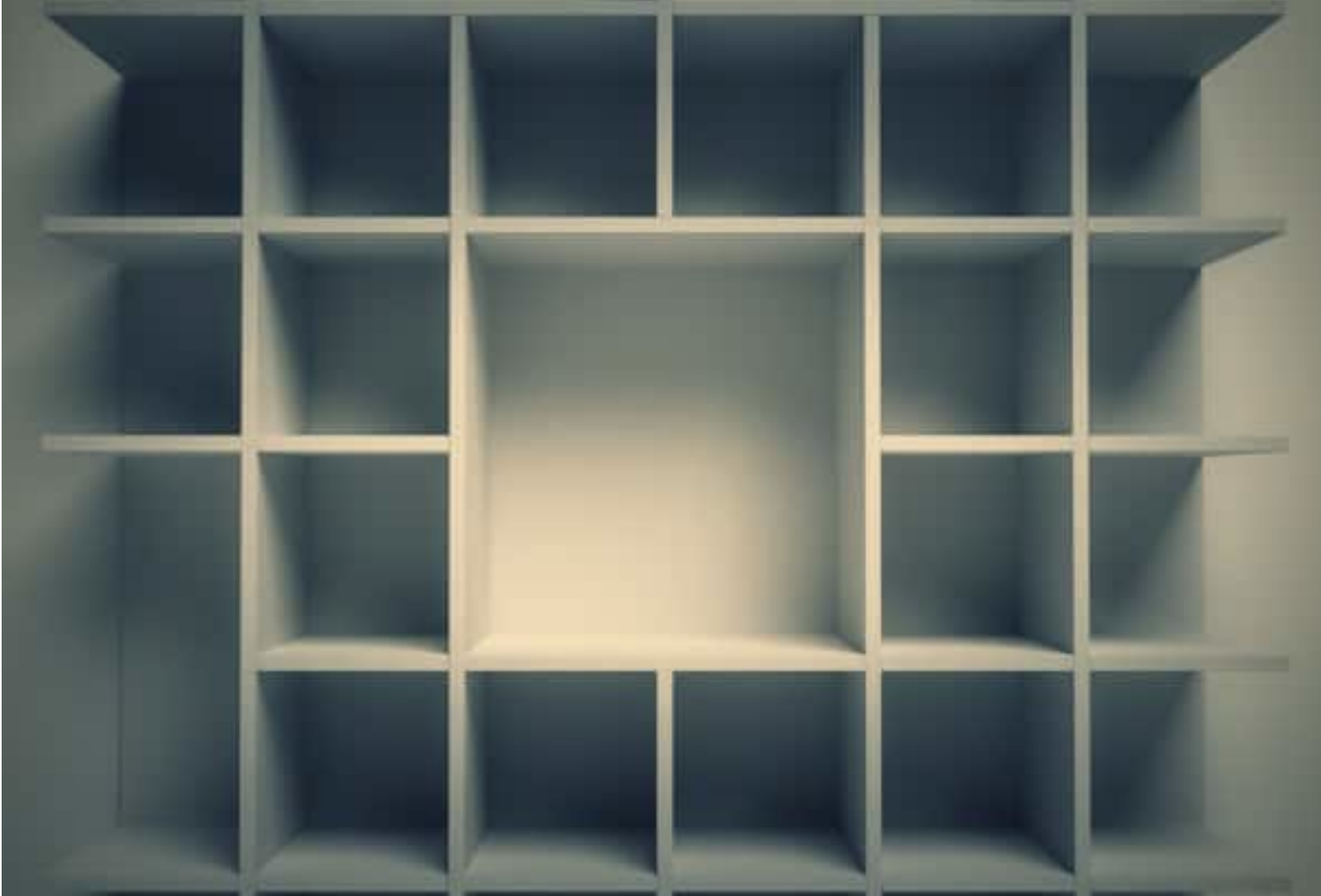
Live Training – Theoretical & practical

Application

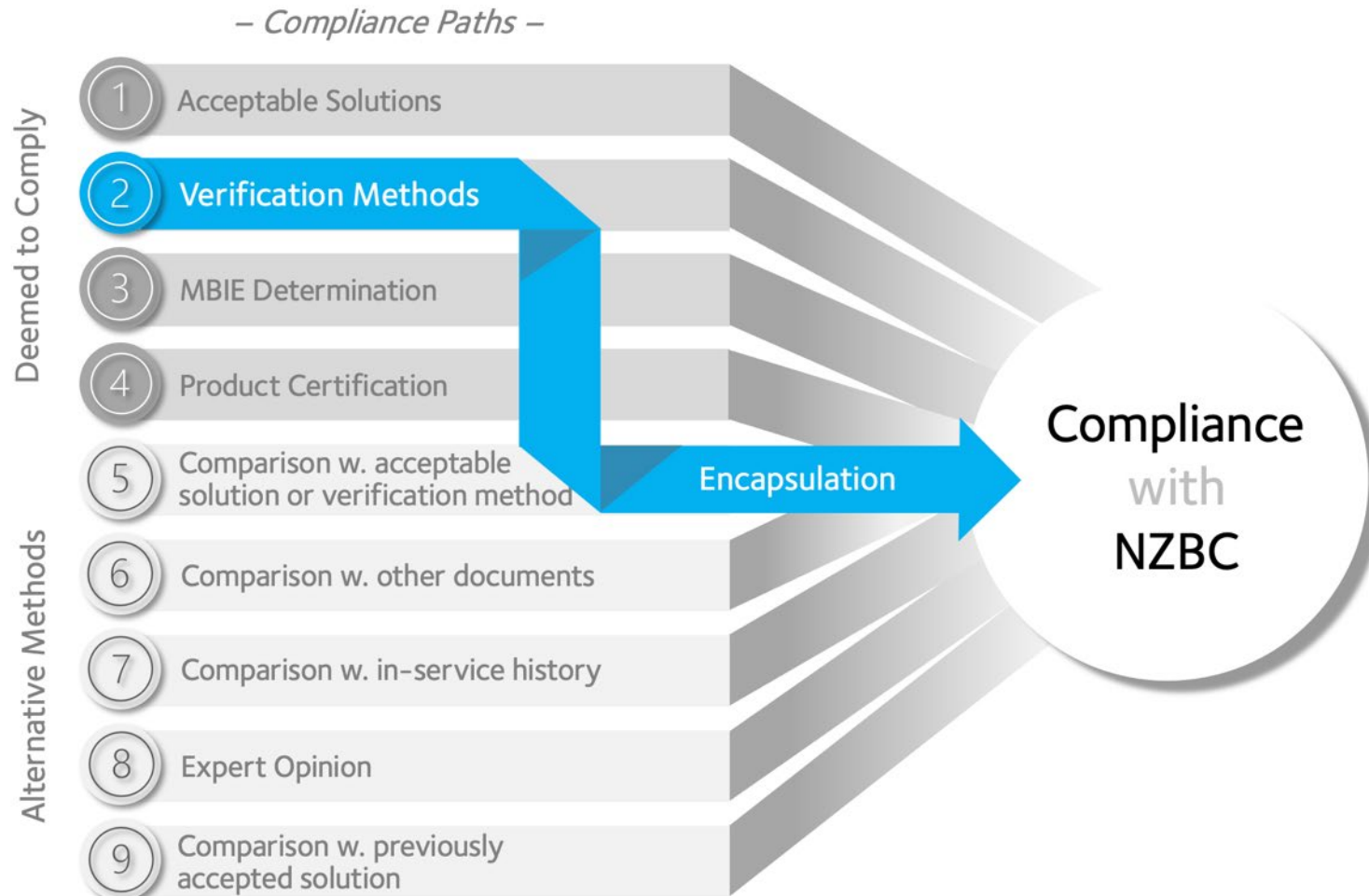
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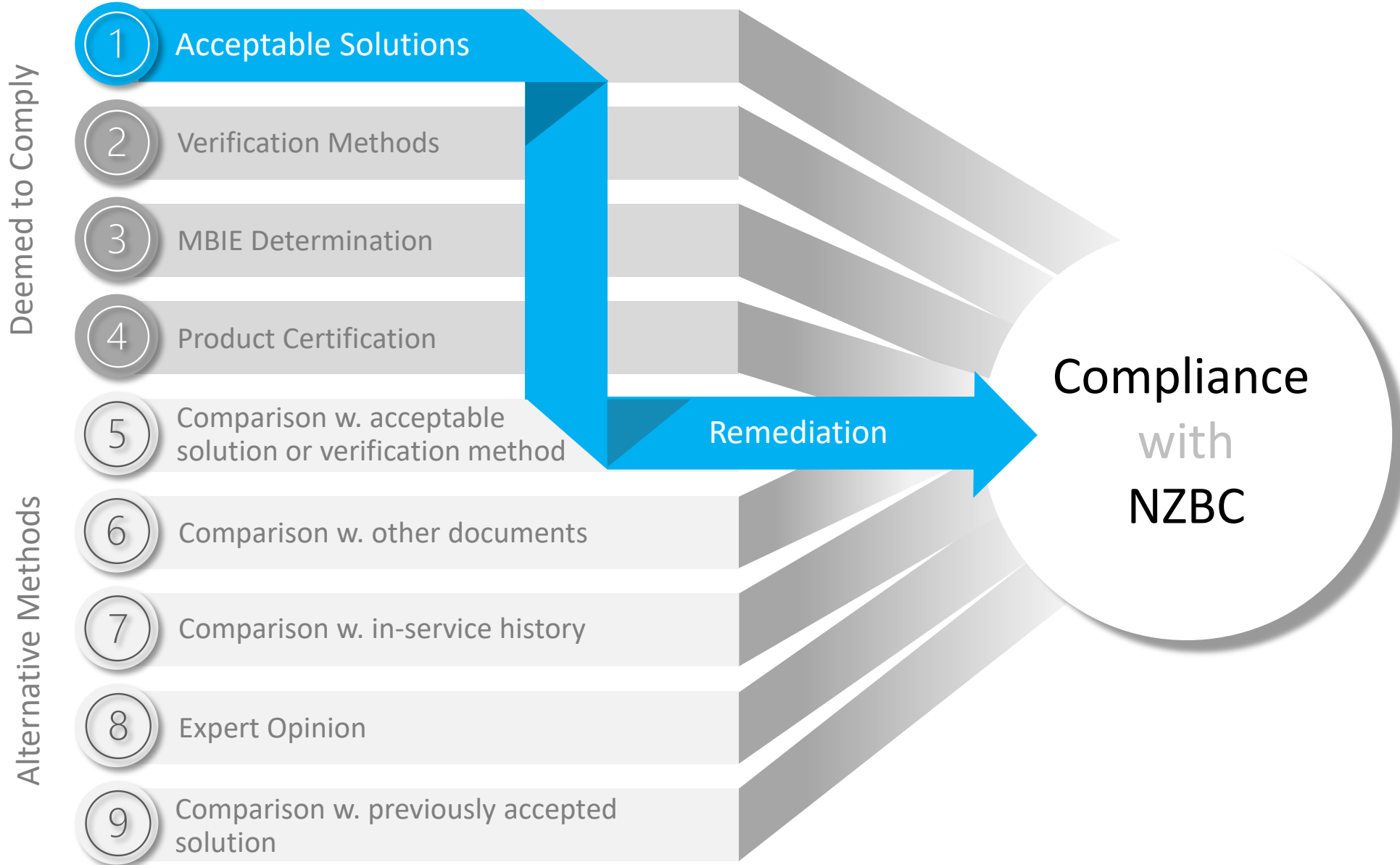
Compliance



Intumescent coating systems for encapsulation of mass timber use a Verification path



– Compliance Paths –



System Design

– Compliance Paths –

Deemed to Comply

- 1 Acceptable Solutions
- 2 Verification Methods
- 3 MBIE Determination
- 4 Product Certification
- 5 Comparison w. acceptable solution or verification method

Alternative Methods

- 6 Comparison w. other documents
- 7 Comparison w. in-service history
- 8 Expert Opinion
- 9 Comparison w. previously accepted solution

Encapsulation

Compliance
with
NZBC

System Design