IFSS INTERNATIONAL FIRE SAFETY STANDARDS

International Fire Safety Standards: Common Principles

Consultation document

Safe Buildings Save Lives

International Fire Safety Standards Coalition

1st edition

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Contents

Preface

On behalf of the members of the International Fire Safety Standards **Coalition** (IFSSC) we are pleased to present the *International Fire Safety Standards: Common Principles* (**IFSS-CP**) consultation document. The **Coalition** comprises organisations from around the world who have worked together positively, constructively and collaboratively to create a high-level overarching performance framework based on **Common Principles** for fire safety engineering design, construction, occupation and ongoing management.

The overall objective of **IFSS-CP** is to prevent injury and death from fire in the built environment and minimise the impact on communities, society and the natural environment. We recognise that the past and current practices and application of fire safety standards across the globe would benefit significantly from consistency in terms of a set of **Common Principles**.

IFSS-CP will improve transparency and shared understanding and reduce risk caused by a fragmentation of processes that can lead to safety gaps. We believe that the public, society, economy and environment will all be better served by a set of **Common Principles** and a fire safety framework implemented worldwide that can be supported through and by public education.

The **Coalition** accepts that standard setting is a never-ending process of continuous change and improvement. We will observe, assess and evaluate the use, application and impact of **IFSS-CP** and its **Common Principles** and revise them as needed.

The **Coalition** is continuing the important work of implementing **IFSS-CP** through engaging with governments, occupiers, owners and other important stakeholders. For further information on IFSS, please visit https://ifss-coalition.org/

Gary Strong

Chair, IFSS Coalition

IFSS Coalition

The **Coalition** was launched on 9 July 2018 at a meeting at the UN Economic Commission for Europe (UNECE). The **Coalition** is a group of professional, not-for-profit organisations responsible for researching, developing, publicising and implementing **IFSS-CP** globally for the construction and real estate sectors. The **Coalition** aims to bring about universal and consistent fire safety for our shared built environment globally, given that fire safety is a very high societal concern. This is to be achieved through the creation and adoption of **IFSS-CP**.

The **Coalition** did not identify any singular, pre-existing overarching fire safety principles that would be suitable for adoption on a worldwide basis and would work in conjunction with other guidelines.

Following the establishment of the **Coalition**, members confirmed that they were committed to creating the **IFSS-CP** and encouraging world markets to accept and adopt this holistic approach as the primary overarching framework for fire safety engineering design, construction, occupation and ongoing management in every jurisdiction across the world. **IFSS-CP** supports and endorses the UN sustainable development goals.

Following the publication of **IFSS-CP**, the **Coalition** members may choose to issue further technical guidance to their members on the adoption and implementation of **IFSS-CP** within their local market(s). The **Coalition** has begun liaising with governments and other stakeholders at a project, local, regional, state, national, supranational and international level to seek adoption of the **IFSS-CP**. The **Coalition** members at the date of publication include:

- ABC – Association of Building Compliance (NZ)
- ACAI – Association of Consultant Approved Inspectors
- AEEBC – The Association of European Experts in Building and Construction
- AMCA – Air Movement and Control Association International
- API – Australian Property Institute
- APS – Association for Project Safety
- ASFP – Association for Specialist Fire Protection
- BAFE – British Approvals for Fire Equipment
- BCA – Building Control Alliance
- BSSIG – Building Surveyors Special Interest Group (South Africa)
- CABE – Chartered Association of Building Engineers
- CASLE – Commonwealth Association of Surveying and Land Economy
- CEBC – Consortium of European Building Control bodies
- CFPA-Asia – Confederation of Fire Protection Associations – Asia
- CIAT – Chartered Institute of Architectural Technologists
- CIBSE – Chartered Institution of Building Services Engineers
- CIOB – Chartered Institute of Building
- CIRIA – Construction Industry Research and Information Association

- CTBUH – Council on Tall Buildings and Urban Habitat
- CTIF – International Association of Fire & Rescue Services
- Efectis
- EFSA – European Fire Safety Alliance
- Engineers Australia
- EPIC – Engineering Panels in Construction
- FIA – Fire Industry Association
- FIG – Federation International de Geometre
- FPA – Fire Protection Association
- FPA Australia – Fire Protection Association Australia
- FSEU – Fire Safe Europe
- FSF – Fire Sector Federation
- HKIS – Hong Kong Institute of Surveyors
- ICC – International Code Council
- IFE – Institution of Fire Engineers
- IFMA – International Facility Management Association
- IMA – Insulation Manufacturers Association
- IWFM – Institute of Workplace and Facilities Management
- IPREA – Institute of Philippine Real Estate Appraisers
- LABC – Local Authority Building Control
- Modern Building Alliance
- NFIA – National Fire Industry Association (Australia)
- NFPA – National Fire Protection Association
- NHBC – National House Building Council
- NIFHA – Northern Ireland Federation of Housing Associations
- NZIBS – New Zealand Institute of Building Surveyors
- PAM – Malaysian Institute of Architects
- PIMA – Polyisocyanurate Insulation Manufacturers Association
- RIBA – Royal Institute of British Architects
- RICS – Royal Institution of Chartered Surveyors
- RMIT University
- RTPI – Royal Town Planning Institute
- SCDF – Singapore Civil Defence Force
- SCSI – Society of Chartered Surveyors Ireland
- SFPE – Society of Fire Protection Engineers
- SGSA – Sports Ground Safety Authority
- SIA – Singapore Institute of Architects
- SIBL – Singapore Institute of Building Ltd
- The World Bank
- Underwriters Laboratories Inc
- United Nations

IFSS Standards Setting Committee

In recognition that developing the actual **Common Principles** would require the work and experience of experts in this field, the **Coalition** established a Standards Setting Committee (**SSC**) to create **IFSS-CP**. The **SSC** was formed on 6 December 2018 and was commissioned by the **Coalition** with the following aims and objectives:

- to research existing relevant fire safety principles and fire codes for **Buildings** to identify current good practice and to evaluate deficiencies in markets, and thereby establish different market needs
- to produce a conceptual framework to guide the drafting and understanding of **IFSS-CP** in the future. The conceptual framework will have the following key aims:
  - to establish a common set of internationally accepted **Common Principles** for fire safety aspects of engineering design, construction, occupation and ongoing management. It will be relevant to all real estate classes and all regions and nations regardless of the differing political, economic, social, technological, legal and environmental (PESTLE) differences between jurisdictions
  - to address the primary concern of life safety from fire, though future editions of **IFSS-CP** may also deal with property protection, the impact on communities and the environment and societal loss of a **Building** (e.g. environmental impact, existential loss, contents, heritage, operations) and
  - to create a framework that will allow comparisons to be made on a like-for-like basis across countries globally and within the EU.
- to link **IFSS-CP** to the International Ethical Standards, the UN sustainable development goals and other relevant International Standards that exist.

The **SSC** is comprised of a cross-section of technical experts from 18 countries with a combined expertise covering over 100 different markets. The **SSC** acts independently of the **Coalition** and its members. At the time of publication, the **SSC** members include:

Chair: Timothy Neal FRICS (UK)

Executive secretary: Alexander Aronsohn FRICS (UK)

- Professor Sam Allwinkle (UK)
- Martin Conlon FRICS (UK)
- Bob Glendenning (UK)
- Kevin Hughes (UK)
- Daniel Joyeux (France)
- Dr Ales Jug (Slovenia)
- William Koffel (USA)
- Susan Lamont (France)
- James Lane (UK)
- Birgitte Messerschmidt (USA)
- Armelle Muller (France)
- Greg Payne (Australia)
- Frances Peacock (UK)
- Benjamin Ralph (UK)
- Malcom Sharp (UK)
- Dwayne Sloan (USA)
- Dr Graham Smith (UK)
- Martin Taylor MRICS (UK)
- Robert Thilthorpe (UK)
- Beth Tubbs (USA)
- Jeff Wood (Australia)

Definitions

For the purposes of **IFSS-CP**, the following terms are defined as indicated below.

Building

An independent structure forming part of a property.

Coalition

The International Fire Safety Standards Coalition, comprising not-for-profit organisations each with a public interest mandate.

Common Principles

A common set of internationally accepted **Common Principles** for fire safety aspects of engineering design, construction, occupation and ongoing management. The **Common Principles** are relevant to all real estate classes and all regions and nations regardless of the differing political, economic, social, technological, legal or environmental differences between jurisdictions. The **Common Principles** are:

- **Prevention**
- **Detection and Communication**
- **Occupant Protection**
- **Containment** and
- **Extinguishment**.

Communication

The activation of mechanisms and alarms resulting from the detection of fire to alert all occupants and the fire service to the presence of fire.

Containment

Limiting of fire and all of its consequences to as small an area as possible.

Detection and Communication

Investigating and discovering of fire followed by informing occupants and the fire service.

Escape

The egress of occupants from a **Building**.

Evacuation

The procedures and processes used to enable people to leave a **Building**.

Extinguishment (also known as Fire Control)

Suppressing of fire and protecting of the surrounding environment.

IFSS-CP

International Fire Safety Standards: Common Principles.

IFSS-CP Framework

The collective application of the **Common Principles**. It enables evidence-based

assessment to achieve fire safety engineering design, construction, occupation and ongoing management on a **Building** level.

Occupant Protection

Facilitating occupant avoidance of and escape from the effects of fire.

Person Responsible (also known as Responsible Person)

The person responsible for fire safety in the **Building** (the duty-holder), usually the owner, landlord, developer or appointed building safety manager.

Prevention

Safeguarding against the outbreak of fire and/or limiting its effects.

Property Life Cycle

The stages that make up the life cycle of a **Building**. These are:

- stage 1 – design
- stage 2 – construct
- stage 3 – in use
- stage 4 – change and
- stage 5 – demolish.

SSC

The Standards Setting Committee (**SSC**) appointed by the IFSSC to develop global standards for fire safety.

Part 1 Introduction

1.1 Context

The complex interrelationships between fire and mankind transcend international borders and disciplinary boundaries. The science of fire knows no geographical or political limits. Over time we have learned fundamental fire safety principles for preventing fire events and managing their impact (i.e. the **Common Principles**: **Prevention**, **Detection and Communication**, **Occupant Protection**, **Containment** and **Extinguishment**) that can be consistently applied internationally. It is tragedy that has often compelled legislative changes – to continue in such a way is an abnegation of responsibility of first magnitude.

As the growth in global population drives towards greater urbanisation, more people are living in higher density, high-rise developments containing numerous uses and occupancy types. At the same time, our urban areas are encroaching on wildland spaces, creating increased areas of risk for wildland-urban and semi-urban interface fires.

New and emerging technologies pose electrical and other challenges that could initiate fires in ways that have never been seen before. New **Building** materials and systems are regularly introduced into the marketplace and are in need of assessment relative to their fire performance. Another challenge is the growing attention to **Building** envelope performance – including thermal performance, air leakage, permeability, water infiltration, etc. In some areas, this is even driven by changes to local codes and regulation.

This has led to the proliferation of combustible insulation products with higher thermal properties and the use of materials to accomplish these additional **Building** performance characteristics. Climate change and the push for more sustainable construction also bring challenges to our built environment, and societies need to become more resilient to change and disruption.

In response to all of these challenging factors, construction products, processes and technologies continue to evolve. They aim to improve cost, business efficiency, quality, customer satisfaction, environmental performance, sustainability and the predictability of delivery timescales, but bring with them new fire safety challenges.

Much is known about the phenomena and effects of fire, as well as what needs to be done to protect people, property and the environment from the destructive effects of fire. This knowledge, however, is not shared as effectively as it could be. A connected and more consistent approach will yield considerable benefits and improve our ability to:

- respond to events
- monitor ongoing developments
- anticipate future threats and opportunities and
- learn from past failures and successes.

At present, the many contrasting approaches and requirements across the world have resulted in significant variations in the design, approval, construction methods, products

and operation of **Buildings**. This is due to local architecture and traditions and responses to local disasters. Hence a disaster experienced in one area has not necessarily impacted the codes and standards in other areas when relevant.

In some cases, certain regions or nations may not have their own **Building** regulatory documents and may depend on national and international references for the design and regulation of **Buildings** (e.g. the International Building Code (IBC) or the National Fire Protection Association (NFPA)). This is a valid and often necessary approach, but some caution is necessary to ensure that fire safety issues are fully addressed in the local context.

The development of a common understanding of **Building** design, construction and management and how the impact of fire affects these will help to build trust and confidence among the many and varied actors, including the public and banks, ultimately underpinning an improved quality of life and increased investment in line with UN sustainable development goals.

Fire safety relates to UN sustainable development goals 3, 4, 8, 9, 11, 12, 13, 16 and 17:

Figure 1: Applicable UN sustainable development goals

Sharing knowledge of the principles of fire safety that have been adopted around the globe represents an important opportunity to educate stakeholders and improve protection for people and **Buildings** from the risk of fire and could help drive improvements in safety in both developed and developing economies.

IFSS-CP primarily focuses on the information required for life safety from fire and aims to minimise the social and economic impact of fire on communities.

Future editions of **IFSS-CP** shall address wider issues such as **Building** preservation for communally and societally important **Buildings** and critical infrastructure, land administration, land governance, land policy, land reform and land tenure.

1.2 Fire safety and education

Appropriately targeted education of stakeholders is a powerful means to develop a culture of fire safety awareness throughout the built environment. Developing and maintaining that culture is complementary to the implementation of **IFSS-CP**.

Implementing **IFSS-CP** will in many cases identify knowledge gaps that education will be required to fill. Those will include education in, about and in support of **IFSS-CP** of and by design and construction practitioners, **Building** and facility managers, developers and owners, firefighters and the general population.

Information and awareness programs underpinning **IFSS-CP** will need to be developed to reach the community in residences, workplaces and educational establishments, so that the population has the ability to make informed decisions throughout the life of **Buildings** and their interaction with them as practitioners, managers or occupants.

1.3 Using other international standards

The **IFSS-CP** project incorporates the UN sustainable development goals (see section 1.1) and the following international standards:

- *International Ethics Standards*: *An ethical framework for the global property market* (IES): IES asserts and sustains the critical role of ethics in professional practice to meet the needs of the global market in maintaining public trust and confidence.
- *International Construction Measurement Standards: Global Consistency in Presenting Construction and Other Life Cycle Costs* (ICMS): ICMS establishes standards for the construction costs of **Buildings**.
- *International Property Measurement Standards* (IPMS): IPMS establishes standards for measuring the floor areas of **Buildings**.
- *International Financial Reporting Standards* (IFRS): IFRS is the international financial reporting standard produced by the International Accounting Standards Board and has been adopted by over 130 countries around the world as the basis for financial reporting.
- *International Valuation Standards* (IVS): IVS is the international valuation standard for businesses, real estate and financial instruments and has also been globally adopted.

Part 2 Common Principles overview

IFSS-CP establishes overarching, performance-based **Common Principles** for fire safety engineering design, construction, occupation and ongoing management. The adoption of **IFSS-CP** will help protect people, property and contents and the environment from the destructive effects of fire.

The following figure shows the interaction between laws, regulations, codes and standards and how the **Common Principles** outlined in this document can apply at each stage.

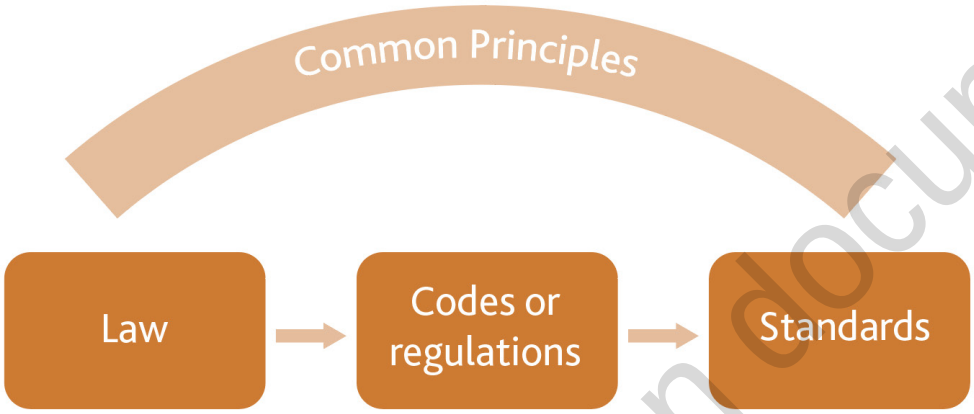

Figure 2: Interaction of Common Principles with law, codes or regulations and standards

2.1 The Common Principles

In all stages of a **Building's** lifecycle, sufficient measures shall be taken to implement the following five **Common Principles**:

1. **Prevention** – Safeguarding against the outbreak of fire and/or limiting its effects.
2. **Detection and Communication** – Investigating and discovering of fire followed by informing occupants and the fire service.
3. **Occupant Protection** – Facilitating occupant avoidance of and escape from the effects of fire.
4. **Containment** – Limiting of fire and all of its consequences to as small an area as possible.
5. **Extinguishment** – Suppressing of fire and protecting of the surrounding environment.

IFSS-CP is intended to be flexible and non-prescriptive so that it can be adopted incrementally and will also advance good practice.

2.2 Aims of the Common Principles

The **Coalition** directed that **IFSS-CP** shall:

- serve the public interest
- be primarily concerned with life safety from fire
- establish a common set of internationally accepted, performance-based **Common Principles** for fire safety and
- create a framework that will allow comparisons to be made on a like-for-like basis across countries.

The **Coalition** advocates that the adoption of **IFSS-CP** will among other things:

- protect people in and around **Buildings**
- provide safe access and egress for firefighters
- allow for harmonisation of **Common Principles** and good practice
- be accessible to all relevant parties, commensurate with allowing robust comparisons to be made
- complement local and regional standards wherever possible
- accommodate the need for periodic innovation, refinement, updating and changes
- recommend a standard reporting format, where appropriate
- support the development of consistent language and terminology for the worldwide and increasingly mobile professions involved in fire safety
- enable global comparisons and benchmarking and provide a system benchmark for international good practice and
- support education and training in fire safety and fire safe design and construction to increase awareness among the population.

In practice, it is expected that **IFSS-CP** shall be adopted incrementally and systematically and that it is capable of being used in all markets and jurisdictions in conjunction with existing standards.

2.3 From the Common Principles to the IFSS-CP Framework

The **Common Principles** become actionable through the **IFSS-CP Framework**, which enables evidence-based assessment to achieve fire safety engineering design, construction, occupation and ongoing management on a **Building** level. The **IFSS-CP Framework** is the collective application of the **Common Principles**, which apply to different stages in the **Property Life Cycle**.

As a result, **IFSS-CP** can either be used at government/regulatory level for making laws, codes/regulations and standards, or at an individual level for evaluating the international fire safety measures within a specific **Building** project at each stage of the **Property Life Cycle**.

The **IFSS-CP Framework** is an important first step in achieving consistent fire safety design and management in real estate during design, construction, use, change and demolition. It works with existing international, supranational and national standards to provide the basis for improving existing processes and to achieve greater transparency and consistency within and between jurisdictions.

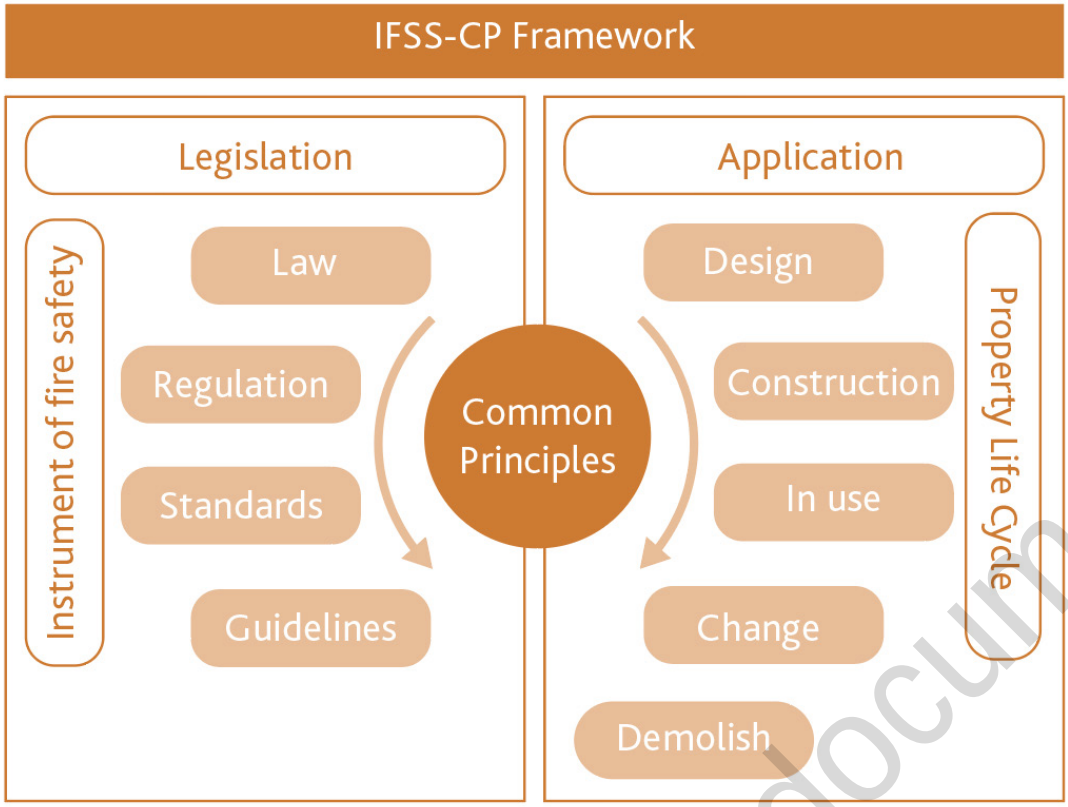

Figure 3: IFSS-CP Framework

IFSS-CP is relevant to individuals and communities and may be used by any person with influence over the **Building's** fire safety arrangements.

IFSS-CP may assist in numerous circumstances, including:

- community expectations
- life safety/protection from fire
- control and fire **Prevention**
- asset protection (**Building** vs. contents vs. people)
- mission continuity
- environmental safeguarding
- insurance particulars
- **Containment** to avoid third-party loss
- structural fire safety (avoiding **Building** collapse, especially in high-rise cities)
- spatial planning
- minimising the impact of fire on communities to aid community resilience
- public education
- control and **Prevention** of fire and smoke spread and
- firefighting infrastructure.

2.4 Property Life Cycle and IFSS-CP Framework

IFSS-CP applies the **Common Principles** at each stage of the **Property Life Cycle**, which can be explained in the following five stages:

- stage 1 – design
- stage 2 – construct
- stage 3 – in use
- stage 4 – change and
- stage 5 – demolish.

The five **Common Principles** shall be considered at each of these stages within the **Property Life Cycle** and are explained in detail in Part 3.

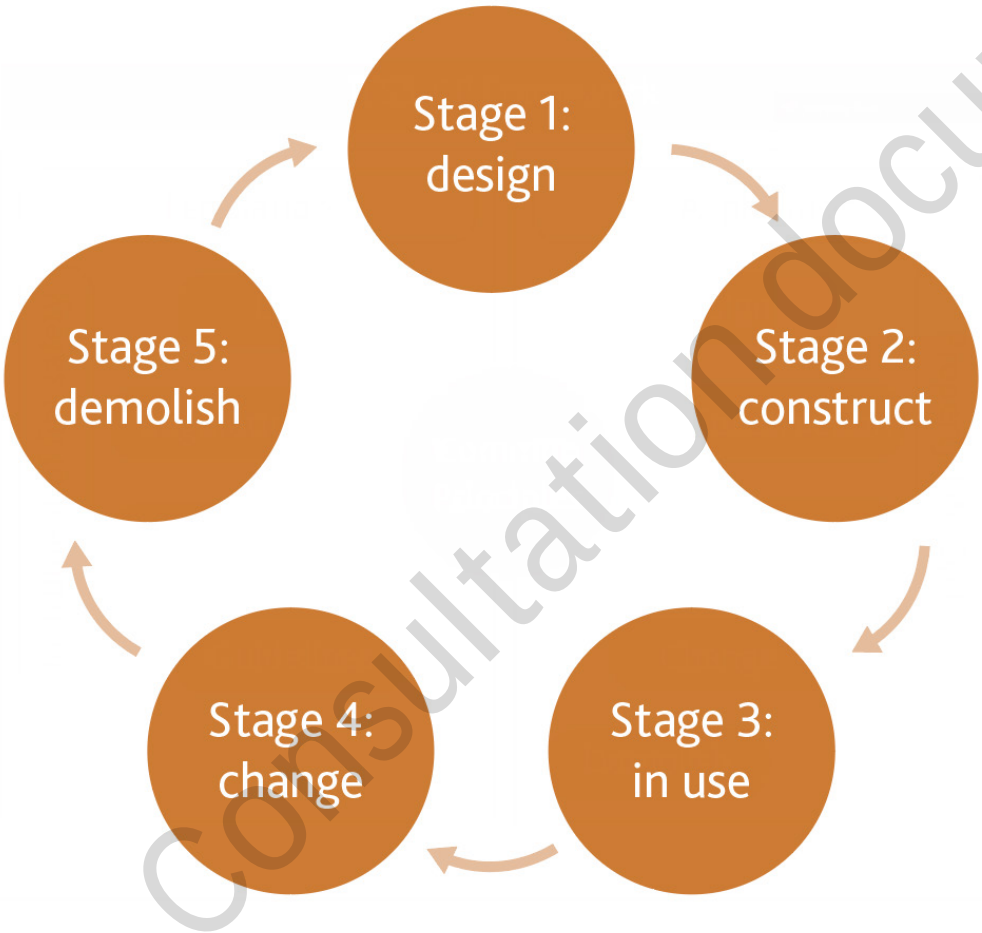

Figure 4: Property Life Cycle

2.5 Documentation requirements

During an assessment under the **IFSS-CP Framework**, it is important that an adequate degree of documentation is prepared and retained for the duration of the **Property Life Cycle**.

The following list includes the type of information to be retained on file for the **Building** or in the report, subject to the **IFSS-CP Framework**:

- purpose of the instruction (fire safety engineering design, construction, occupation and ongoing management, etc.)
- date of the instruction
- name and address of the parties to the instruction
- address of the **Building**
- **Building** description – supplemented by plans/photos/digital clerk of work (drone) filming
- signature, complete with date, of the **Person Responsible**
- academic qualifications/professional qualifications and licence/registration number (if applicable, or appropriate competency/experience) as applicable in the local jurisdiction and
- appendix containing information used, referenced or relied on including author, date, purpose and methodology.

References should also be retained, including their date of creation, the author, their method of creation and any limitations.

2.6 Information requirements

In some instances, the information required to complete and update the five **Common Principles** may also need to be derived from multiple different sources. Depending on the circumstances, some aspects of this information may not be available. The information relied on and used must remain relevant and shall be certified, validated and qualified.

IFSS-CP may also operate in jurisdictions without sufficient or functioning fire safety codes, regulations or principles. Where this is the case, it will still provide the parties and their professional advisers with a framework for fire safety in which information can be collected, verified and disclosed.

The referencing of all information is to enable current and future users to identify exactly what information was used and/or relied on to compile the assessment.

Compliance with **IFSS-CP** requires that all information sources compiled for the **IFSS-CP Framework** are disclosed. Where known, the information shall be clearly referenced and have the following attributes stated in the final report:

- the date the information was created and subsequently updated
- the source and provenance of the information creator/author
- the original purpose for which the information was created
- how the original information was compiled
- any limitations or exclusions in the information
- any assumptions made and how these are to be managed and validated and
- the adequacy of the **Common Principles**.

Part 3 Fire safety measures and strategies

3.1 The Common Principles

These five **Common Principles** shall be considered at each stage of the **Property Life Cycle**:

1 **Prevention** – Safeguarding against the outbreak of fire and/or limiting its effects.

2 **Detection and Communication** – Investigating and discovering of fire followed by informing occupants and the fire service.

3 **Occupant Protection** – Facilitating occupant avoidance of and escape from the effects of fire.

4 **Containment** – Limiting of fire and all of its consequences to as small an area as possible.

5 **Extinguishment** – Suppressing of fire and protecting of the surrounding environment.

Each **Common Principle** is assigned equal importance and for each **Common Principle** listed in the **IFSS-CP Framework** users shall do the following, where applicable:

- incorporate facilities or procedures to address the **Common Principle** appropriate to the situation in accordance with a recognised code or principles and
- ensure that each **Common Principle** meets local regulatory requirements and is compatible with the code or principles selected.

3.2 Applying Common Principles to the Property Life Cycle

Each of the five **Common Principles** shall be reviewed at each stage of the **Property Life Cycle**.

Each **Property Life Cycle** stage represents a distinct phase and the next stage cannot be commenced before the **IFSS-CP Framework** process is accepted and completed for the previous stage in the order of priority set out below:

- design (planning stage)
- construct
- in use
- change and
- demolish.

The potential causes of fires and how the **Common Principles** relate are reviewed at each stage of the **Property Life Cycle**.

3.3 Achieving the Common Principles

Like many complex systems, fire safety measures in the built environment interact with each other at many different levels. While a holistic view is the ultimate goal of

the **IFSS-CP Framework**, it is useful to focus on each **Common Principle** and consider which fire safety measures and strategies will meet its objectives.

In many cases, a fire safety measure or strategy that is able to assist in meeting the objectives of a particular **Common Principle** will also assist in meeting those of other **Common Principles**. It is not the intention of the **IFSS-CP Framework** to restrict a particular fire safety measure or strategy to being cited as meeting the objectives of only one **Common Principle**. Rather, the intention is to ensure that the objectives of each **Common Principle** are shown to be met by the most appropriate range of fire safety measures and strategies and that the fire safety measures and strategies which best meet the objectives of each **Common Principle** are identified.

For example, while passive fire-rated **Building** elements are an important measure in containing fire and its effects, active suppression systems such as automatic sprinklers can also assist with **Containment** – both by protecting passive elements and by controlling fire growth.

3.3.1 Prevention principle

The assessment of risks and proposed fire protection measures should take into account recognised causes of fire, including:

- arson
- electrical fires
- accidental fires (e.g. through cooking, smoking, candles, bonfires, chemical spills, etc.)
- explosions (e.g. through gas, fireworks, terrorism, war, etc.) and
- natural causes (e.g. lightning strikes, wildfires, etc.).

At every stage of the **Property Life Cycle**, measures must be established within the **IFSS-CP Framework** process to prevent the occurrence of fire. With fire **Prevention**, the aim is to prevent and stop fires from happening. The **Prevention** principle has four goals:

- life safety from fire
- property damage **Prevention**
- protection of operations and
- public education.

To be successful, fire **Prevention** shall be considered at each stage of the **Property Life Cycle** and the **Building** shall be designed, constructed, used, changed and demolished so as to eliminate as far as reasonably practicable the outbreak of fire due to natural or human causes. This will include control of ignition sources and management of potential fuel sources. A proactive challenge culture can support this premise by asking 'what if?' type questions and providing room to consider failure modes of fire systems so that the defence in terms of the **Building's** resilience to fire is properly understood.

The fire safety measures and strategies listed in each stage of the **Property Life Cycle** shown below are indicative only; there may be additional fire safety measures and strategies that are necessary to add to this list or are required for legal or regulatory reasons.

Stage 1: design

This stage involves assessing risks and evaluating appropriate fire **Prevention** measures at the planning stage. The following fire safety measures and strategies must be considered:

- arson **Prevention**
- electrical safety
- product safety
- installation of materials and contents (fire/ignition resistance)
- smoking
- fuel and oxygen (flammable materials, etc.)
- natural and man-made disasters such as wildfires, terrorism and war
- process accidents (e.g. chemical spills), etc. and
- adjacent hazards.

Stage 2: construct

This is applicable to the site personnel and the structure on which they are working. Risks and fire protection measures applicable to the construction stage should also consider the fire safety measures and strategies identified and applied to stage 1. In addition, the following fire safety measures and strategies must be considered:

- security (to prevent intruders who may deliberately or accidentally start a fire)
- waste control and disposal
- storage of materials and storage of flammable substances
- control of all items stored or being used on site (those posing a fire risk should be highlighted and given specific fire protection)
- assessment of high-risk procedures such as welding and grinding (hot work permit/ controls)
- exposed flammable materials due to different stages of construction and
- primary and secondary sources of ignition.

Stage 3: in use

Fire risk assessment and fire **Prevention** measures while the property is in use should take into consideration all fire safety measures and strategies from stage 1. They must reflect the actual situation at the property. In addition, the following fire safety measures and strategies must be considered:

- briefing occupants on fire **Prevention** – e.g. hot work processes
- briefing occupants on safe **Evacuation** principles
- smoking controls
- electrical equipment safety and
- identification of potential hazards such as hoardings or easily ignited materials.

Stage 4: change

Fire risk assessment and fire **Prevention** measures while the property is subject to change should take into consideration all fire safety measures and strategies from stage 1 and, as relevant, stage 2. This includes soft changes and physical **Building**

changes such as changes to car parks, waste processing plants and plant and equipment upgrades.

Stage 5: demolish

This is applicable to the site personnel and the structure on which they are working. Risks and fire protection measures applicable to the demolition stage should also consider the fire safety measures and strategies identified and applied to stages 1 and 2. In addition, the following fire safety measures and strategies must be considered:

- security (to prevent intruders who may deliberately or accidentally start a fire)
- safe storage and disposal of discarded materials
- designated storage areas for waste materials well away from sources of ignition
- an inventory of all items stored or being used on site (those posing a fire risk should be highlighted and given specific fire protection) and
- assessment of high-risk procedures such as use of cutting equipment.

3.3.2 Detection and Communication principle

At every stage of the **Property Life Cycle** measures must be established within the **IFSS-CP Framework** to aid good **Communication** among all relevant stakeholders and between systems to prevent a fire or to minimise the impact of a fire. Furthermore, should an outbreak of fire occur, it should be, where relevant, automatically detected and the occupants and other agencies alerted by the **Communication** methods agreed as safe in the circumstances. Automatic systems shall be initiated and external agencies informed.

The fire safety measures and strategies listed in each stage shown below are indicative only; there may be additional fire safety measures and strategies that are necessary to add to this list or are required for legal or regulatory reasons.

Stage 1: design

The following fire safety measures and strategies must be considered at the planning stage:

- automatic **Detection** systems
- automatic **Communication** systems
- internal geometry
- sight lines
- spatial layout/wayfinding
- voice alarm systems
- **Building** configuration
- spatial layout/geometry
- warning activations
- operating suppression systems
- staff training/continual education
- fire brigade **Communication** and smoke control.

Stage 2: construct

The following fire safety measures and strategies must be considered:

- **Detection** systems
- fixed and mobile **Communication** system strategies
- site offices
- warning activations
- operating suppression systems
- temporary fire safety systems
- phased implementation of permanent systems
- fire brigade **Communications**
- language barriers and
- signage.

Stage 3: in use

The following fire safety measures and strategies must be considered:

- inspection
- testing and maintenance of all fixed and mobile **Communication** systems
- staff training/continual education – particularly where manual alarms are present
- system impairment procedures and
- compatibility of new materials with the existing system.

Stage 4: change

As stage 1, plus consideration of the following fire safety measures and strategies:

- design (this also includes the site offices)
- signage
- inspection, testing and maintenance of all **Communication** systems and
- appropriateness of existing systems to changed **Building** layout and use.

Stage 5: demolish

As stage 2, but it should be considered that suppression systems are likely to have been decommissioned and not offer the previous protection.

3.3.3 Occupant Protection principle

At every stage of the **Property Life Cycle** measures must be established within the **IFSS-CP Framework** to enable the safe movement of all occupants to a safe location. In case of fire, the occupants shall have the time and the opportunity to reach a place of safety before being adversely affected by the products of combustion.

The fire safety measures and strategies listed in each stage shown below are indicative only; there may be additional fire safety measures and strategies that are necessary to add to this list or are required for legal or regulatory reasons.

Stage 1: design

The following fire safety measures and strategies must be considered at the planning stage:

- fire signs and fire notices
- protocols
- **Building** configuration
- means of egress and potential restrictions en route (e.g. shared **Escape** and logistical corridors, mezzanine and gantry headroom, narrow walkways, etc.)
- travel distances
- time to egress (time to start to move and movement time)
- fire/smoke barriers
- simultaneous **Evacuation**
- phased **Evacuation**
- protect in place
- progressive horizontal **Evacuation**
- final exit and stair capacities
- merging population flows
- corridor widths
- crowd control
- predicted behavioural response
- rescue
- assembly points
- refuge areas
- **Evacuation** lifts
- emergency lighting
- **Escape** lighting
- automatic smoke control
- self-rescue equipment
- awareness of outside assistance requirements (for disabled people) and
- coordination with fire brigade.

Stage 2: construct

As stage 1 (wherever relevant), plus consideration of the following fire safety measures and strategies:

- number and type of workers
- other personnel and their roles
- **Evacuation** plans
- staff training and accreditation
- security guards
- work procedures carried out by site personnel
- ability to rescue
- trained operatives

- change control and **Communication** procedures with respect to phased completion of **Escape** routes or temporary impairment
- regular walk-downs and
- monitoring.

Stage 3: in use

The following fire safety measures and strategies must be considered:

- training and preparation of occupants/residents/staff for **Escape** and **Evacuation**
- designated fire wardens
- good housekeeping related to **Escape**
- inspection, testing and maintenance of all fire systems
- procedures for extraordinary use or circumstances such as large gatherings or egress path impairment and
- coordination with fire brigade.

Stage 4: change

As stages 1, 2 or 3, as relevant, underpinned where practicable by a fire safety assurance workshop. An increase in the number of occupants or a change in the ability of occupants to **Escape** (e.g. disabled people, children, the elderly) shall be taken into account to adapt the occupant egress conditions. A modification of **Escape** routes (length, width, etc.) shall be studied.

Stage 5: demolish

As stage 2, including consideration of the following fire safety measures and strategies:

- number and type of workers
- other personnel and their roles
- **Evacuation** plans
- staff training and accreditation
- security guards and
- work procedures carried out by site personnel.

The temporary modifications of **Escape** routes shall be communicated to the workers and occupants.

3.3.4 Containment principle

At every stage of the **Property Life Cycle** measures must be established within the **IFSS-CP Framework** to ensure that fire and smoke spread is contained to prevent a threat to life and aid **Extinguishment**. Furthermore, in case of fire, the products of combustion and the effects of fire shall be limited to the smallest area practicable via a combination of fire-rated construction, smoke control and/or suppression as agreed in the **Building**-specific **IFSS-CP Framework**.

The fire safety measures and strategies listed in each stage shown below are indicative only; there may be additional fire safety measures and strategies that are necessary to add to this list or are required for legal or regulatory reasons.

Stage 1: design

At the planning stage, both passive and active systems should be considered, including the following fire safety measures and strategies:

- selection of materials and contents (fire resistance and growth)
- linings (surface spread of flame and reaction to fire characteristics)
- compartmentation (fire door and shutter sets, fire-rated glazing, ductwork and dampers, fire barriers, firestopping, etc.)
- suppression (all supporting systems)
- structural fire protection
- smoke hazard management
- automatic smoke control
- smoke lobbies
- external fabric of the **Building** (cladding) and
- distance between **Buildings** and services.

Stage 2: construct

The following fire safety measures and strategies must be considered:

- phasing construction
- installation of materials
- compartmentation
- use suppression (all supporting systems) and
- structural fire protection planning (especially with timber-framed **Buildings**).

Stage 3: in use

The following fire safety measures and strategies must be considered:

- inspection
- testing and maintenance of all **Containment** systems and
- training and preparation of occupants/residents/staff for **Containment** and good housekeeping related to **Containment**.

Stage 4: change

As stage 1, plus consideration of the following fire safety measures and strategies:

- phasing construction
- installation of materials
- compartmentation
- use suppression (all supporting systems)
- structural fire protection
- inspection and
- training and preparation of occupants/residents/staff for **Containment** and good housekeeping related to **Containment**.

Stage 5: demolish

As stage 2.

3.3.5 Extinguishment principle

At every stage of the **Property Life Cycle**, measures must be established within the **IFSS-CP Framework** to aid **Extinguishment** and protect the surrounding environment. In the event of a fire provisions shall be made for it to be extinguished by the occupants, outside agencies and/or automatic systems as efficiently as possible.

The fire safety measures and strategies listed in each stage shown below are indicative only; there may be additional fire safety measures and strategies that are necessary to add to this list or are required for legal or regulatory reasons.

Stage 1: design

The following fire safety measures and strategies must be considered at the planning stage:

- environmental protection
- access and facilities for the fire brigade (people and vehicles)
- automatic suppression
- dry risers
- wet risers
- water supply
- lifts
- lobbies
- fire extinguishers
- manual firefighting equipment
- digital **Building** information
- availability of firefighters and awareness of outside assistance required and
- adjacent hazards and proximity of proposed construction to existing built environment, including considerations for interfacing or shared facilities.

Stage 2: construct

The following fire safety measures and strategies must be considered:

- environmental protection
- access and facilities for the fire brigade (people and vehicles)
- temporary suppression
- dry risers
- wet risers
- water supply
- vertical access
- lobbies
- temporary fire extinguishers
- manual firefighting equipment
- site information
- availability of firefighters and
- outside assistance.

Stage 3: in use

The following fire safety measures and strategies must be considered:

- inspection, testing and maintenance of all **Extinguishment** systems
- training and preparation of occupants and residents/staff
- good housekeeping related to **Extinguishment** systems and
- liaison with fire and rescue services.

Stage 4: change

As stage 1, plus consideration of the following:

- inspection, testing and maintenance of all **Extinguishment** systems
- training and preparation of occupants and residents/staff
- good housekeeping related to **Extinguishment** systems
- liaison with fire and rescue services and
- appropriateness of existing systems and equipment to changed **Building** layout and use.

Stage 5: demolish

- As stage 2.

Part 4 IFSS-CP Framework

The **IFSS-CP Framework** articulates the functions, life span characteristics and attributes of fire safety in **Buildings**. It can be used to determine general and specific functions (**Building** and management), hierarchies, competencies, knowledge and skills. **IFSS-CP** has been designed for policy makers, professionals and others to ensure that they have considered the full breadth, depth and range of fire safety measures and strategies at each stage of the **Property Life Cycle**.

The steps to complete the **IFSS-CP Framework** are as follows:

1 Complete the summary checklist on the following page and the applicable checklists in the Appendices. Enter the details, date of recording and whether there is any documentary support and, if so, what form this takes.

2 Review the **Prevention** principle (see Part 3) to establish how accurate/reliable the information is within that **Common Principle** overall. Then use a traffic light system to report where the information comes from at every stage of the **Property Life Cycle**. Green (G) indicates high quality information, yellow (Y) indicates disputed or questionable information and red (R) indicates no information or unreliable information. This is a general indication of the possibility that the information relied on within the **IFSS-CP Framework** may not be up to date, may differ from an objective assessment, may have questionable content, may come from a source that is difficult to verify or may not exist (intrusive verification works might also be required).

   This subjective assessment should be cross-examined in a fire safety assurance workshop, attended by suitably qualified and experienced personnel with decision-making powers and who are accountable for exercising such powers.

3 Repeat steps 1 to 2 above for each **Common Principle** and fire safety measure and strategy within the **IFSS-CP Framework**.

4 Disseminate all the information collected and delegate, as required in the circumstances, for competent persons to examine the **Common Principles** and fire safety measures and strategies. Act on the information as appropriate and make a holistic judgement on the overall safety risk of the **Building(s)**.

5 The overall risk assessment should be identified as high, medium or low risk, and should be reviewed with the owner, regulator or other parties as appropriate. The risk assessment will entail continual reviews of the existing or new design, construction, management and demolition proposals.

Common Principle	Fire safety measures and strategies	Property Life Cycle stage	Information	Information provenance (R/Y/G)
Prevention	See Appendix A, Table A1	Stage 1: design		
	See Appendix A, Table A2	Stage 2: construct		
	See Appendix A, Table A3	Stage 3: in use		
	See Appendix A, Table A4	Stage 4: change		
	See Appendix A, Table A5	Stage 5: demolish		
Detection and Communication	See Appendix B, Table B1	Stage 1: design		
	See Appendix B, Table B2	Stage 2: construct		
	See Appendix B, Table B3	Stage 3: in use		
	See Appendix B, Table B4	Stage 4: change		
	See Appendix B, Table B5	Stage 5: demolish		
Occupant Protection	See Appendix C, Table C1	Stage 1: design		
	See Appendix C, Table C2	Stage 2: construct		
	See Appendix C, Table C3	Stage 3: in use		
	See Appendix C, Table C4	Stage 4: change		
	See Appendix C, Table C5	Stage 5: demolish		
Containment	See Appendix D, Table D1	Stage 1: design		
	See Appendix D, Table D2	Stage 2: construct		
	See Appendix D, Table D3	Stage 3: in use		
	See Appendix D, Table D4	Stage 4: change		
	See Appendix D, Table D5	Stage 5: demolish		
Extinguishment	See Appendix E, Table E1	Stage 1: design		
	See Appendix E, Table E2	Stage 2: construct		
	See Appendix E, Table E3	Stage 3: in use		
	See Appendix E, Table E4	Stage 4: change		
	See Appendix E, Table E5	Stage 5: demolish		

Table 1: IFSS-CP Framework summary checklist

Part 5 Accountability and verification

5.1 Accountability

In order for the **IFSS-CP Framework** to operate effectively there must be an element of accountability and responsibility in terms of who fills it in. In many instances, there may be a number of key players involved in the different stages of the **IFSS-CP Framework**, including the client, principal designer, principal constructor and the maintainer/user.

In some countries, accountability and responsibility is addressed through a market desire for fire safe **Buildings**, but in others a more restrictive regulatory approach may be necessary. There are other triggers, such as insurance, which may assist in driving safety outcomes. In some cases, such as after a major fire loss, accountability and responsibility are more readily addressed due to the willingness to avoid similar outcomes. However, it is often the case that the memory of such events fades and a lack of understanding of the risk subsequently returns. The key is that the regulatory culture and education must be well understood when establishing fire safety provisions to ensure they will be successfully implemented and maintained over time.

The accountability and responsibility for the contents of the **IFSS-CP Framework** primarily lies with the owner, duty holder or owner representative, **Building** certifier or the occupant in terms of maintenance of any fire safety systems or equipment.

5.2 Verification process

A good verification process must include the following:

- accountability (it must be comprehensive and visible)
- competency (e.g. qualification, assessment, regulation, validation and certification)
- quality assurance (i.e. validation and/or verification) and
- review cycle (i.e. in use and code cycle).

In addition, in order for the **IFSS-CP Framework** verification process to be carried out effectively, the following parties shall be involved to ensure that there is no conflict of interest:

- **Responsible Person** (i.e. controlling mind)
- independent certifier and
- verifier (e.g. society's representative/fire brigade/**Building** official).

Contents – IFSS-CP Framework

Appendix A Example Prevention checklists

Prevention principle – stage 1: design		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Arson prevention		
Electrical safety		
Product safety		
Installation of materials and contents (fire/ignition resistance)		
Smoking		
Fuel and oxygen (flammable materials, etc.)		
Natural and man-made disasters such as wildfires, terrorism and war		
Process accidents (e.g. chemical spills), etc.		
Adjacent hazards		

Table A1: Prevention principle – stage 1: design

Prevention principle – stage 2: construct		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Security (to prevent intruders who may deliberately or accidentally start a fire)		
Waste control and disposal		
Storage of materials and storage of flammable substances		
Control of all items stored or being used on site (those posing a fire risk should be highlighted and given specific fire protection)		
Assessment of high-risk procedures such as welding and grinding (hot work permit/controls)		
Exposed flammable materials due to different stages of construction		
Primary and secondary sources of ignition		

Table A2: Prevention principle – stage 2: construct

Prevention principle – stage 3: in use		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Arson prevention		
Electrical safety		
Product safety		
Installation of materials and contents (fire/ignition resistance)		
Smoking		
Fuel and oxygen (flammable materials, etc.)		
Natural and man-made disasters such as wildfires, terrorism and war		
Process accidents (e.g. chemical spills), etc.		
Adjacent hazards		
Briefing occupants on fire prevention – e.g. hot work processes		
Briefing occupants on safe evacuation principles		
Smoking controls		
Electrical equipment safety		
Identification of potential hazards such as hoardings or easily ignited materials		

Table A3: Prevention principle – stage 3: in use

Prevention principle – stage 4: change		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Arson prevention		
Electrical safety		
Product safety		
Installation of materials and contents (fire/ignition resistance)		
Smoking		
Fuel and oxygen (flammable materials, etc.)		
Natural and man-made disasters such as wildfires, terrorism and war		
Process accidents (e.g. chemical spills), etc.		
Adjacent hazards		
Security (to prevent intruders who may deliberately or accidentally start a fire)		
Waste control and disposal		
Storage of materials and storage of flammable substances		
Control of all items stored or being used on site (those posing a fire risk should be highlighted and given specific fire protection)		
Assessment of high-risk procedures such as welding and grinding (hot work permit/controls)		
Exposed flammable materials due to different stages of construction		
Primary and secondary sources of ignition		
Soft changes		
Physical building changes		

Table A4: Prevention principle – stage 4: change

Prevention principle – stage 5: demolish		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Security (to prevent intruders who may deliberately or accidentally start a fire)		
Safe storage and disposal of discarded materials		
Designated storage areas for waste materials well away from sources of ignition		
Installation of materials and contents (fire resistance and growth)		
An inventory of all items stored or being used on site (those posing a fire risk should be highlighted and given specific fire protection)		
Assessment of high-risk procedures such as use of cutting equipment		

Table A5: Prevention principle – stage 5: demolish

Appendix B Example Detection and Communication checklists

Detection and Communication principle – stage 1: design		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Automatic detection systems		
Automatic communication systems		
Internal geometry		
Sight lines		
Spatial layout/wayfinding		
Voice alarm systems		
Building configuration		
Spatial layout/geometry		
Warning activations		
Operating suppression systems		
Staff training/continual education		
Fire brigade communications and smoke control		

Table B1: Detection and Communication principle – stage 1: design

Detection and Communication principle – stage 2: construct		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Detection systems		
Fixed and mobile communication system strategies		
Site offices		
Warning activations		
Operating suppression systems		
Temporary fire safety system		
Phased implementation of permanent systems		
Fire brigade communications		
Language barriers		
Signage		

Table B2: Detection and Communication principle – stage 2: construct

Detection and Communication principle – stage 3: in use		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Inspection		
Testing and maintenance of all fixed and mobile communication systems		
Staff training/continual education – particularly where manual alarms are present		
System impairment procedures		
Compatibility of new materials with the existing system		

Table B3: Detection and Communication principle – stage 3: in use

Detection and Communication principle – stage 4: change		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Automatic detection systems		
Automatic communication systems		
Internal geometry		
Sight lines		
Spatial layout/wayfinding		
Voice alarm systems		
Building configuration		
Spatial layout/geometry		
Warning activations		
Operating suppression systems		
Staff training/continual education		
Fire brigade communications and smoke control		
Site offices		
Signage		
Inspection, testing and maintenance of all communication systems		
Appropriateness of existing systems to changed building layout and use		

Table B4: Detection and Communication principle – stage 4: change

Detection and Communication principle – stage 5: demolish		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Detection systems		
Fixed and mobile communication system strategies		
Site offices		
Warning activations		
Operating suppression systems		
Temporary fire safety systems		
Phased implementation of permanent systems		
Fire brigade communications		
Language barriers		
Signage		

Table B5: Detection and Communication principle – stage 5: demolish

Appendix C Example Occupant Protection checklists

Occupant Protection principle – stage 1: design		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Fire signs and fire notices		
Protocols		
Building configuration		
Means of egress and potential restrictions en route (e.g. shared escape and logistical corridors, mezzanine and ganty headroom, narrow walkways, etc.)		
Travel distances		
Time to egress (time to start to move and movement time)		
Fire/smoke barriers		
Simultaneous evacuation		
Phased evacuation		
Protect in place		
Progressive horizontal evacuation		
Final exit and stair capacities		
Merging population flows		
Corridor widths		
Crowd control		
Predicted behavioural response		
Rescue		
Assembly points		
Refuge areas		
Evacuation lifts		
Emergency lighting		
Escape lighting		
Automatic smoke control		
Self-rescue equipment		
Awareness of outside assistance requirements (for disabled people)		
Coordination with fire brigade		

Table C1: Occupant Protection principle – stage 1: design

Occupant Protection principle – stage 2: construct		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Number and type of workers		
Other personnel and their roles		
Evacuation plans		
Staff training and accreditation		
Security guards		
Work procedures carried out by site personnel		
Ability to rescue		
Trained operatives		
Change control and communication procedures with respect to phased completion of escape routes or temporary impairment		
Regular walk-downs		
Monitoring		

Table C2: Occupant Protection principle – stage 2: construct

Occupant Protection principle – stage 3: in use		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Training and preparation of occupants/residents/staff for escape and evacuation		
Designated fire wardens		
Good housekeeping related to escape		
Inspection, testing and maintenance of all fire systems		
Procedures for extraordinary use or circumstances such as large gatherings or egress path impairment		
Coordination with fire brigade		

Table C3: Occupant Protection principle – stage 3: in use

Occupant Protection principle – stage 4: change		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Fire signs and fire notices		
Protocols		
Building configuration		
Means of egress and potential restrictions en route (e.g. shared escape and logistical corridors, mezzanine and gantry headroom, narrow walkways, etc.)		
Travel distances		
Time to egress (time to start to move and movement time)		
Fire/smoke barriers		
Simultaneous evacuation		
Phased evacuation		
Protect in place		
Progressive horizontal evacuation		
Final exit and stair capacities		
Merging population flows		
Corridor widths		
Crowd control		
Predicted behavioural response		
Rescue		
Assembly point		
Refuge areas		
Evacuation lifts		
Emergency lighting		
Escape lighting		
Automatic smoke control		
Self-rescue equipment		
Awareness of outside assistance requirements (for disabled people)		
Number and type of workers		
Other personnel and their roles		
Evacuation plans		
Staff training and accreditation		
Security guards		
Work procedures carried out by site personnel		
Ability to rescue		
Trained operatives		

(continued on following page)

Occupant Protection principle – stage 4: change		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Change control and communication procedures with respect to phased completion of escape routes or temporary impairment		
Regular walk-downs		
Monitoring		
Training and preparation of occupants/residents/staff for escape and evacuation		
Designated fire wardens		
Good housekeeping related to escape		
Inspection, testing and maintenance of all fire systems		
Procedures for extraordinary use or circumstances such as large gatherings or egress path impairment		
Coordination with fire brigade		

Table C4: Occupant Protection principle – stage 4: change

Occupant Protection principle – stage 5: demolish		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Number and type of workers		
Other personnel and their roles		
Evacuation plans		
Staff training and accreditation		
Security guards		
Work procedures carried out by staff personnel		
Ability to rescue		
Trained operatives		
Change control and communication procedures with respect to phased completion of escape routes or temporary impairment		
Regular walk-downs		
Monitoring		
Modification of escape routes		

Table C5: Occupant Protection principle – stage 5: demolish

Appendix D Example Containment checklists

Containment principle – stage 1: design		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Selection of materials and contents (fire resistance and growth)		
Linings (surface spread of flame and reaction to fire characteristics)		
Compartmentation (fire door and shutter sets, fire-rated glazing, ductwork and dampers, fire barriers, firestopping, etc.)		
Suppression (all supporting systems)		
Structural fire protection		
Smoke hazard management		
Automatic smoke control		
Smoke lobbies		
External fabric of the building (cladding)		
Distance between buildings and services		

Table D1: Containment principle – stage 1: design

Containment principle – stage 2: construct		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Phasing construction		
Installation of materials		
Compartmentation		
Use suppression (all supporting systems)		
Structural fire protection planning (especially with timber-framed buildings		

Table D2: Containment principle – stage 2: construct

Containment principle – stage 3: in use		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Inspection		
Testing and maintenance of all containment systems		
Training and preparation of occupants/residents/staff for containment and good housekeeping related to containment		

Table D3: Containment principle – stage 3: in use

Containment principle – stage 4: change		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Selection of materials and contents (fire resistance and growth)		
Linings (surface spread of flame and reaction to fire characteristics)		
Compartmentation (fire door and shutter sets, fire-rated glazing, ductwork and dampers, fire barriers, firestopping, etc.)		
Suppression (all supporting systems)		
Structural fire protection		
Smoke hazard management		
Automatic smoke control		
Smoke lobbies		
External fabric of the building (cladding)		
Distance between buildings and services		
Phasing construction		
Installation of materials		
Inspection		
Training and preparation of occupants/residents/staff for containment		
Good housekeeping related to containment		

Table D4: Containment principle – stage 4: change

Containment principle – stage 5: demolish		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Phasing construction		
Installation of materials		
Compartmentation		
Use suppression (all supporting systems)		
Structural fire protection planning (especially with timber-framed buildings)		

Table D5: Containment principle – stage 5: demolish

Appendix E Example Extinguishment checklists

Extinguishment principle – stage 1: design		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Environmental protection		
Access and facilities for the fire brigade (people and vehicles)		
Automatic suppression		
Dry risers		
Wet risers		
Water supply		
Lifts		
Lobbies		
Fire extinguishers		
Manual firefighting equipment		
Digital building information		
Availability of firefighters and awareness of outside assistance required		
Adjacent hazards and proximity of proposed construction to existing built environment – including considerations for interfacing or shared facilities		

Table E1: Extinguishment principle – stage 1: design

Extinguishment principle – stage 2: construct		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Environmental protection		
Access and facilities for the fire brigade (people and vehicles)		
Temporary suppression		
Dry risers		
Wet risers		
Water supply		
Vertical access		
Lobbies		
Temporary fire extinguishers		
Manual firefighting equipment		
Site information		
Availability of firefighters and awareness of outside assistance		

Table E2: Extinguishment principle – stage 2: construct

Extinguishment principle – stage 3: in use		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Inspection		
Testing and maintenance of all extinguishment systems		
Training and preparation of occupants/residents/staff		
Good housekeeping related to extinguishment systems		
Liaison with fire and rescue services		

Table E3: Extinguishment principle – stage 3: in use

Extinguishment principle – stage 4: change		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Environmental protection		
Access and facilities for the fire brigade (people and vehicles)		
Automatic suppression		
Dry risers		
Wet risers		
Water supply		
Lifts		
Lobbies		
Fire extinguishers		
Manual firefighting equipment		
Site information		
Building information		
Availability of firefighters and awareness of outside assistance required		
Adjacent hazards and proximity of proposed construction to existing built environment – including considerations for interfacing or shared facilities		
Inspection		
Testing and maintenance of all extinguishment systems		
Training and preparation of occupants/residents/staff		
Good housekeeping related to extinguishment systems		
Liaison with fire rescue services		
Appropriateness of existing systems		
Equipment to changed building layout and use		

Table E4: Extinguishment principle – stage 4: change

Extinguishment principle – stage 5: demolish		
Fire safety measures and strategies	**Information**	**Information provenance (R/Y/G)**
Environmental protection		
Access and facilities for the fire brigade (people and vehicles)		
Temporary suppression		
Dry risers		
Wet risers		
Water supply		
Vertical access		
Lobbies		
Temporary fire extinguishers		
Manual firefighting equipment		
Site information		
Building information		
Availability of firefighters and awareness of outside assistance required		

Table E5: Extinguishment principle – stage 5: demolish