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## Economic Commission for Europe

### Committee on Urban Development, Housing and Land Management

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Item 6(c) of the provisional agenda

**Review of the implementation of the programmes of work 2018-2019 and 2020:  
affordable, adequate, energy efficient and healthy housing:  
Fire safety standards in buildings**

## **International Fire Safety Standards: Common Principles “Safe Buildings Save Lives”**

### **Note by the Bureau of the Committee**

#### *Summary*

The Committee on Urban Development, Housing and Land Management at its eightieth session took note of the activities of the International Fire Safety Standards Coalition on the development of a set of new, high-level international standards on fire safety: International Fire Safety Standards: Common Principles “Safe Buildings Save Lives”, with the Royal Institutions for Chartered Surveyors serving as a secretariat to the International Fire Safety Standards Coalition for the development of the common principles.

The Committee Bureau discussed the Common Principles and recommended to endorse the Common Principles as an Economic Commission for Europe standard.

This document includes a description of the International Fire Safety Standards: Common Principles.

The implementation Framework of the Common Principles and additional technical guidance are available in the document ECE/HBP/2020/INF.8.

The Committee is invited to endorse the International Fire Safety Standards: Common Principles: “Safe Buildings Save Lives” as an Economic Commission for Europe standard.

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## I. Introduction

1. The Grenfell Tower fire in London in June 2017 made the need for a coherent global approach to fire safety urgent. That fire that claimed 72 lives, was the worst in the United Kingdom for almost a century and not only focused attention on building and fire safety in the United Kingdom but also exposed global inadequacies in how fire safety standards are set.
2. As the property market has become increasingly international with investments flowing across national borders, differences in materials testing and certifications for fire safety and in standards on how to manage buildings in use remain. There are high uncertainty and risks to the public, with the loss of lives of people in extreme cases of fires in buildings.
3. The Geneva UN Charter on Sustainable Housing, which was endorsed by the Committee on Urban Development, Housing and Land Management in 2014, underlines the importance of improving the resilience of buildings to natural and human-generated hazards through safety planning, design and construction. The development of international fire safety standards is an important element for the implementation of the Charter.

## II. International Fire Safety Standards Coalition and the Common Framework

4. The International Fire Safety Standards: Common Principles (IFSS-CP) were developed by the International Fire Safety Coalition<sup>1</sup> with an objective to prevent injury and death from fire in the built environment and minimise the impact on communities, society and the natural environment. The IFSS-CP encompasses principles for fire safety buildings at the stages of engineering design, construction, occupation and ongoing management.
5. The International Fire Safety Standards 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.
6. The Coalition started the development of the IFSS-CP because it did not identify any singular, pre-existing overarching fire safety principles that would be suitable for adoption on a worldwide basis and that would work in conjunction with other guidelines. The Coalition considered it necessary to elaborate a set of principles which would address fire safety of buildings comprehensively and on all the stages of the life cycle of a building.
7. Following the development of the IFSS-CP, the Coalition developed IFSS-CP Framework for the application of the IFSS-CP which is available in the information document ECE/HBP/2020/INF.8. The Coalition will be working to produce further technical guidance to its members on the adoption and implementation of the IFSS-CP within their local market(s). The Coalition cooperates with governments and other stakeholders at various levels: project, local, regional, state, national, supranational and international levels, to seek adoption and implementation of the IFSS-CP.

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<sup>1</sup> For further information on IFSS, please visit <https://ifss-coalition.org/>

### III. Definitions

8. For the purposes of the IFSS-CP, the following terms are defined as indicated below.
- (a) Building - an enclosed structure with an interior and a specific residential or non-residential use;
  - (b) Coalition - the International Fire Safety Standards Coalition, comprising not-for-profit organizations, each with a public interest mandate;
  - (c) 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:
    - (i) Prevention;
    - (ii) Detection and Communication;
    - (iii) Occupant Protection;
    - (iv) Containment; and
    - (v) Extinguishment.
  - (d) 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;
  - (e) Containment - limiting of fire and all its consequences to as small an area as possible;
  - (f) Detection and Communication - investigating and discovering of fire followed by informing occupants and the fire service;
  - (g) Escape - the egress of occupants from a building;
  - (h) Evacuation - the procedures and processes used to enable people to leave a building;
  - (i) Extinguishment (also known as Fire Control) - suppressing fire and protecting the surrounding environment;
  - (j) 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;
  - (k) Occupant Protection - Facilitating occupant avoidance of and escape from the effects of fire;
  - (l) 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;
  - (m) Prevention - safeguarding against the outbreak of fire and/or limiting its effects;
  - (n) Property - buildings, structures and any physical items within the legal boundaries of a plot. This may include the contents of buildings;

- (o) Property Life Cycle - the stages that make up the life cycle of a building. These are:
  - (i) Stage 1 – design;
  - (ii) Stage 2 – construct;
  - (iii) Stage 3 – in use;
  - (iv) Stage 4 – change;
  - (v) Stage 5 – demolish.
- (p) Proprietary Rights - legal rights over real property by a person or organization who is not an owner or occupier. This includes rights of way and rights of entry and land between buildings. Such rights are specified in covenants relating to the property;
- (q) Reviewer - an individual competent in the subject matter to be reviewed, has the education, training and experience, and able to apply scientific and engineering principles, practices, standards and judgement, to evaluate design concepts and performance objectives, and their solution results;
- (r) The Standards Setting Committee (SSC) appointed by the Coalition to develop global standards for fire safety;
- (s) Stakeholder - one who has a share or an interest. Specifically, an individual, or representative of same, having an interest in the successful completion of a project. The reason for having an interest in the successful completion of a project might be financial, safety related, regulatory, etc. Not all stakeholders have equal authority or input into the process. The degree of stakeholder involvement depends on many factors, including the type of project management and delivery system;
- (t) Structure - An independent or semi-independent functional structure without an interior, which forms part of the infrastructure.

#### **IV. The Common Principles**

9. In all stages of a building's lifecycle, sufficient measures shall be taken to implement the following five Common Principles:
- (a) Prevention – safeguarding against the outbreak of fire and/or limiting its effects;
  - (b) Detection and Communication – investigating and discovering fire, followed by informing occupants and the fire service;
  - (c) Occupant Protection – facilitating occupant avoidance of and escape from the effects of fire;
  - (d) Containment – limiting fire and all its consequences to as small an area as possible;
  - (e) Extinguishment – suppressing fire and protecting the surrounding environment.
10. The IFSS-CP is intended to be flexible and non-prescriptive so that it can be adopted incrementally and can also advance good practice. The Common Principles were developed in such a way that they are universally applicable throughout the world, regardless of the existing codes, standards and guidance already in place. As a result, the 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.

## **A. Aims of the Common Principles**

11. The IFSS-CP shall:

- (a) Serve the public interest;
- (b) Be primarily concerned with life safety from fire, but where practicable, also aim to limit or prevent the loss of property;
- (c) Establish a common set of internationally accepted, performance-based Common Principles for fire safety;
- (d) Create a framework that will allow comparisons to be made on a like-for-like basis across countries.

12. The IFSS-CP will among other things:

- (a) Protect people in and around buildings;
- (b) Provide safe access and egress for firefighters;
- (c) Allow for harmonisation of Common Principles and good practice;
- (d) Be accessible to all relevant parties, commensurate with allowing robust comparisons to be made;
- (e) Complement local and regional standards wherever possible;
- (f) Accommodate the need for periodic innovation, refinement, updating and changes;
- (g) Recommend a standard reporting format, where appropriate;
- (h) Support the development of consistent language and terminology for the worldwide and increasingly mobile professions involved in fire safety;
- (i) Enable global comparisons and benchmarking and provide a system benchmark for international good practice;
- (j) Support education and training in fire safety and fire safe design and construction to increase awareness among the population.

13. In practice, it is expected that the 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.

14. The Common Principles are applied at each stage of the Property Life Cycle.

## **B. The Five Common Principles**

15. However, though each Common Principle is of equal importance there is a certain hierarchy in relation to them. For example, if the Common Principles have not been satisfactorily dealt with at the Prevention stage then the sub principles contained within each successive stage (detection and communication, occupant protection, containment and extinguishment) become increasingly important for each successive stage.

(a) **Principle 1 - Prevention**

16. 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.

17. 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.

(a) 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:

- (i) Arson prevention;
- (ii) Electrical safety;
- (iii) Product safety;
- (iv) Installation of materials and contents (fire/ignition resistance);
- (v) Smoking;
- (vi) Fuel and oxygen (flammable materials, etc.);
- (vii) Natural and man-made disasters such as wildfires, terrorism and war;
- (viii) Process accidents (e.g. chemical spills), etc;
- (ix) Adjacent hazards.

(b) 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:

- (i) Security (to prevent intruders who may deliberately or accidentally start a fire);
- (ii) Waste control and disposal;
- (iii) Storage of materials and storage of flammable substances;
- (iv) Control of all items stored or being used on site (those posing fire risk should be highlighted and given specific fire protection);
- (v) Assessment of high-risk procedures such as welding and grinding (hot work permit/controls);
- (vi) Exposed flammable materials due to different stages of construction;
- (vii) Primary and secondary sources of ignition.

(c) 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:

- (i) Briefing occupants on fire prevention – for example, hot work processes;
- (ii) Briefing occupants on safe evacuation principles;
- (iii) Smoking controls;
- (iv) Electrical equipment safety;
- (v) Identification of potential hazards such as hoardings or easily ignited materials.

(d) 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 upgrades to plant and equipment.

(e) 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:

- (i) Security (to prevent intruders who may deliberately or accidentally start a fire);
- (ii) Safe storage and disposal of discarded materials;
- (iii) Designated storage areas for waste materials well away from sources of ignition;
- (iv) An inventory of all items stored or being used on site (those posing a fire risk should be highlighted and given specific fire protection);
- (v) Assessment of high-risk procedures such as use of cutting equipment.

**(b) Principle 2 - Detection and Communication principle**

18. 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.

19. 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.

(a) Stage 1: design. The following fire safety measures and strategies must be considered at the planning stage:

- (i) Automatic detection systems;
- (ii) Automatic communication systems;
- (iii) Internal geometry;
- (iv) Sight lines;
- (v) Spatial layout/wayfinding;
- (vi) Voice alarm systems;

- (vii) Building configuration;
  - (viii) Spatial layout/geometry;
  - (ix) Warning activations;
  - (x) Operating suppression systems;
  - (xi) Staff training/continual education;
  - (xii) Fire brigade communication and smoke control;
- (b) Stage 2: construct. The following fire safety measures and strategies must be considered:
- (i) Detection systems;
  - (ii) Fixed and mobile communication system strategies;
  - (iii) Site offices;
  - (iv) Warning activations;
  - (v) Operating suppression systems;
  - (vi) Temporary fire safety systems;
  - (vii) Phased implementation of permanent systems;
  - (viii) Fire brigade communications;
  - (ix) Language barriers;
  - (x) Signage.
- (c) Stage 3: in use. The following fire safety measures and strategies must be considered:
- (i) Inspection;
  - (ii) Testing and maintenance of all fixed and mobile communication systems;
  - (iii) Staff training/continual education – particularly where manual alarms are present;
  - (iv) System impairment procedures
  - (v) Compatibility of new materials with the existing system.
- (d) Stage 4: change. As stage 1, plus consideration of the following fire safety measures and strategies:
- (i) Design (this also includes the site offices);
  - (ii) Signage;
  - (iii) Inspection, testing and maintenance of all communication systems;
  - (iv) Appropriateness of existing systems to changed building layout and use.
- (e) 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.



(c) **Principle 3 - Occupant Protection principle**

20. At every stage of the Property Life Cycle measures must be established within the IFSSCP 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.

21. 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.

(a) Stage 1: design. The following fire safety measures and strategies must be considered at the planning stage:

- (i) Evacuation procedures including emergency exit signage and lighting;
- (ii) Protocols;
- (iii) Building configuration;
- (iv) Means of egress and potential restrictions en route (e.g. shared escape and logistical corridors, mezzanine, protected areas/lobbies and gantry headroom, narrow walkways, etc.);
- (v) Travel distances;
- (vi) Time to egress (time to start to move and movement time);
- (vii) Fire/smoke barriers;
- (viii) Sprinkler systems;
- (ix) Alternative means of escape;
- (x) Fire break floors;
- (xi) Simultaneous Evacuation;
- (xii) Phased Evacuation;
- (xiii) Protect in place;
- (xiv) Progressive horizontal Evacuation;
- (xv) Final exit and stair capacities;
- (xvi) Merging population flows;
- (xvii) Corridor widths;
- (xviii) Crowd control;
- (xix) Predicted behavioural response;
- (xx) Rescue;
- (xxi) Assembly points;
- (xxii) Refuge areas;
- (xxiii) Evacuation lifts;
- (xxiv) Emergency lighting;
- (xxv) Escape lighting;
- (xxvi) Automatic smoke control;

- (xxvii) Self-rescue equipment;
  - (xxviii) Awareness of outside assistance requirements (for disabled people);
  - (xxix) Coordination with fire brigade.
- (b) Stage 2: construct. As stage 1 (wherever relevant), plus consideration of the following fire safety measures and strategies:
- (i) Number and type of workers;
  - (ii) Other personnel and their roles;
  - (iii) Temporary evacuation plans and procedures;
  - (iv) Staff training and accreditation;
  - (v) Security guards;
  - (vi) Work procedures carried out by site personnel;
  - (vii) Ability to rescue;
  - (viii) Trained operatives;
  - (ix) Change control and communication procedures with respect to phased completion of escape routes or temporary impairment;
  - (x) Regular walk-downs;
  - (xi) Monitoring.
- (c) Stage 3: in use. The following fire safety measures and strategies must be considered:
- (i) Education, training and preparation of occupants/residents/staff for escape and evacuation (i.e., fire drills);
  - (ii) Designated fire wardens;
  - (iii) Good housekeeping related to escape;
  - (iv) Inspection, testing and maintenance of all fire systems;
  - (v) Procedures for extraordinary use or circumstances such as large gatherings or egress path impairment;
  - (vi) Coordination with fire brigade.
- (d) 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 and the elderly) shall be taken into account to adapt the occupant egress conditions. A modification of escape routes (length, width, etc.) shall be studied.
- (e) Stage 5: demolish. As stage 2, including consideration of the following fire safety measures and strategies:
- (i) Number and type of workers;
  - (ii) Other personnel and their roles;
  - (iii) Evacuation plans;
  - (iv) Staff training and accreditation;
  - (v) Security guards;
  - (vi) Work procedures carried out by site personnel.

22. The temporary modifications of escape routes shall be communicated to the workers and occupants.

**(d) Principle 4 - Containment principle**

23. At every stage of the Property Life Cycle measures must be established within the IFSSCP 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.

24. 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.

(a) Stage 1: design. At the planning stage, both passive and active systems should be considered, including the following fire safety measures and strategies:

- (i) Selection of materials and contents (fire resistance and growth);
- (ii) Linings (surface spread of flame and reaction to fire characteristics);
- (iii) Compartmentation (fire door and shutter sets, fire-rated glazing, ductwork and dampers, fire barriers, firestopping, etc.);
- (iv) Suppression (all supporting systems);
- (v) Structural fire protection;
- (vi) Smoke hazard management;
- (vii) Automatic smoke control;
- (viii) Smoke lobbies;
- (ix) External fabric of the building (cladding);
- (x) Distance between buildings and services.

(b) Stage 2: construct. The following fire safety measures and strategies must be considered:

- (i) Phasing construction;
- (ii) Installation of materials;
- (iii) Compartmentation;
- (iv) Use suppression (all supporting systems);
- (v) Structural fire protection planning (especially with timber-framed buildings).

(c) Stage 3: in use. The following fire safety measures and strategies must be considered:

- (i) Inspection;
- (ii) Testing and maintenance of all containment systems;
- (iii) Training and preparation of occupants/residents/staff for containment and good housekeeping related to containment.

(d) Stage 4: change. As stage 1, plus consideration of the following fire safety measures and strategies:

- (i) Phasing construction;
- (ii) Installation of materials;
- (iii) Compartmentation;
- (iv) Use suppression (all supporting systems);
- (v) Structural fire protection;
- (vi) Inspection;
- (vii) Training and preparation of occupants/residents/staff for containment and good housekeeping related to containment.

(e) Stage 5: demolish. As stage 2.

**(e) Principle 5 - Extinguishment principle**

25. 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.

26. 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.

(a) Stage 1: design. The following fire safety measures and strategies must be considered at the planning stage:

- (i) Environmental protection;
- (ii) Access and facilities for the fire brigade (people and vehicles);
- (iii) Automatic suppression;
- (iv) Dry risers;
- (v) Wet risers;
- (vi) Water supply;
- (vii) Lifts;
- (viii) Lobbies;
- (ix) Fire extinguishers;
- (x) Manual firefighting equipment;
- (xi) Digital Building information;
- (xii) Availability of firefighters and awareness of outside assistance required
- (xiii) Adjacent hazards and proximity of proposed construction to existing built environment, including considerations for interfacing or shared facilities,

(b) Stage 2: construct. The following fire safety measures and strategies must be considered:

- (i) Environmental protection;
- (ii) Access and facilities for the fire brigade (people and vehicles);
- (iii) Temporary suppression;

- (iv) Dry risers;
  - (v) Wet risers;
  - (vi) Water supply;
  - (vii) Vertical access;
  - (viii) Lobbies;
  - (ix) Temporary fire extinguishers;
  - (x) Manual firefighting equipment;
  - (xi) Site information;
  - (xii) Availability of firefighters;
  - (xiii) Outside assistance.
- (c) Stage 3: in use. The following fire safety measures and strategies must be considered:
- (i) Inspection, testing and maintenance of all extinguishment systems;
  - (ii) Training and preparation of occupants and residents/staff;
  - (iii) Good housekeeping related to Extinguishment systems;
  - (iv) Liaison with fire and rescue services.
- (d) Stage 4: change. As stage 1, plus consideration of the following:
- (i) Inspection, testing and maintenance of all Extinguishment systems;
  - (ii) Training and preparation of occupants and residents/staff;
  - (iii) Good housekeeping related to Extinguishment systems;
  - (iv) Liaison with fire and rescue services;
  - (v) Appropriateness of existing systems and equipment to changed Building layout and use.
- (e) Stage 5: demolish. As stage 2. 2.3

## V. From the Common Principles to the International Fire Safety Standards: Common Principles Framework

27. 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. A full description of the implementation Framework and additional technical guidance are available in the information document ECE/HBP/2020/INF. 8.

28. 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.

29. The Committee is invited to endorse the “International Fire Safety Standards: Common Principles “Safe Buildings Save Lives”” as an ECE standard.