



Introducing the Good Practice Notes on Life and Fire Safety for Hotels and Hospitals

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(FPC Risk)**

Our presenters



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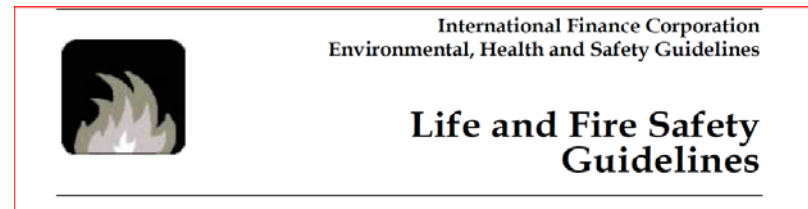
Luis Cestari is a Consultant with IFC's Environment, Social and Governance Department, based in Washington, D.C. Luis has a Master's of Science in Fire Protection Engineering from the University of Maryland and over 25 years of experience as a life and fire safety engineer. In addition, Luis is a member of the National Fire Protection Association and is a professional member and technical instructor for the Society of Fire Protection Engineers.



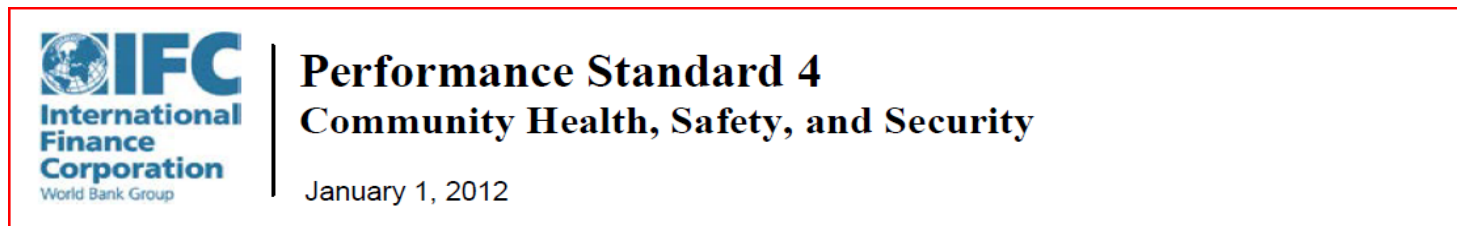
Ralf Bruyninckx is the CEO of FPC Risk, responsible for the overall management of FPC Risk and Global Business Development. He began his career as a fire risk engineer in 1998 and combines an engineering degree with a business background. His primary expertise is in fire risk analysis and performance-based design.

IFC's approach - framework

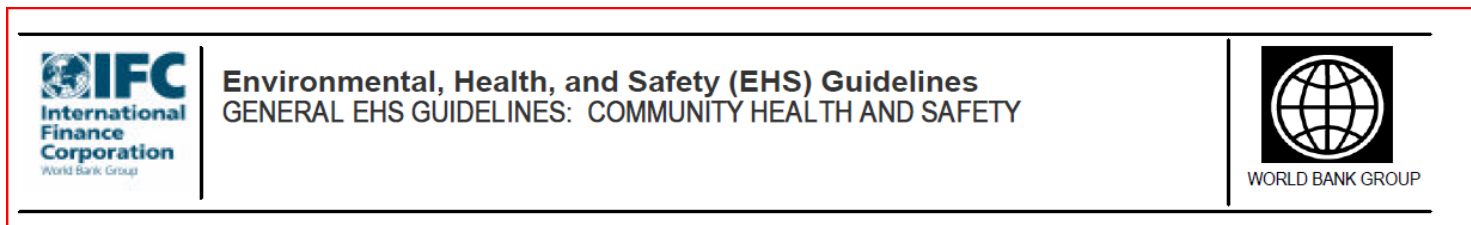
- In 2001: The Life and Fire Safety (L&FS) Guidelines



- Since 2006: PS4: “Infrastructure and Equipment Safety”



- General EHS Guidelines, section 3.3 (Life and Fire Safety)



Applicability - all new buildings and buildings programmed for renovation **accessible to the public**

- Hospitals
- Hotels
- Retail facilities
- Education centers
- Cinema and other leisure facilities
- Airports and other passenger terminals



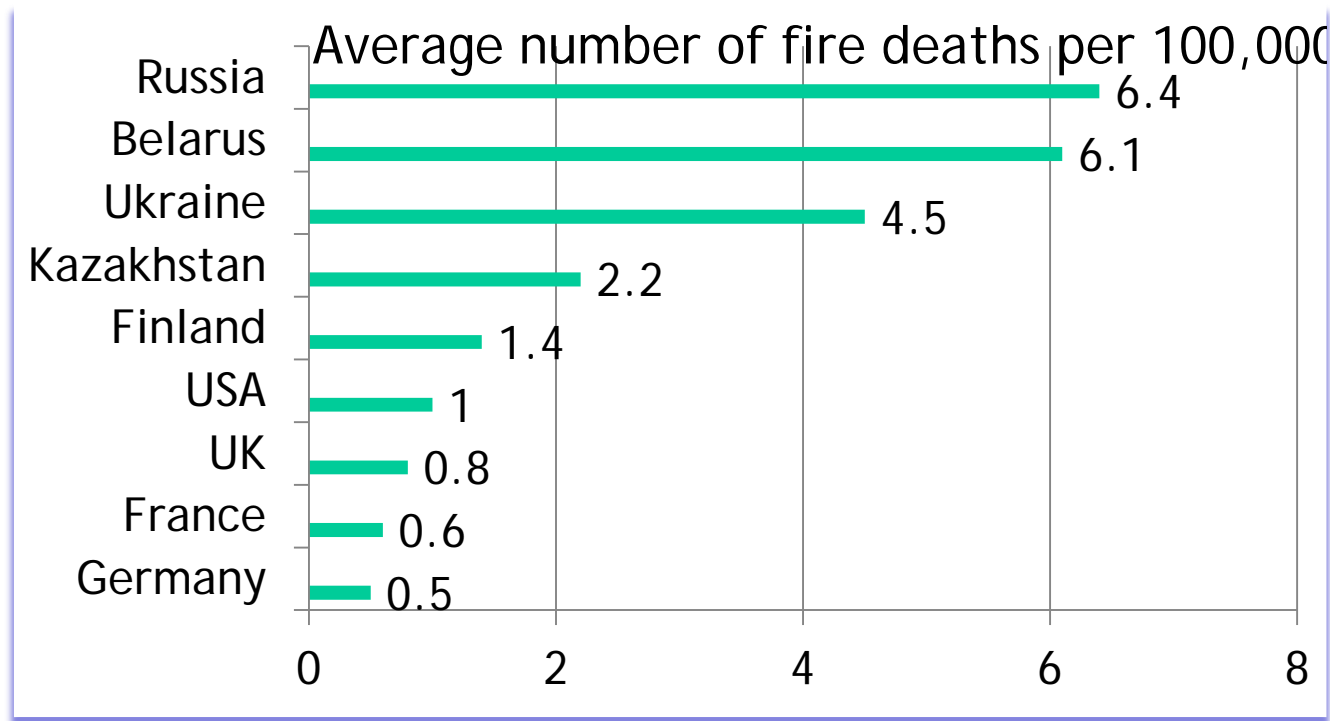
Building should be compliant with:

- Local codes and regulations;
- and **internationally** accepted L&FS standard (e.g. US-NFPA 101, standards from Australia, Canada, South Africa, and United Kingdom)

Occupants are often **unfamiliar** with the building layout or **unable** to evacuate on their own.

Fire Safety in Emerging Markets

- Emerging markets record 10 times fire deaths per year compared to developed countries.



Source: https://www.ctif.org/sites/default/files/ctif_report22_world_fire_statistics_2017.pdf

Fire Safety in Emerging Markets



Fire Safety in Emerging Markets

- Clients are highly compliance driven (and, in fact, do invest in fire safety);
- However, there are gaps in local codes and regulations; and
- Discrepancy between design stage/operation
 - Lack of awareness and safety culture
 - Lack of technical knowledge
 - Minimum budget spent on maintenance
 - Security vs. Safety
- Consequences of fire in EM are generally much more severe due to the lack (or improper performance) of protective L&FS systems and low emergency readiness



IFC's approach - design/construction vs operation

- Verification of building compliance should always be done by a **suitably qualified professional**:
 - concept design (Master Plan)
 - engineering design
 - post-construction
- Any “Change of use” during operational stage shall also obtain professional verification
- For existing buildings with high risk: A qualified professional should conduct a life and fire safety audit (**risk-based** analysis)
- Clients need to establish a **systematic approach** towards L&FS matters on operational stage – to ensure continuous and sound L&FS management

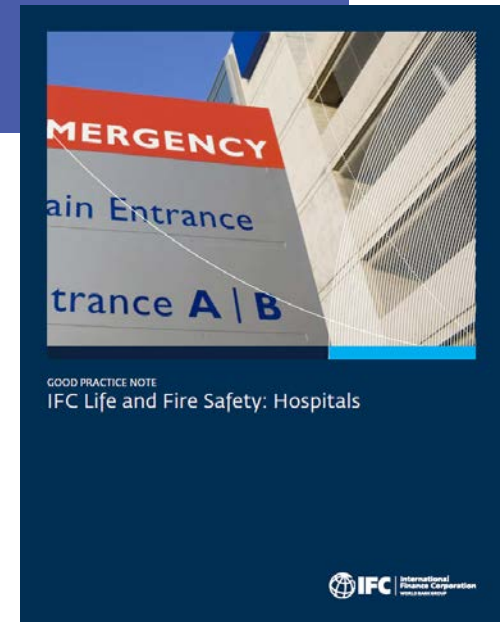
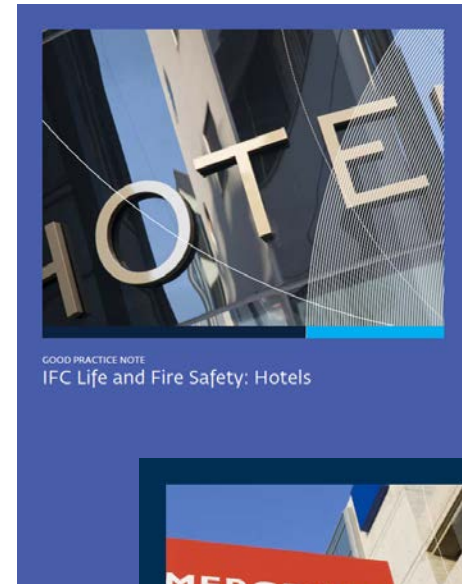
IFC's L&FS Good Practice Notes

- GPNs are intended to help project teams early in the process to understand key design and operational requirements for specific occupancy, and associated additional costs
- GPNs also contain useful practical documents like checklists, maintenance schedule and other
- GPNs have universal applicability

Documents are available at:

www.ifc.org/LFSHotels

www.ifc.org/LFSHospitals



Basis for GPNs

- International Codes / Standards / Guidelines
- Experience (technical / operational / organizational)
- Statistical data
- New technologies
- Risk analysis techniques



Life and fire safety objectives

LIFE AND FIRE SAFETY OBJECTIVES

The following objectives should be demonstrated by the project team when designing a building:

- Safe evacuation of occupants
- Limit fire and smoke spread to the room of fire origin
- Safe intervention for fire brigade

These life and fire safety objectives can only be achieved through implementation of technical and operational measures.

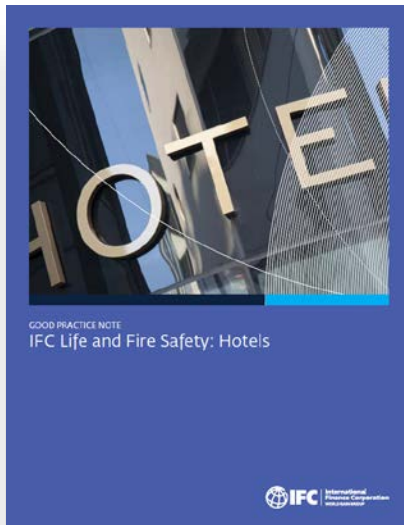
GPN Document Structure

DOCUMENT STRUCTURE

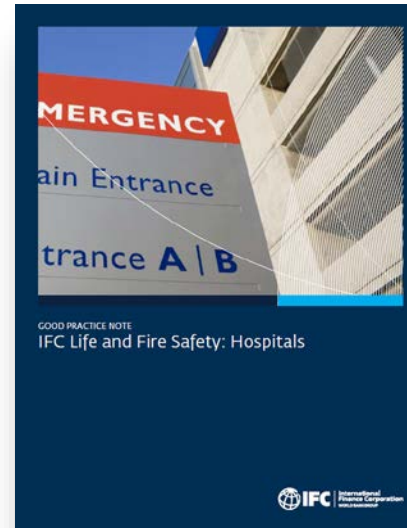
This GPN consist of two main parts:

- A description of fire safety approach, specific requirements and components of fire protection
- Four annexes:
 - Annex A. Guideline Key Life and Fire Safety Design Principles
 - Annex B. Key Life and Fire Safety Audit Aspects
 - Annex C. Inspection and Maintenance Schedule
 - Annex D. Life and Fire Safety Documentation and Approval Flow

Specific Fire Safety Risks

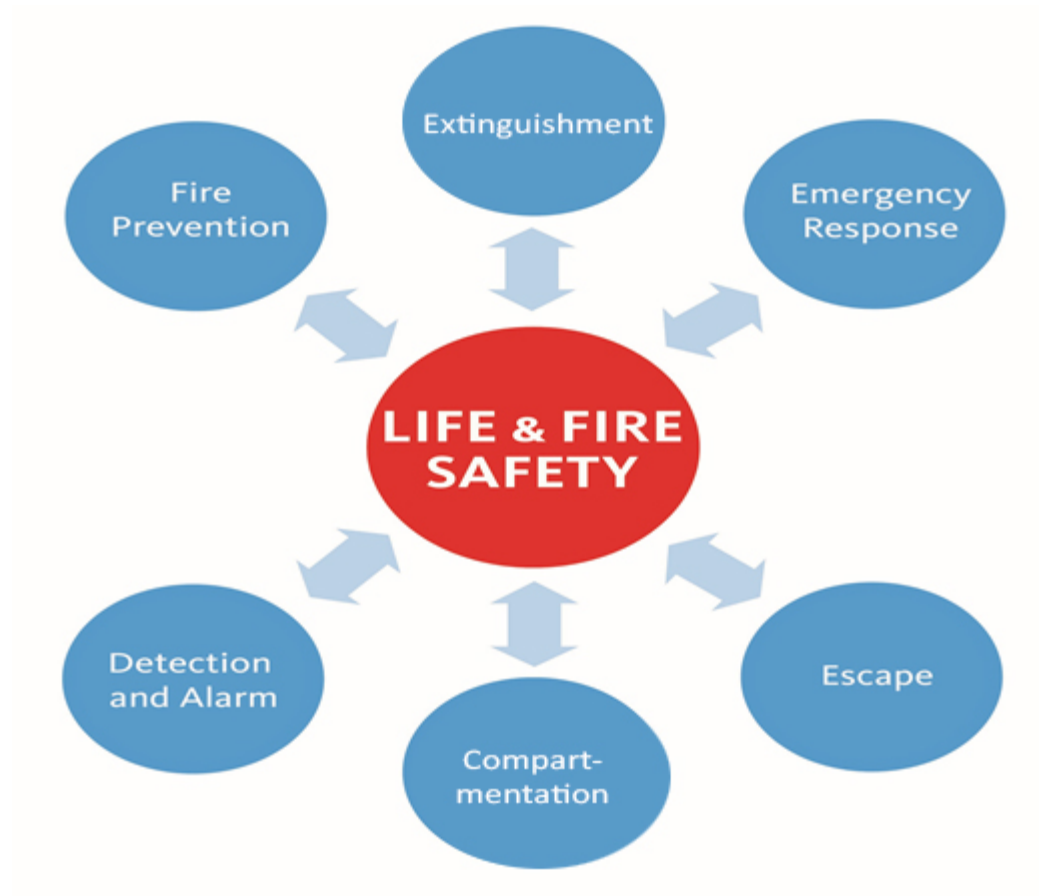


- Multi – occupancy
- Large atrium
- Back of the house
- People are unfamiliar / sleeping



- Mobility
- Bed linen
- Surgery rooms
- Presence of Oxygen Transportation

L&FS Components



IFC's L&FS Good Practice Notes - What?

GUIDELINE KEY LFS DESIGN PRINCIPLES

STRUCTURAL RESISTANCE		
Recommended	Single-storey: 60 min	> 1 storey: 120 min

COMPARTMENTATION		
Required	Between building floors Vertical openings	< 25 m: 60 min > 25 m: 120 min self-closing doors
Required	Between function areas Safe means of egress	60 min, self-closing doors
Required	Corridors in patient room areas	30 min flame tight, self-closing doors
Required	"Safe refuge" on patient floors	60 min, self-closing doors
Required	High-risk areas	Rating dependent on hazardous area and active protection, self-closing doors

INTERIOR FINISH / FURNISHING, MATTRESSES, CURTAINS	
Required	As a minimum, all materials should comply with local regulations
Required	Non-combustible interior finish materials, use of items that are tested on their performance in a fire.

FIRE DETECTION	
Required	Patient rooms: addressable fire detectors Indication of the location of the fire in the nurse department on the floor
Required	Throughout the building Indicative price range ⁽¹⁾ : New: 25 – 45 USD/m² Existing: 30 – 50 USD/m²

FIRE ALARM	
Required	Alarm throughout buildings
Required	Flashing lights in areas with high noise levels
Recommended	Voice evacuation system in public areas and patient room areas
Recommended	Flashing lights in surgery and other critical care areas

SMOKE CONTROL	
Required	Stairwell pressurization system in buildings > 25 m
Required	SHEVS in atria
Recommended	Smoke removal system in guest room corridors, as per local code

EVACUATION				
Required	maximum evacuation lengths in sprinklered occupancies			
Occupancy	Common path	Dead-end corridor	Distance to exit	Distance in patient room
Patient room areas	30 m	10 m	60 m	15 m
Restaurant Commercial Waiting area	5 m	5 m	75 m	
Offices	30 m	15 m	90 m	
Required	maximum evacuation lengths in unsprinklered occupancies			
Occupancy	Common path	Dead-end corridor	Distance to exit	Distance in patient room
Patient room areas	10 m	10 m	45 m	15 m
Restaurant Commercial Waiting area	5 m	5 m	60 m	
Offices	25 m	5 m	60 m	
Required	Minimum 2 exits per area Minimum 3 exits if 500 < # persons ≤ 1000 Minimum 4 exits if 1000 < # persons			
Required	Each safe refuge area in patient room areas gives out on a fire access elevator Every safe refuge area leads to two independent exits without returning to the area of fire origin.			
Required	Evacuation widths as per local codes.			
Required	Minimum 50% of exit capacity to discharge through safe means of egress, not leading through the reception area.			

FIRE EXTINGUISHERS	
Required	Hazardous areas of unsprinklered buildings
Recommended	Throughout the buildings (as per local codes)

STANDPIPES	
Recommended	Wet standpipes and/or standpipes as per local codes Hose reels throughout the building

AUTOMATIC SUPPRESSION SYSTEMS	
Required	Kitchen hood systems protecting hazardous cooking equipment (eg fat fryers) in open kitchens
Required	Sprinkler systems throughout the building, except in low-rise hospitals that only contain outpatient rooms. Indicative price range ⁽¹⁾ : New: 40 – 65 USD/m² Existing: 55 – 80 USD/m²
Recommended	Kitchen hood systems in kitchen areas that are separated from restaurants
Recommended	Gas extinguishing systems in area where a fire can lead to large business interruption (eg computer rooms, large archives)

⁽¹⁾ the indicative price ranges are general estimates that are considered to be representative for typical hotel buildings. Further variance might occur, due to complexity of the building and regional price differences.

IFC's L&FS Good Practice Notes - What?

GUIDELINE KEY LFS DESIGN PRINCIPLES

STRUCTURAL RESISTANCE		
Recommended	Single-story: see note	2+ stories: see note

ELEVATION				
Required	Maximum maximum lengths in specified occupancies			
Corridor	Common path	Dead-end corridor	Distance to exit	Distance to patient room
Patient room area	30 m	30 m	30 m	30 m
Restaurant	30 m	30 m	30 m	
Commercial				
Waiting area				

AUTOMATIC SUPPRESSION SYSTEMS

Required	Kitchen hood systems protecting hazardous cooking equipment (eg fat fryers) in open kitchens
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Recommended	Fluorescent lights in surgery and other critical care areas

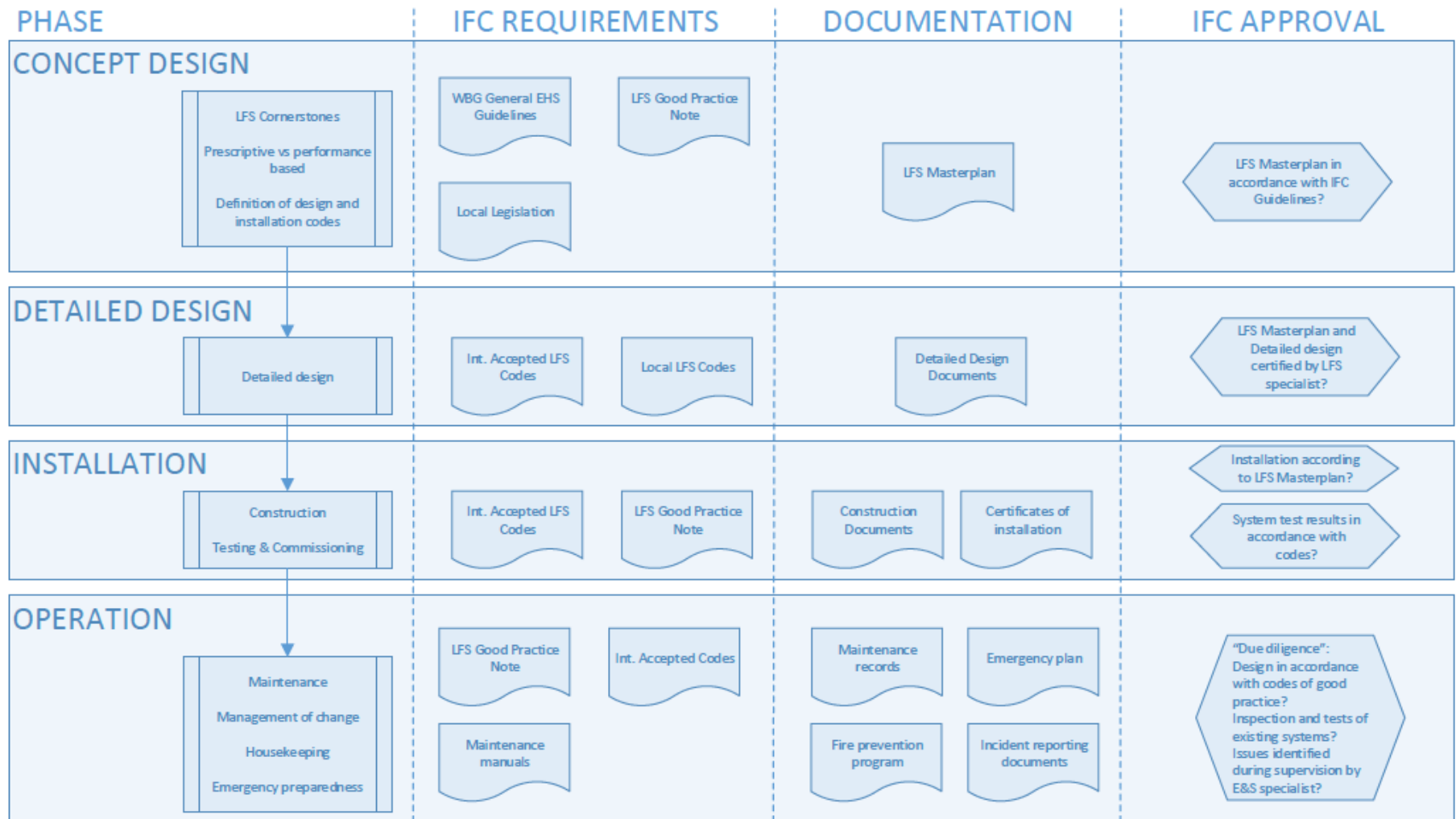
SOUND CONDITIONS	
Required	Soundproofing system in buildings > 10 m
Required	Soundproofing in areas
Recommended	Soundproofing system in guest room corridors, as per local code

Required	Kitchen hood systems protecting hazardous cooking equipment (eg fat fryers) in open kitchens
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(1) All the indicative price ranges are general estimates and are considered as approximate for general building types. For the accurate price, please refer to the local market and project-specific requirements.

Documentation approval flow

Annex D. Life and Fire Safety Documentation and Approval Flow



Footnote: all projects are expected to meet local fire safety requirements

Financial Structure - Identified Cases

- New building (GF or BF) - Design agreed or not?
- New + Existing buildings to undergo major renovation
- New + Existing building(s) to remain intact
- Existing (renovation or not)



L&FS Systems - Operation and Maintenance (O&M)

Question: What is the main difference between L&FS systems and other building systems? See the following points of view:

- Design
- O&M
- Use
- Testing



L&FS Systems (Audit + O&M)

Annex B:

- Useful for Inspection or Supervision Stage
- Both by Client or IFC

Annex B. Key Life and Fire Safety Audit Aspects

OVERALL FIRE SAFETY

Is a LFS master plan available?

Is the building accepted by local authorities? Are acceptance documents available?

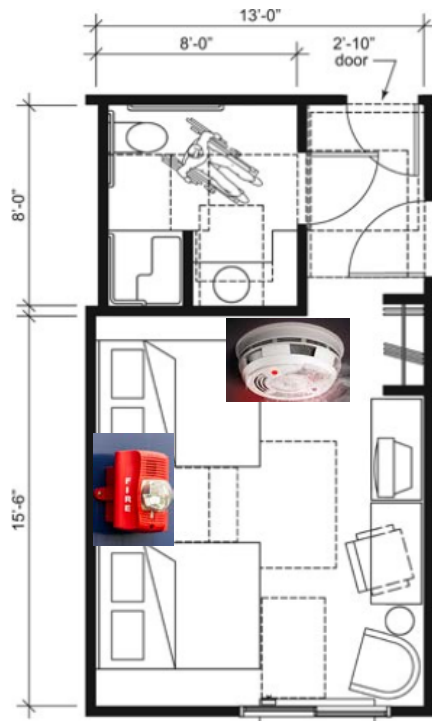
FIRE COMPARTMENTATION

Are as-built compartmentation plans, showing all fire separations, available?

Are certificates for all components of fire separations available?

- Fire doors
- Fire dampers
- Cable, pipe and duct sealing materials

Hotel: Fire Alarm in ADA room (used by hearing impaired person) or smoking rooms

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L&FS Systems (O&M)

Annex C:

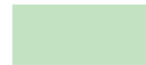
- GPN's assist to define L&FS systems O&M plans with methodology.

Frequency	Fire detection and alarm	Gaseous extinguishing system	Portable fire extinguishers	Fire doors	Fire dampers	Smoke control system
QUARTERLY	Visual inspection of system (callpoints not blocked, free space around detectors, ...)		Visual inspection of accessibility	Visual inspection of doors		
				Verify that doors are not blocked open		
SEMI-ANNUALLY		Visual inspection of system and containers				Functional test
		Record container pressures and weights				
ANNUALLY	Functional test of all detectors, call points and alarms	Visual inspection of hoses	Maintain and recharge as required by maintenance instruction	Check door for physical damage, no open holes left from replaced hardware.	Visual inspection of hinges and other moving parts	
	Functional test of alarm transmission	Inspect enclosures or rooms for tightness		Check door closers on functionality and coordination of door leaves at double doors	Remove fusible link and operate damper	
	Battery test			Check closing of automatically closing doors upon fire detection	Lubrication as per manufacturer's instructions	
	Inspection of log book					
EVERY 5 YEARS	Revision of all detectors (without self-check option)	Hydrostatic test of system				
		Complete visual inspection of gas containers				
EVERY 8 YEARS	Revision of all smoke detectors with self-check option					
Certification inspection by third party	Every year	Every year				Every year

MAINTENANCE

Regular inspection rounds are needed to check that all means of egress are free and unobstructed. These inspections can be performed by the security teams or during so-called 'self-inspection' rounds on which this and other fire safety aspects are checked. Formalized records should be kept on the findings of the rounds and the actions that were taken as a result of the inspections.

The emergency lighting requires at least yearly maintenance by a certified company. During these maintenance rounds, the performance of system batteries should be checked. Other failures like broken bulbs should be corrected as soon as possible.



By building owner.



By maintenance contractor.



Certification by accredited body as per legal requirement, it should be done by third party

GPN's & Emergency Response Planning

- Tendency - Hospitals and Hotels
- Hazards
- Type of plan and Goals
- Evacuation? - Level of Evacuation
- Situations that merit evacuation
- Fire Extinguishing Activities and Control

Hospitals

- Patient Prioritization in Different Evacuation Scenarios
- Priority Ratings for Immediate Evacuation of Patients
- Hazards/ Evacuation transportation equipment

Hotels:

- Disable guests
- Phased Evacuation per floor



Conclusions

- There are multiple **challenges** in tackling Life and Fire Safety aspects in investment projects:
 - Gaps between local vs international requirements
 - Cultural behavior
 - Clients' resistance to invest in safety beyond local compliance
 - Lack of lenders' resources to supervise projects
- **Designing for zero risk is not achievable**, but investors should act to the best of their ability to minimize L&FS risks in its portfolio and to protect its reputation:
 - Awareness raising and knowledge transfer
 - Reliance on professional certification of buildings;
 - Strict enforcement of L&FS conditions in the legal agreements;
 - Regular supervision visits;
 - Contracts with third parties to review high-risk portfolio clients.

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Evaluation link:

www.surveymonkey.com/r/WebinarEvalLFS