Italian regulatory requirements/incentives for sprinklers

Piergiacomo Cancelliere, PhD
Italian National Fire Rescue and Service, CNVVF
Comandante VV.F. di Rimini

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Agenda

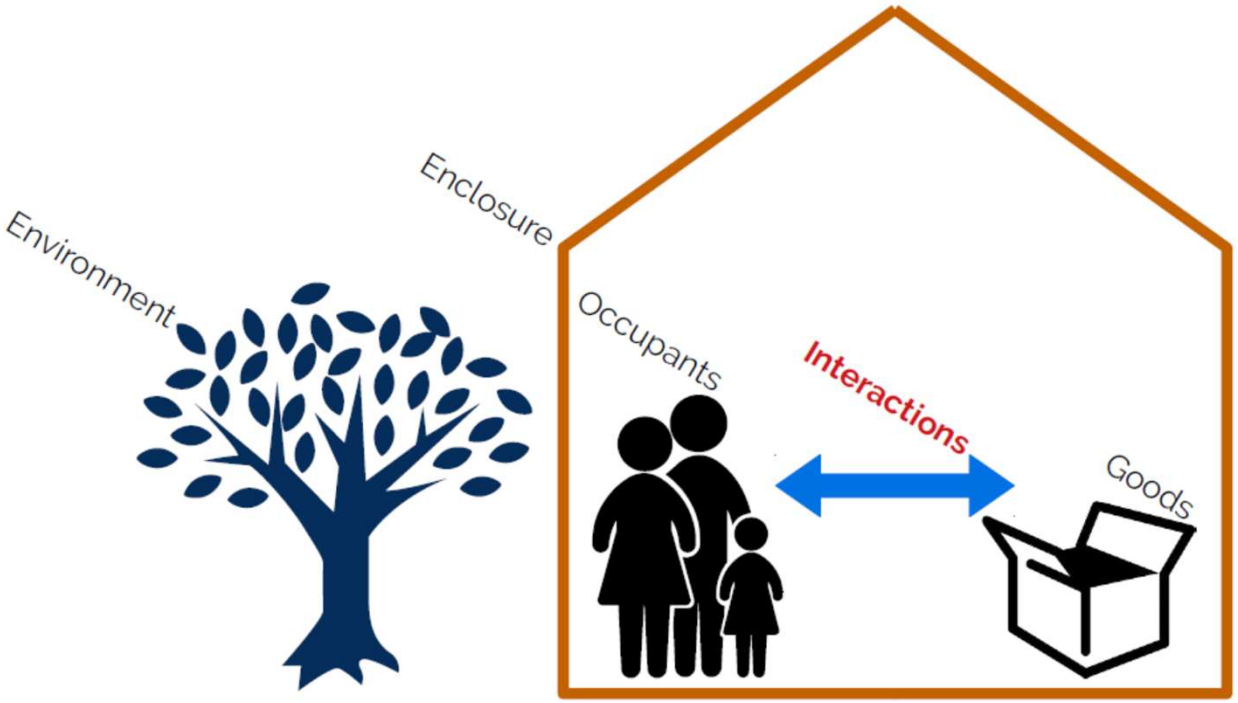
- Fire safety, what?
  - Prescriptive Fire Safety
  - Performance based Fire Safety
- The ITALIAN FIRE CODE (IFC15)
- An example, “Fire Control” measure S.6 of the IFC15
- Fire Control & Fire Engineering Performance Design (FSE)

Fire safety, what?

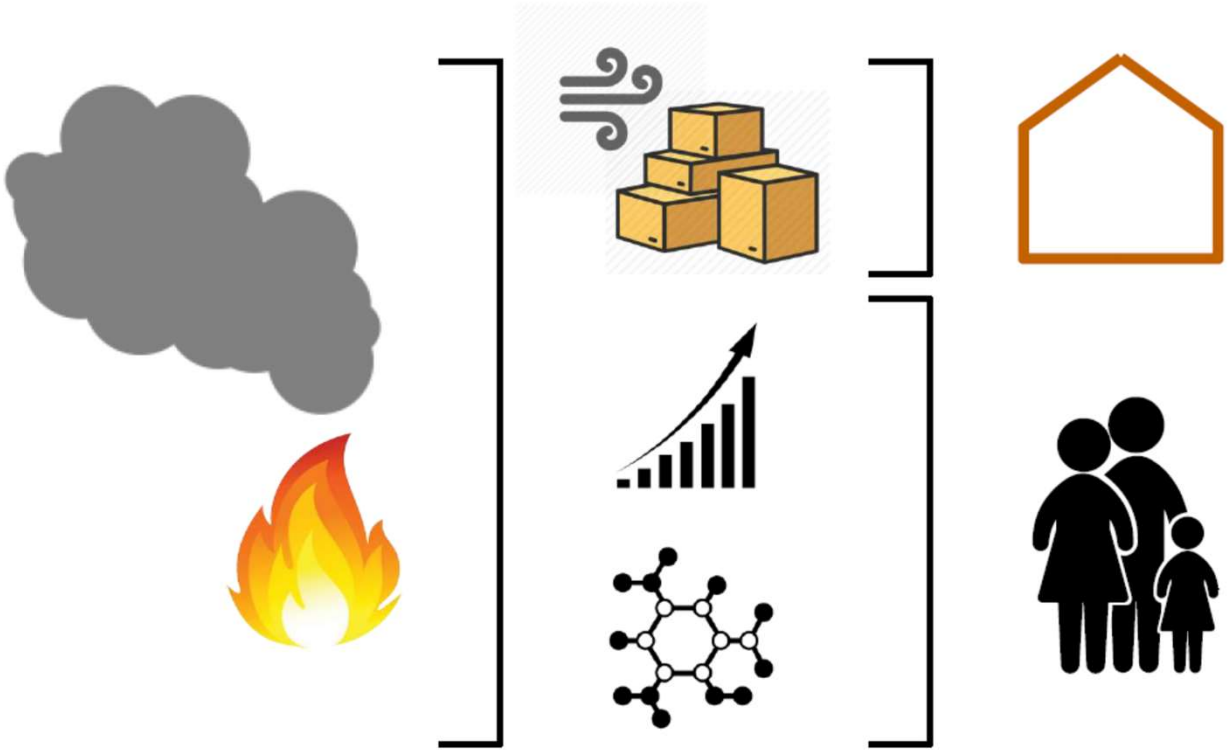
Fire safety is not
compliance to prescriptions

Fire Safety is the art of
reducing the fire risk to an acceptable level
and keeping that level over time...

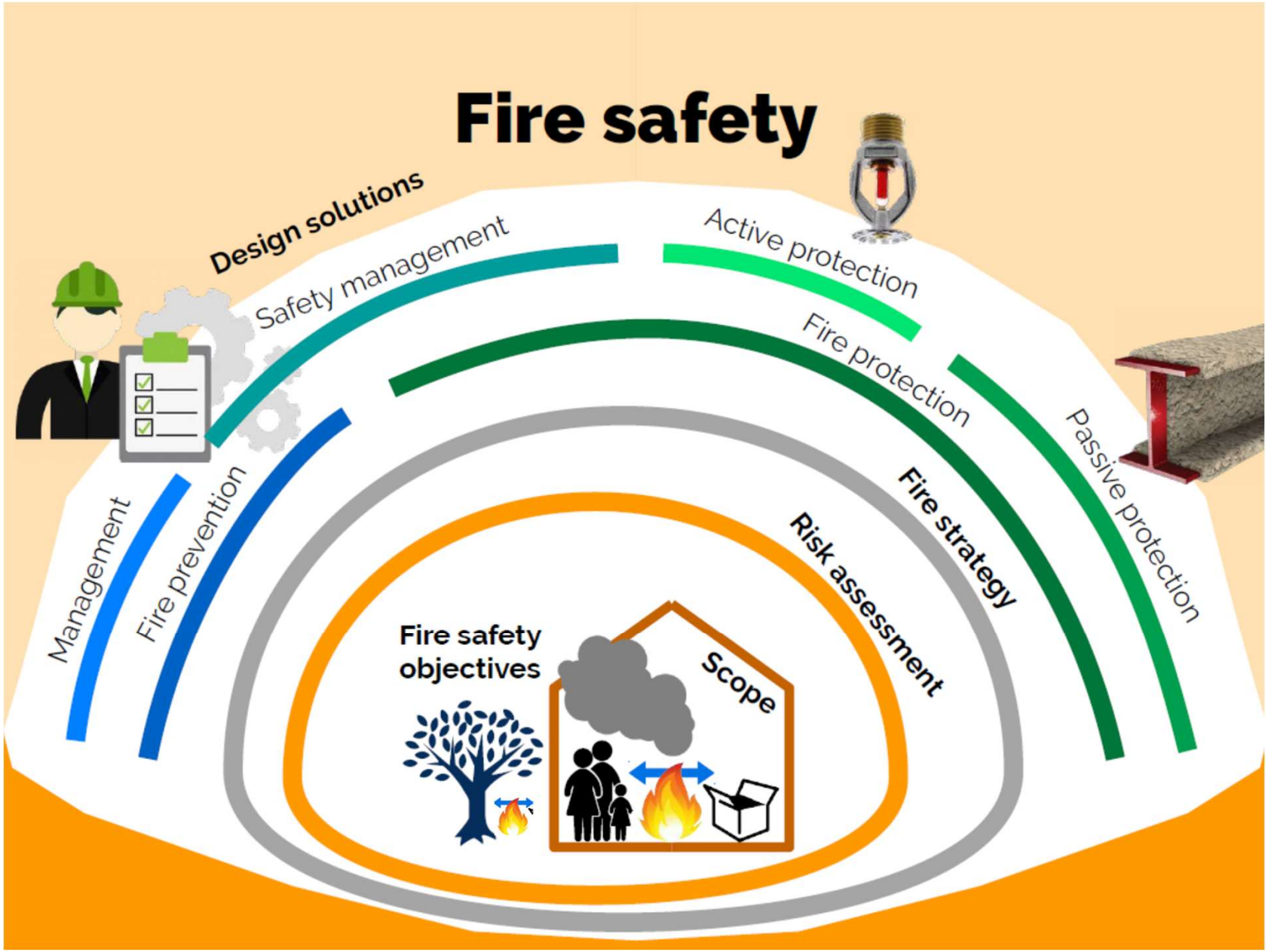
… in a complex system

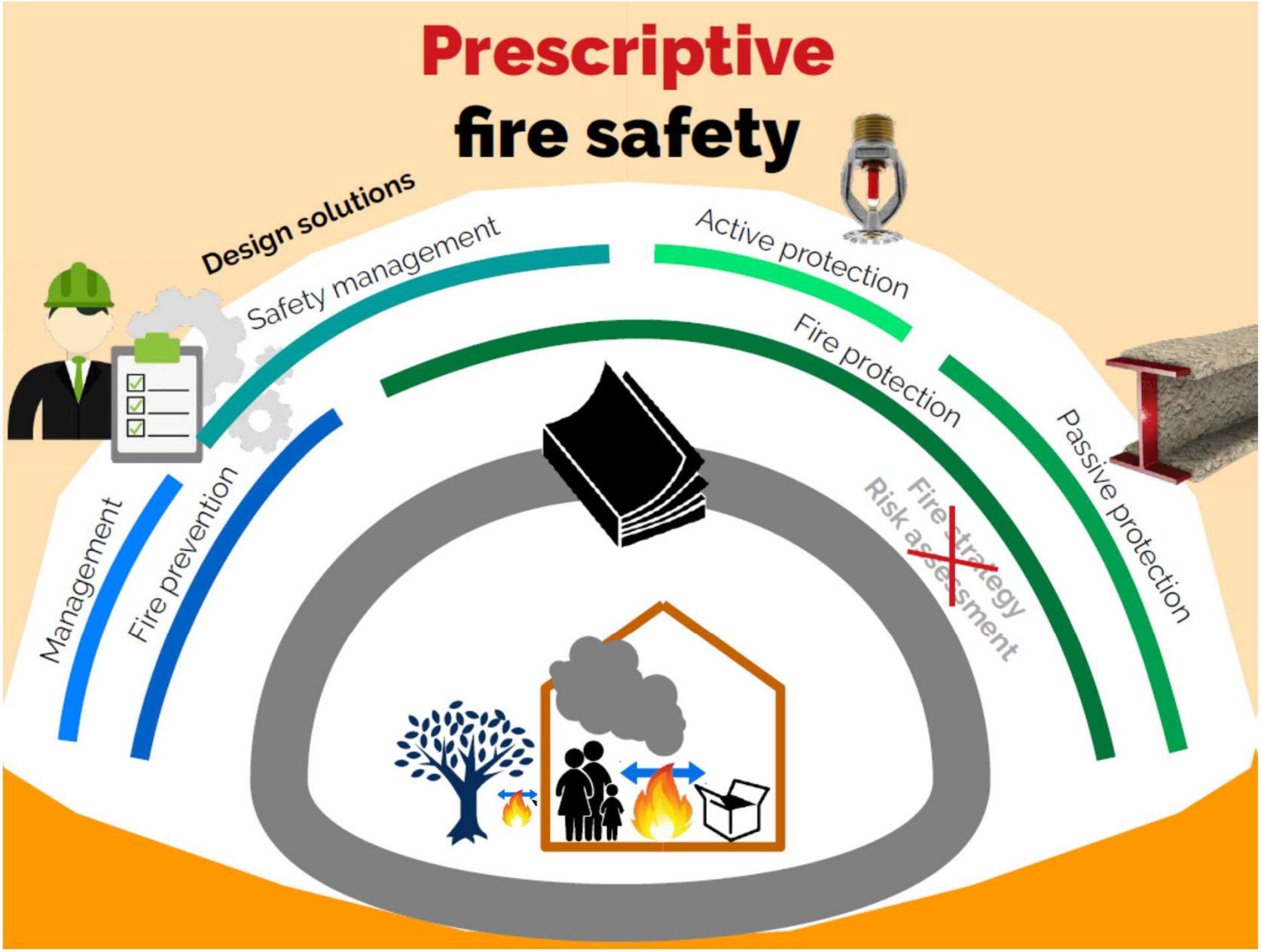


Fire → Params → Effects



Fire scenarios


Fire safety
Design solutions
Safety management
Active protection
Fire protection
Passive protection
Management
Fire prevention
Fire strategy
Risk assessment
Fire safety objectives
Scope


Prescriptive
fire safety
Design solutions
Safety management
Active protection
Fire protection
Passive protection
Management
Fire prevention
Fire strategy
Risk assessment

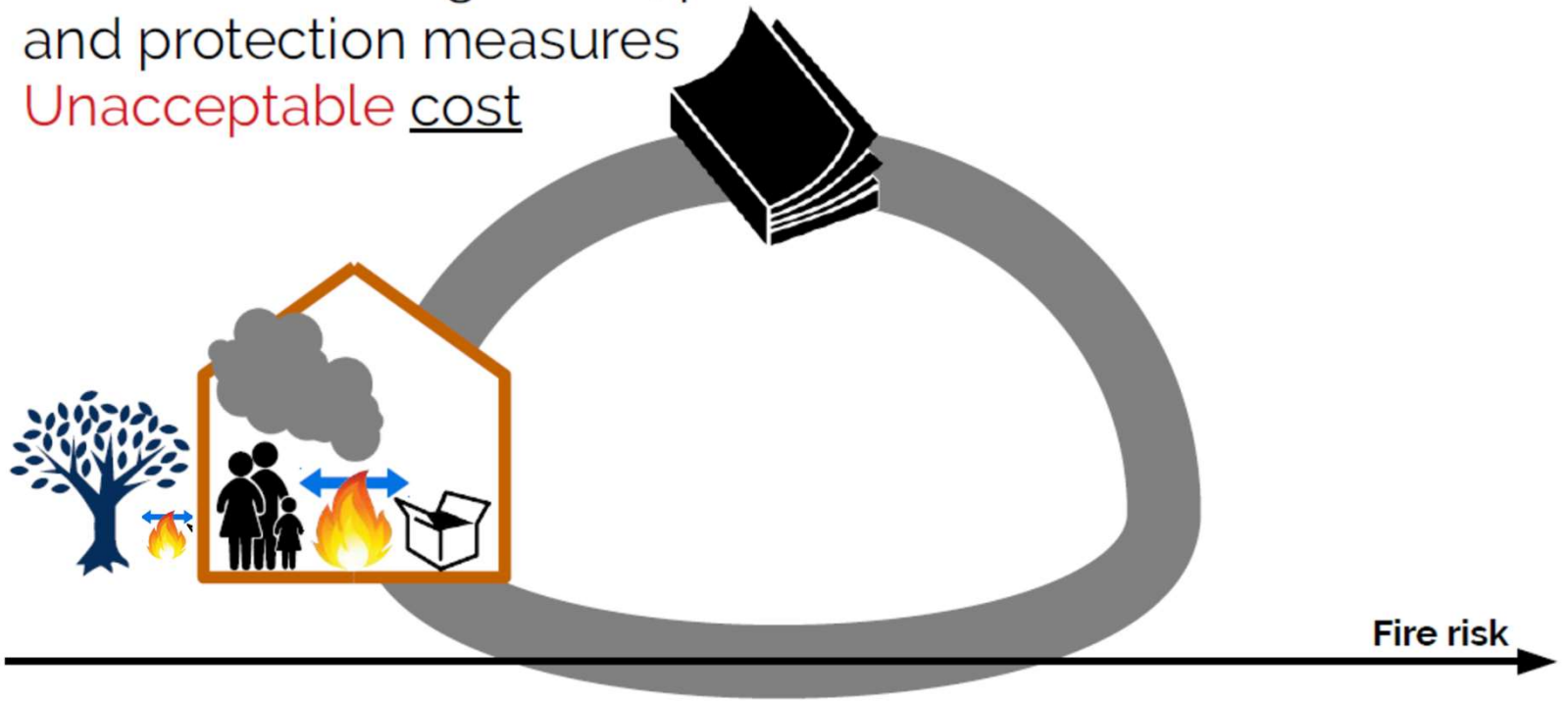
Prescriptive
fire safety

Average activity, coherent fire risk

Simpler design

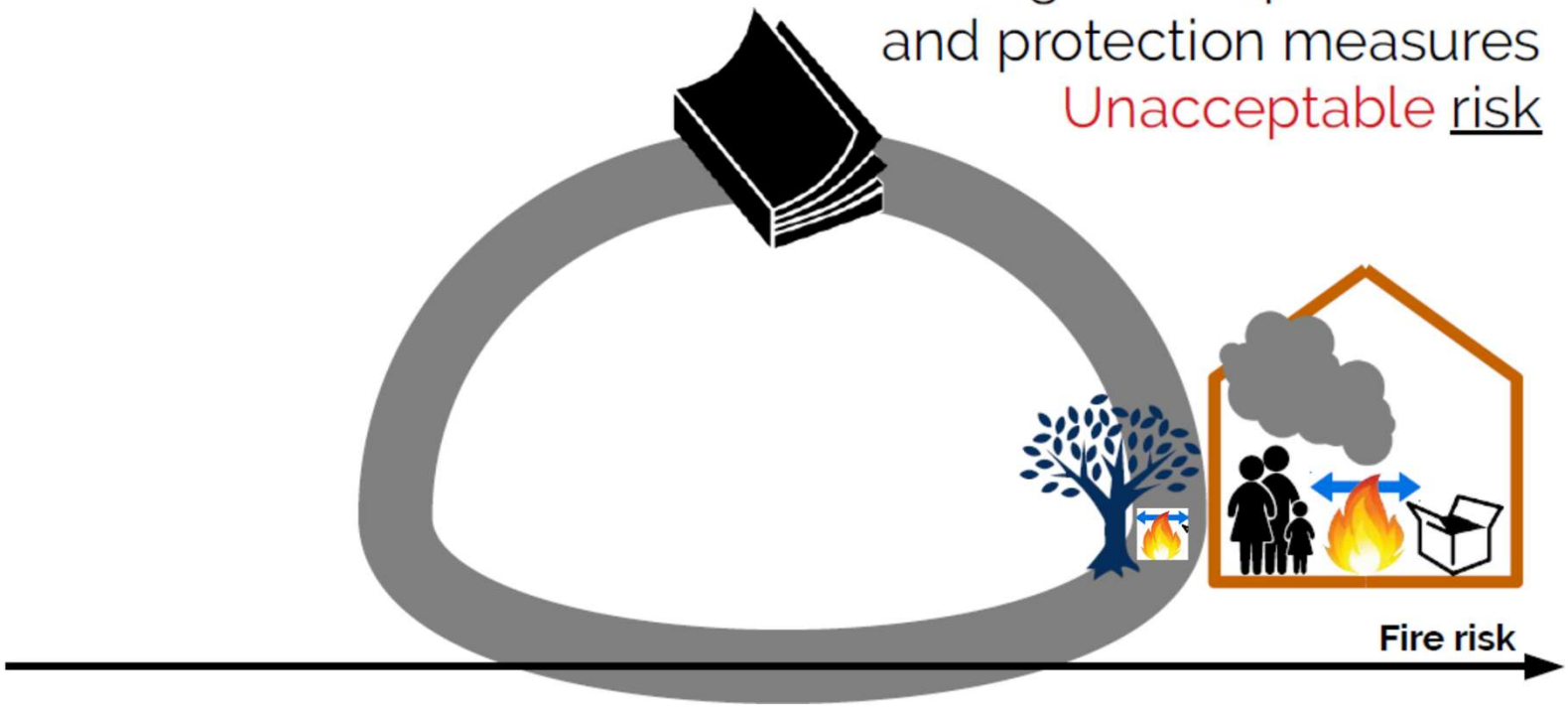
Prescriptive
fire safety

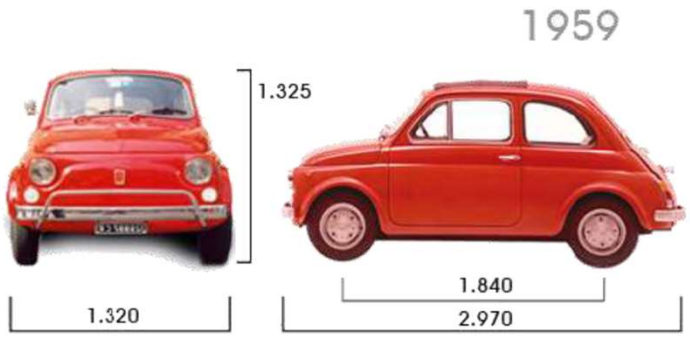
Simple activity, lower fire risk
Excessive management, preventive and protection measures
Unacceptable cost



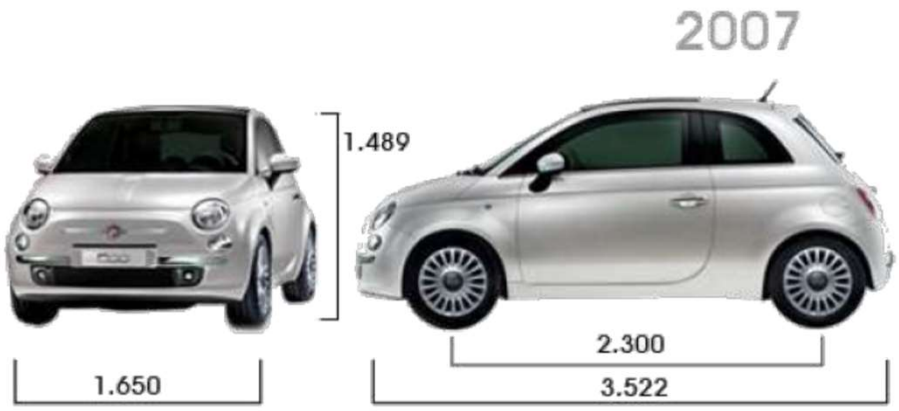
Prescriptive fire safety

Complex activity, higher fire risk
Insufficient management, preventive and protection measures
Unacceptable risk





A complex world needs **a flexible regulation**



An attempt in that direction:

Italian Fire Prevention Code, 2015

IFC15

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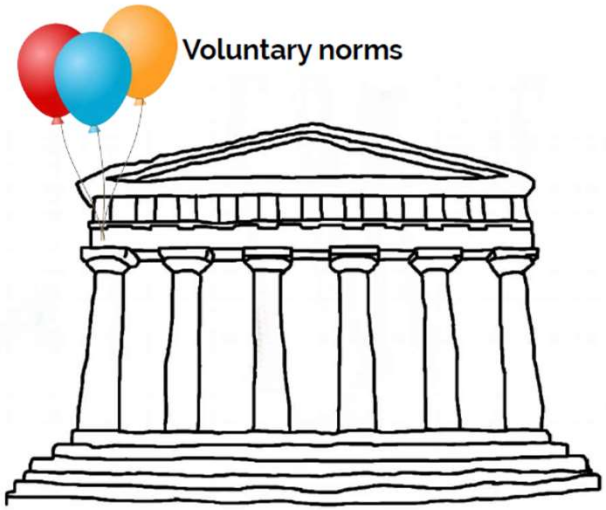
Italian regulatory context
in summary

- **1934-2015**
  - **Hundreds** of **strictly prescriptive** compulsory texts
  - Simple but rigid application
  - **Low** internal coherence, **no transparency** * some exceptions apply
    overall vision, language, methods, interactions, ...
- **2015-now**, IFC15
  - **One hybrid** text:
    prescriptive deemed-to-satisfy solutions +
    performance-based alternative solutions = IFC15
  - Simplicity + Flexibility
  - **High** internal coherence,
    an attempt towards transparency
    still far from perfect, maybe a step in the right direction

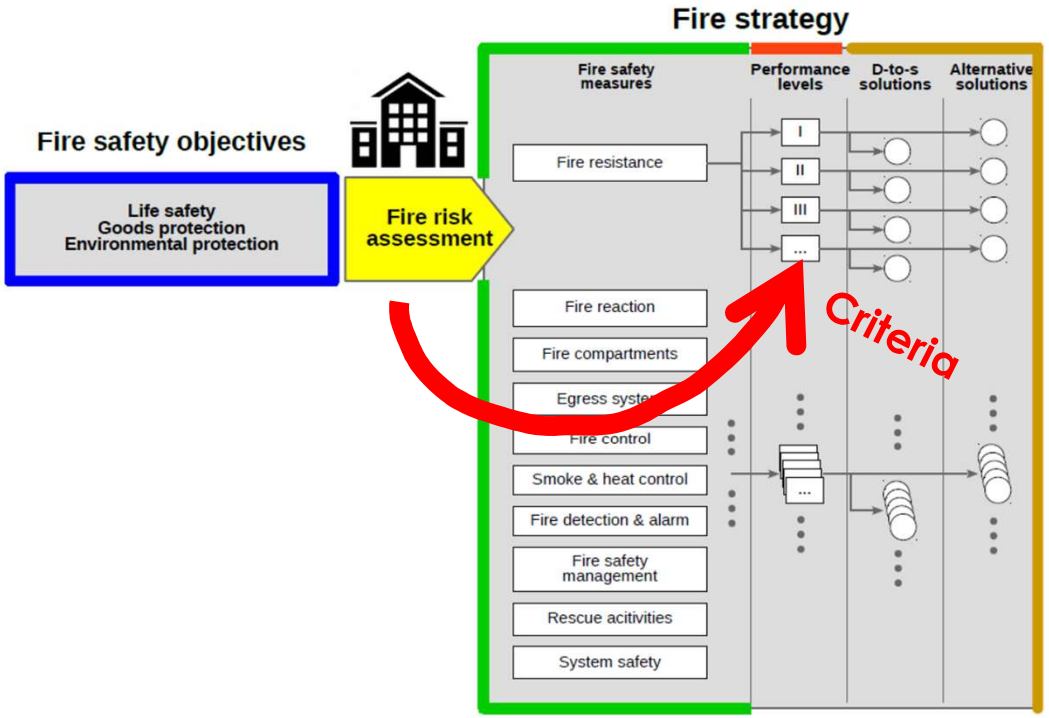
IFC15 structure



Fire safety objectives

RTV

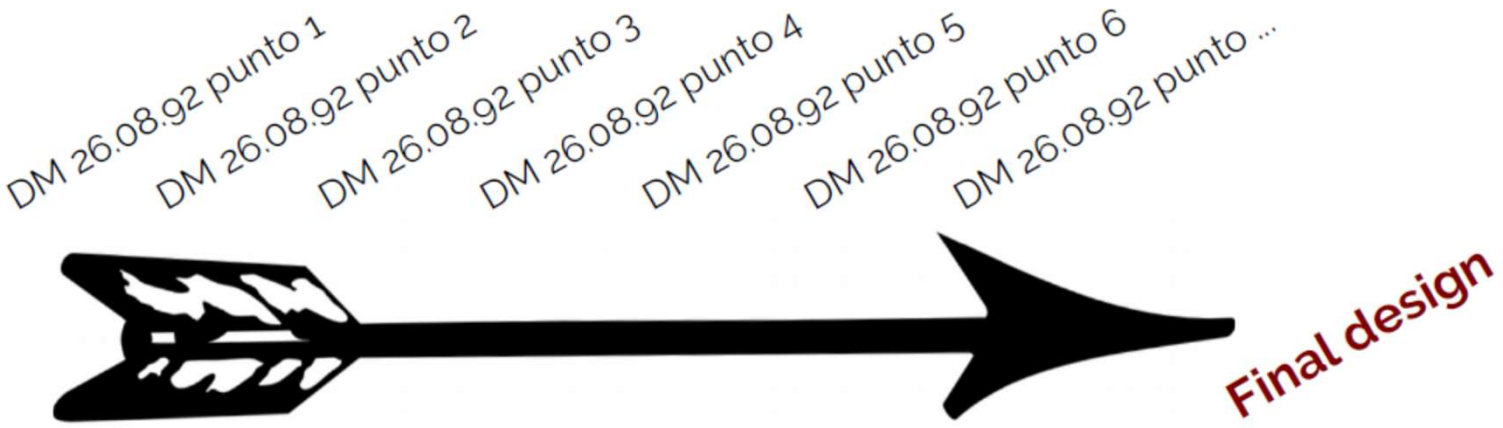
Fire strategy
Methods
Generalities



An example of

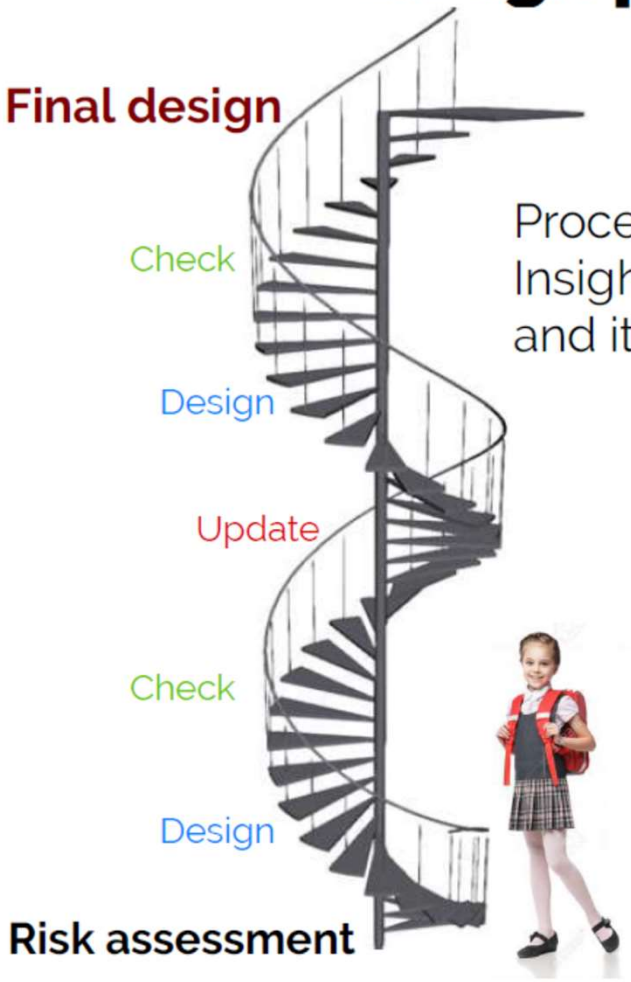
performance level selection

Prescriptive design process



Process without feedback loop
No knowledge of system complexity

Performance-based design process



Process with feedback loop
Insight into the system complexity
and its critical components

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S.6 «Fire Control measure»

S.6 scope:

a. control (or extinction) of a “small” starting fire;

b. manual control (or extinction) of a fire;

c. automatic control (or extinction) of a fire.

S.6.2 Performance levels

1. Table 129 shows the performance levels attributable to the *settings* (*areas*) of activity for the present fire protection measure.

Performance level	Description
I	No requirement
II	Extinction of a fire start
III	Manual fire control or extinction
IV	Inhibition, control or extinction of the fire with automatic systems extended to portions of activity
V	Inhibition, control or extinction of the fire with automatic systems extended to the whole activity

Table 122: Performance levels

S.6 «Fire Control measure»

Level of Performance	Assignment criteria
I	Not allowed in activities subjected to fire inspection
II	Area where all of the following conditions have been met: - Risk profiles: R_{life} included in A1, A2, B1, B2, Ci1, Ci2, $C_{ii}1$, $C_{ii}2$, $C_{iii}1$, $C_{iii}2$; R_{prop} equals to 1 and 2; R_{env} not significant; - crowding density not greater than 0.7 persons/m^2; - all floors of the activity located at a height between -5 m and 32 m; - qf specific fire load not greater than 600 MJ/m^2; - gross surface area of each compartment not greater than 4'000 m^2; - hazardous substances or mixtures are not used or stored in any significant quantities; - hazardous processing as concerns fire and explosion is not performed.
III	Activities not included in the other assignment criteria.
IV	**According to the results of the risk assessment** (e.g. area with high crowding, activity with complex geometries or underground floors, high specific qf fire load, hazardous substances or mixtures (significant quantities), hazardous processing as concerns fire, ...).
V	If requested by the owner, provided for by project technical specifications, required by the authorities for strategic buildings safety, or required by vertical technical fire safety regulations.

S.6 «Fire Control measure»

S.6 deemed to satisfy solutions:

- **LoP II** "Fire extinguishers must be installed";
- **LoP III** + Fire hydrants (or hoses) must be installed;
- **LoP IV** + An automatic system to inhibit, control or extinguish the fire must be provided to protect areas of the activity;
- **LoP V** + An automatic system to inhibit, control or extinguish the fire must be provided to protect **all the areas** of the activity;

S.6 «Fire Control measure»

S.6 d-ts-s applying RTV (Vertical Technical Rule) :

Offices

Area	Attività				
	HA	HB	HC	HD	HE
TA, TM, TO, TT	II	III			
TK	III [1]		IV		
TZ	Secondo le risultanze della valutazione del rischio				
[1] Livello di prestazione IV qualora ubicati a quota < -10 m o di superficie > 50 m².					

TK: Areas where qf>1200MJ/mq

HA: h ≤ 12 m;
HB: 12 m <h ≤ 24 m;
HC: 24 m <h ≤ 32 m;
HD: 32 m <h ≤ 54 m;
HE: h > 54 m.

Hotel

Posti letto	Area	Attività				
		HA	HB	HC	HD	HE
PA, PB	TA, TB, TC, TM, TO, TT	II	III			
PC	TA, TB, TC, TM, TO, TT	III				
PD, PE	TA, TB, TC, TM, TO, TT	III		IV		V
Qualsiasi	TK	III [1]		IV		
Qualsiasi	TZ	Secondo le risultanze della valutazione del rischio				
[1] Livello di prestazione IV, qualora ubicati a quota < -10 m o di superficie lorda > 50 m²						

PA: 25 < p ≤ 50;
PB: 50 < p ≤ 100;
PC: 100 < p ≤ 500;
PD: 500 < p ≤ 1000;
PE: p > 1000;

S.6 «Fire Control measure»

S.6 d-ts-s applying RTV (Vertical Technical Rule) :

Car parks

Autorimessa	Autorimessa								
	SA				SB				SC
	AA	AB	AC	AD	AA	AB	AC	AD	
HA	II	II [1]	III [1]	IV	II	III	III [1]	IV	IV
HB	II	III	III [1]	IV	II	III	III	IV	
HC; HD	IV				IV				
[1] Incremento di un livello di prestazione per autorimesse chiuse.									

AA: 300 m^2 < A ≤ 1000 m^2;

AB: 1000 m^2 < A ≤ 5000 m^2;

AC: 5000 m^2 < A ≤ 10000 m^2;

AD: A > 10000 m^2.

HA: -1 m ≤ h ≤ 6 m;

HB: -5 m ≤ h ≤ 12 m;

HC: -10 m ≤ h ≤ 24 m;

HD: tutti i casi non rientranti nelle classificazioni precedenti.

Schools

Area	Attività				
	HA	HB	HC	HD	HE
TA, TM, TO, TT	II	III			
TK	III [1]		IV		
TZ	Secondo le risultanze della valutazione del rischio				
[1] Livello di prestazione IV qualora ubicati a quota < -5 m.					

- TK: Areas where qf>1200MJ/mq or areas with hazardous substances or hazardous process

HA: h ≤ 12 m;

HB: 12 m <h ≤ 24 m;

HC: 24 m <h ≤ 32 m;

HD: 32 m <h ≤ 54 m;

HE: h > 54 m.

…and so on for shopping centers, kindergarten, …

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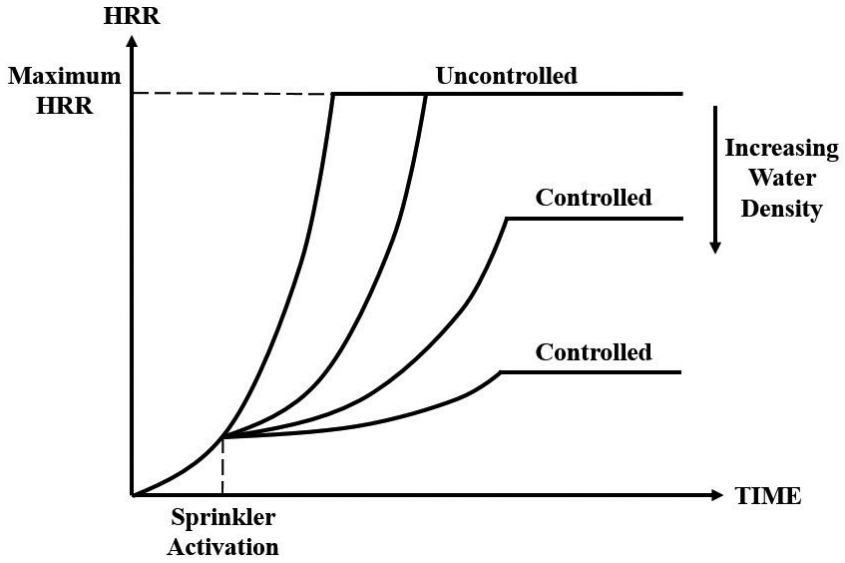
Fire Control & Fire Engineering Performance Design (FSE)

System or plant (fire control systems, Sprinkler, …) with superior availability: a system or plant with a higher level of availability than the minimum required by the reference standards of the system or plant considered;

Fire Control & Fire Engineering Performance Design (FSE)

If the active protection systems are considered in order to reduce the RHR(t) or to contribute in the mitigating of fire effects (smoke control, fire detection, sprinkler, …) superior availability systems must be designed and installed.



Grazie per l'attenzione

Piergiacomo Cancelliere, *Ph.D.*
E-mail piergiacomo.cancelliere@vigilfuoco.it

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