



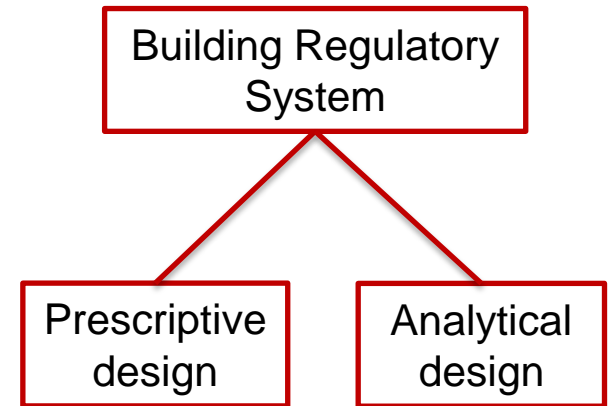
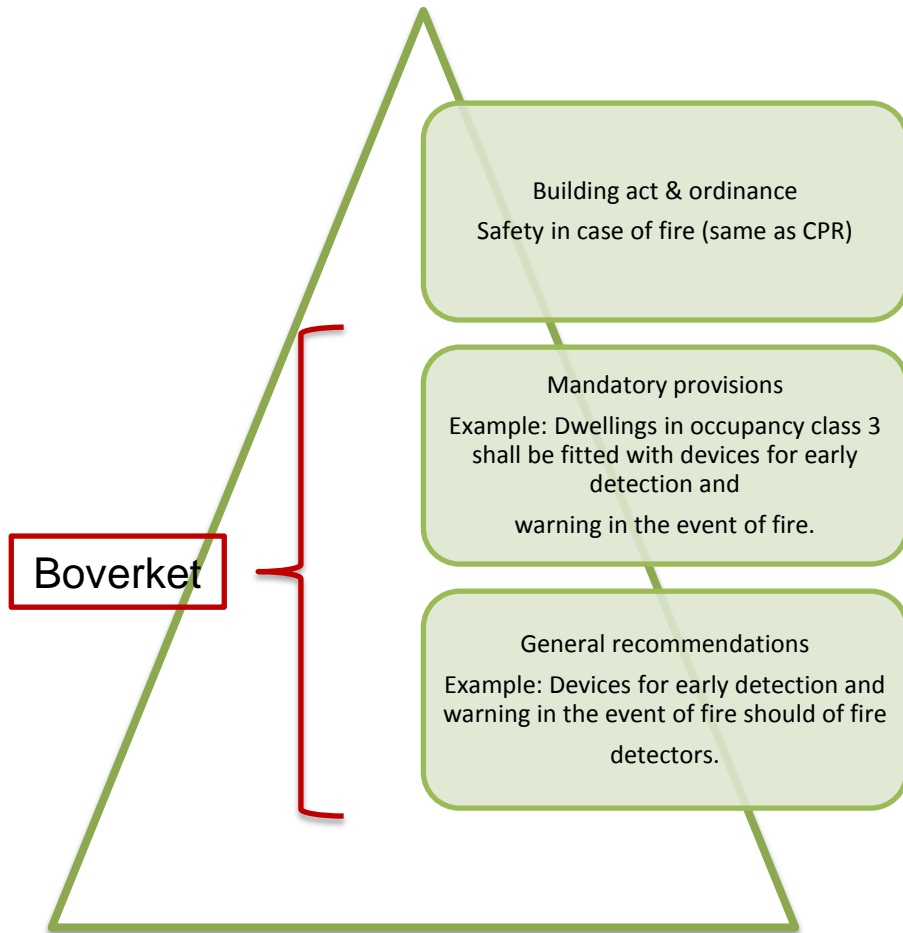
# Boverket

Swedish National Board of Housing,  
Building and Planning

## Sweden

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# Verifying Fire Engineered Solutions as part of a Building Regulatory System



### Br0

Buildings with a very high need for protection shall be designed in building class Br0.

- Buildings more than 16 storeys
- Large buildings containing hospitals
- Buildings containing prisons
- Buildings with certain assembly halls
  - Not on ground floor + > 1000 people
  - Alcohol + ground floor + > 600 people
  - Alcohol + not on ground floor + > 300 people

# Example: Tenability conditions

## Swedish general recommendations on FSE

## SIS-TS 24833:2014/INSTA 950

Tabell 7 Nivå för kritisk påverkan vid analys av utrymningssäkerhet

Kriterium	Nivå
1. Brandgaslagrets nivå ovan golv	lägst 1,6 + (rumshöjden (m) x 0,1)
2. Siktbarhet, 2,0 ovan golv	10,0 m i utrymmen > 100 m <sup>2</sup> 5,0 m i utrymmen ≤ 100 m <sup>2</sup> . Kriteriet kan även tillämpas för situationer där köbildning inträffar i ett tidigt skede vid den plats kön uppstår.
3. Värmestrålning/Värmedos	max 2,5 kW/m <sup>2</sup> eller en kortvarig strålning på max 10 kW/m <sup>2</sup> i kombination med max 60 kJ/m <sup>2</sup> utöver energin från en strålningsnivå på 1 kW/m <sup>2</sup>
4. Temperatur	max 80 °C
5. Toxicitet, 2,0 m ovan golv	Kolmonoxidkoncentration (CO) < 2 000 ppm Koldioxidkoncentration (CO <sub>2</sub> ) < 5 % Syrgaskoncentration (O <sub>2</sub> ) > 15 %

Table 5 – Tenable conditions when evaluating the available safe egress time (NKB, 1994 and adaptation by INSTA)

Parameter	Criteria
Visibility	Visibility no less than 3 m in the primary fire compartment at area of ≤ 100 m <sup>2</sup> . Visibility no less than 10 m at height of 2 m in escape routes and compartments of areas > 100 m <sup>2</sup> . As an alternative to determine visibility, a smoke-free height of 1.6 m + 0,1 x H.
Thermal <sup>a</sup>	Continuous radiation intensity of maximum 2.5 kW/m <sup>2</sup> and a short-term radiation intensity of maximum 10 kW/m <sup>2</sup> if the maximum radiant dose is less than 60 kJ/m <sup>2</sup> .
Temperature	Gas temperature not higher than 80 °C.
Toxicity <sup>b</sup>	CO < 2 000 ppm CO <sub>2</sub> < 5 % O <sub>2</sub> > 15 %
<sup>a</sup> In addition to the energy from background radiation.	
<sup>b</sup> Toxicity does not need to be calculated when the visibility surpasses 5 m.	

The Swedish general recommendation on FSE came into force in 2012.

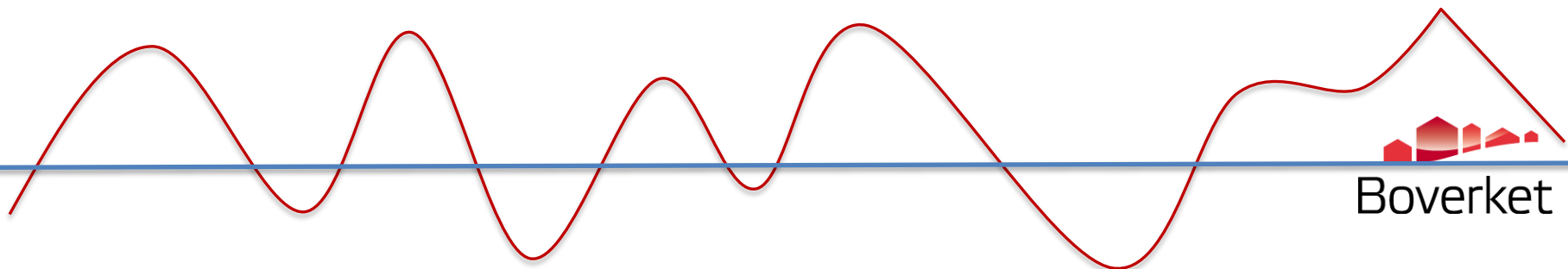
INSTA 950: published in 2014.

# Why did we write general recommendations on FSE?

In 1994 → performance based requirements and a possibility to use FSE

Around 1994 the control system changed, fewer controls by the local building authority and more responsibility for the client/owner

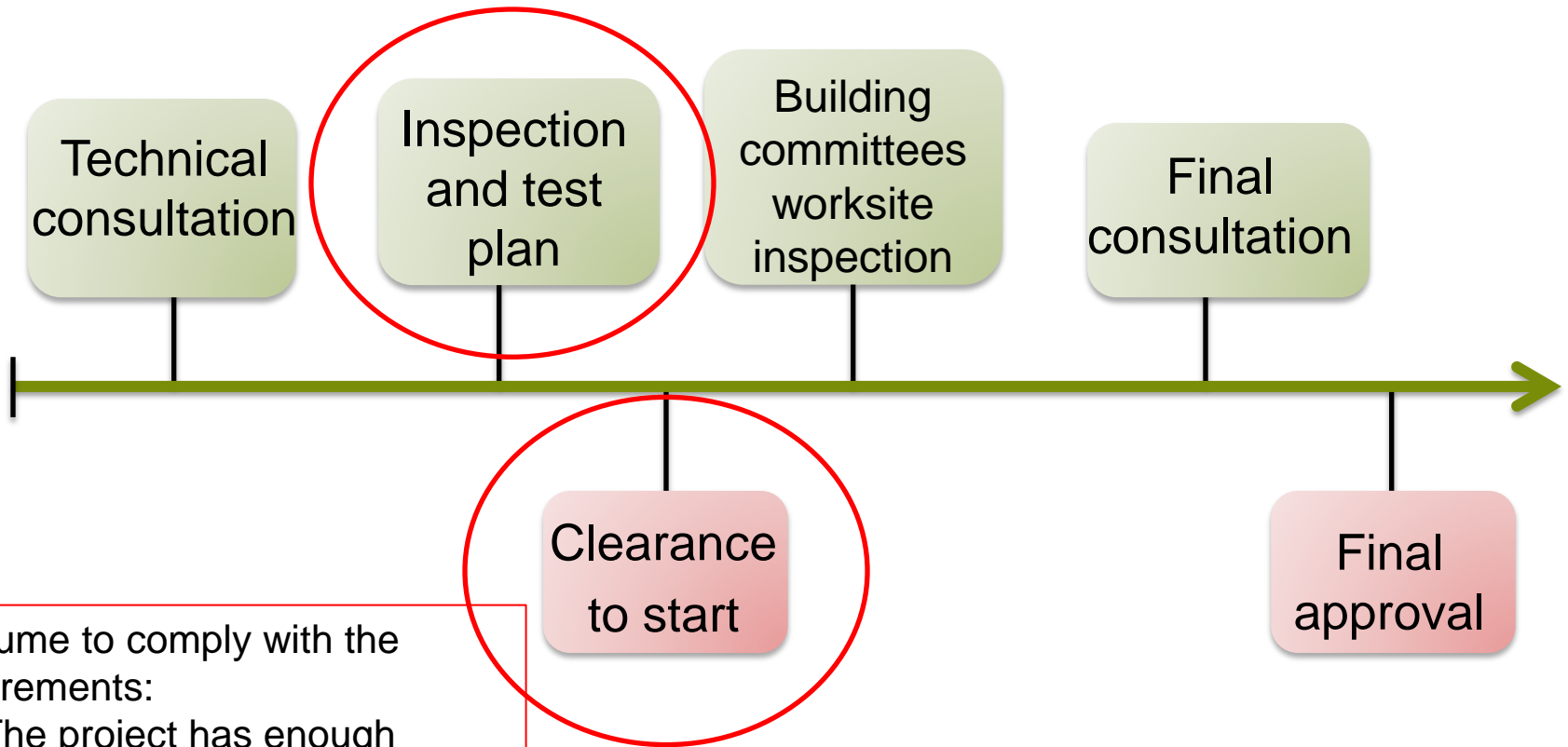
The building code gives us the minimum requirements that a building shall fulfil. When using FSE, 1994 →, the required level of fire safety varied a lot, sometimes below what was acceptable



# Control system in Sweden

A client/owner responsibility

- Deny a start certificate
- Have more controls in the inspection and test plan



Presume to comply with the requirements:

1. The project has enough competence
2. The project doesn't have enough competence



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**Thank you for your attention!**

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