NORWEGIAN BUILDING AUTHORITY

Building Regulations in Norway

History and development

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Content of the Presentation

- The Building Authorities
- The Building Regulations
- Experiences from two revision processes

The Kingdom of Norway

- Area: 385 000 sq. km – as Japan
- Population: 5,3 million – as Singapore
- Capital is Oslo: 660.000 – fastest growing in Europe
- Other major cities: Bergen 280.000
  Trondheim 190.000
- No. of local authorities: 428 – decreasing
- Not a member of EU, but the EEA

The Building Authorities

- **Parliament (”Stortinget”)**
  - Adopts laws and regulations
- **Ministry of Local Government and Modernisation**
  - Supreme authority responsible for housing policy and the Planning and Building Act
- **Norwegian Building Authority**
  - National authority responsible for building regulations
- **Municipal/local building authority**
  - Executive authority in building projects

The Norwegian Building Regulations

The oldest Norwegian Regulations

Preventing structural collapses and fires

- 940: The law of Haakon Adalsteinfostre
- 1100: The Gulating Law
- 1274-76: The Laws of Magnus Lagabøter

- No building requirements
- Punishment for causing collapse or fire

15th – 19th century City conflagrations

Fra Aalesund efter Branden: Tilvenstre betegner et Krybs Hermetikfabrikens høie Bilæ, hvor Branden brød ud.

Ålesund 1904

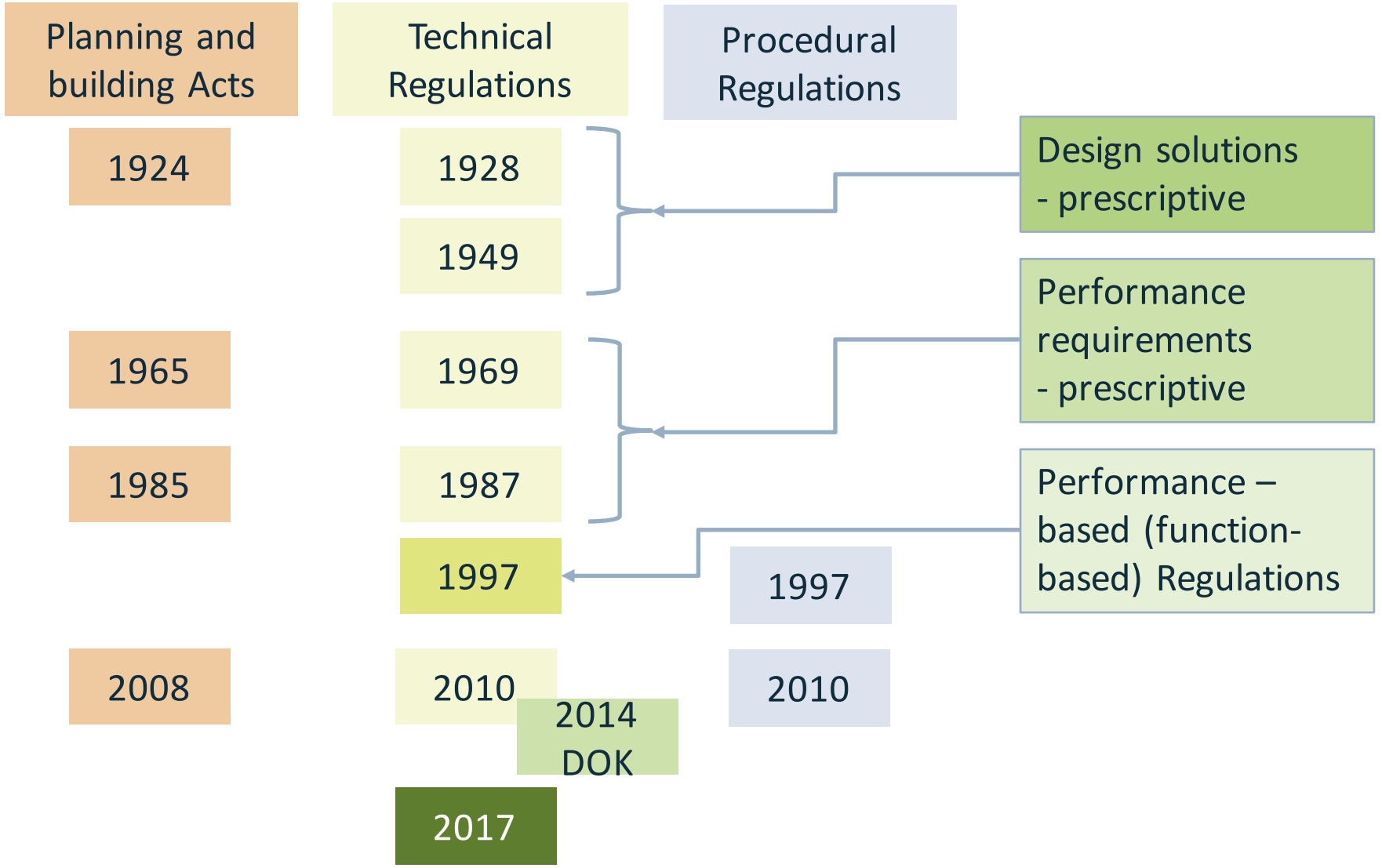
- Oslo: 1624, 1686, 1708, 1785, 1819, 1858, 1879
- Bergen: 1413, 1561, 1582, 1589, 1623,1640,1660, 1675, 1686, 1702,1756, 1795, 1830, 1855, 1916
- Trondheim: 1432, 1531, 1598, 1651, 1681, 1708, 1717, 1788, 1818, 1841, 1842, 2002
- Stavanger: 1684, 1768, 1833, 1860
- Drammen: 1850, 1857, 1866, 1870
- Ålesund: 1904

Building Regulations 17th – 19th century

- Exterior brick walls mandatory within city boundaries

- Poor people had to build their houses outside the city boundary

Building Regulations 20th – 21th century



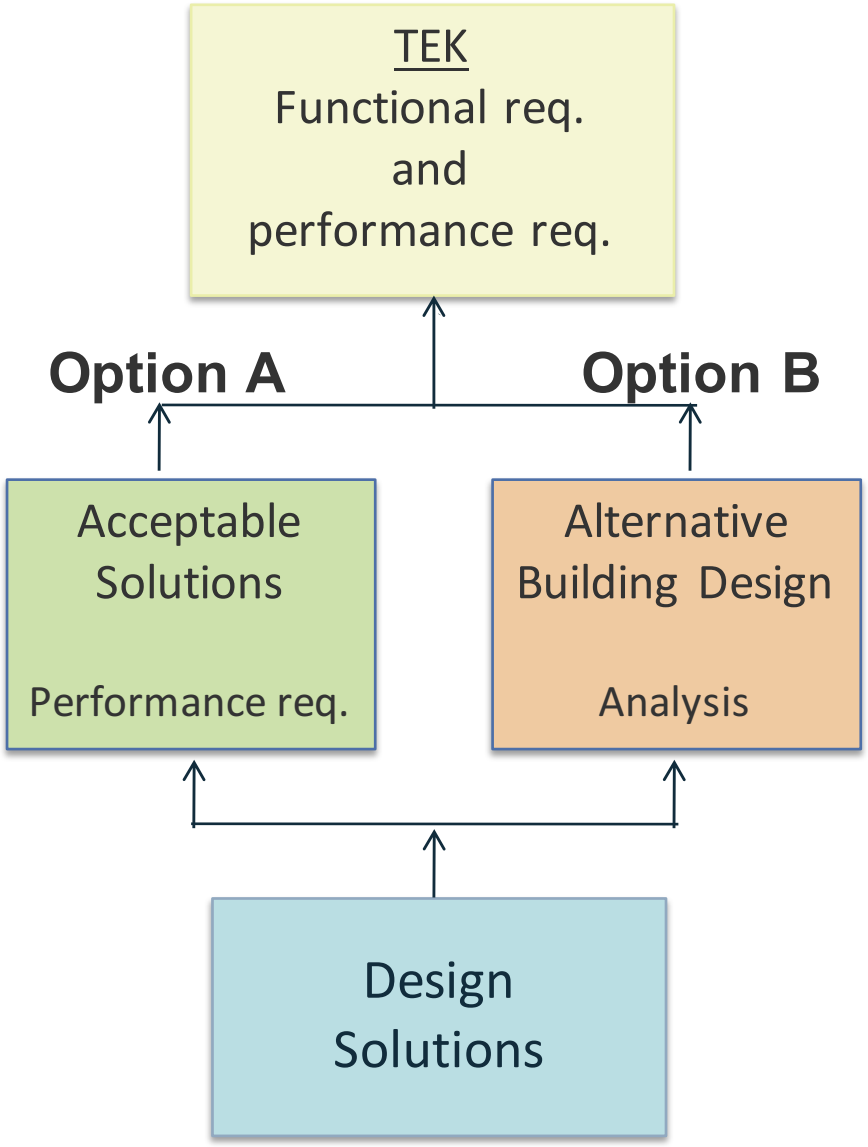
Present Norwegian Building Regulations

- PBA: The Planning and Building Act
  - TEK10: Technical Regulations
    - VTEK10: Acceptable Solutions
  - SAK10: Building Application Regulations
    - Including responsibility and control
  - DOK: Product Marketing Regulations

- In English at our web site www.dibk.no (PBA, TEK10 and SAK10):

  http://www.dibk.no/no/BYGGEREGLER/Gjeldende-byggeregler/Building-Regulations-in-English/

Present Norwegian Building Regulations



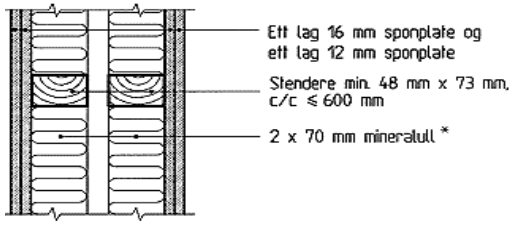
Functional requirement

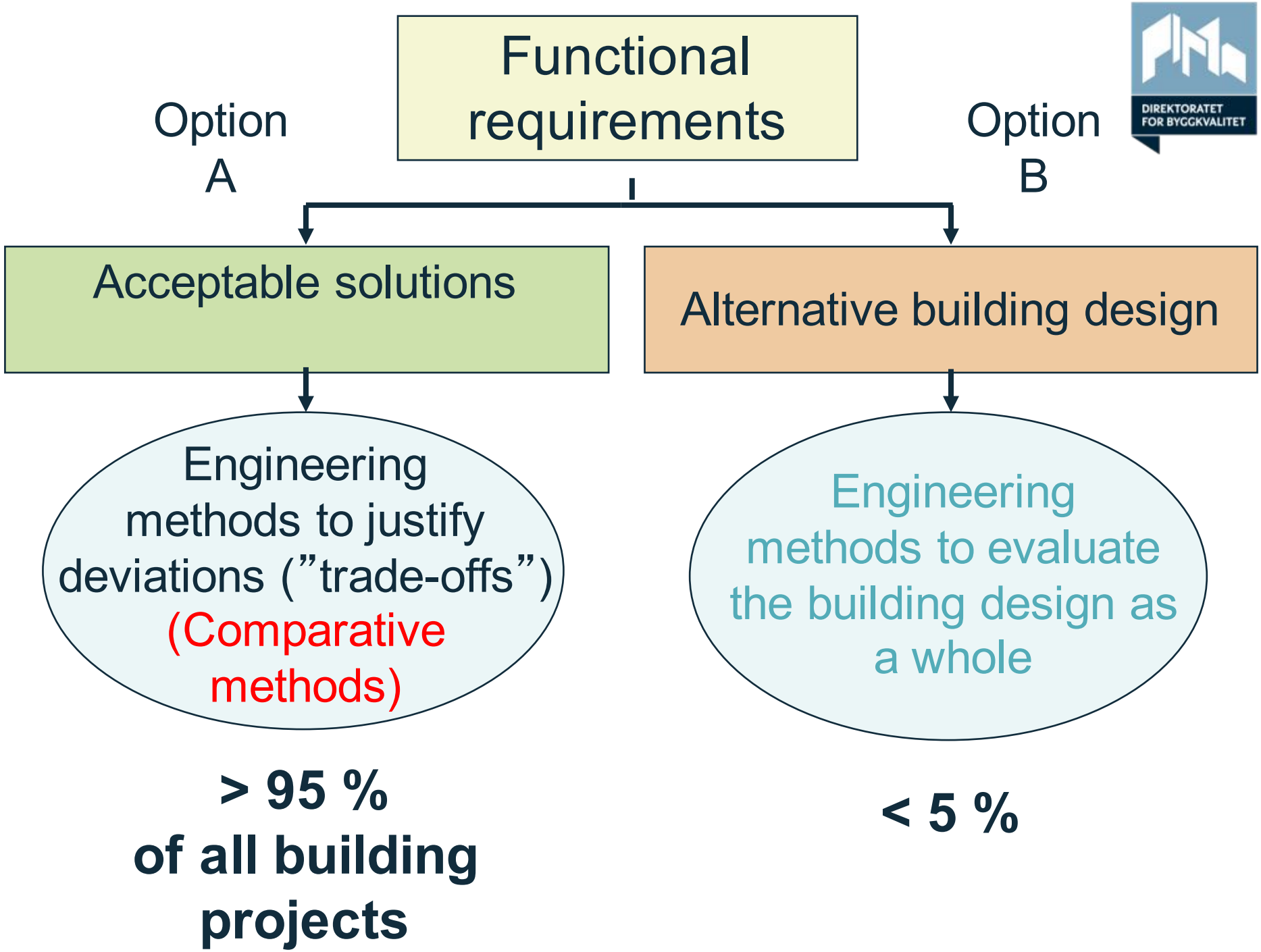
Load bearing capacity and stability at least for the time necessary for escape and rescue

Performance requirement (acceptable solutions or analysis)

REI 30

Design solution




Functional requirements
Option A
Option B
Acceptable solutions
Alternative building design
Engineering methods to justify deviations (”trade-offs”) (Comparative methods)
Engineering methods to evaluate the building design as a whole
> 95 % of all building projects
< 5 %

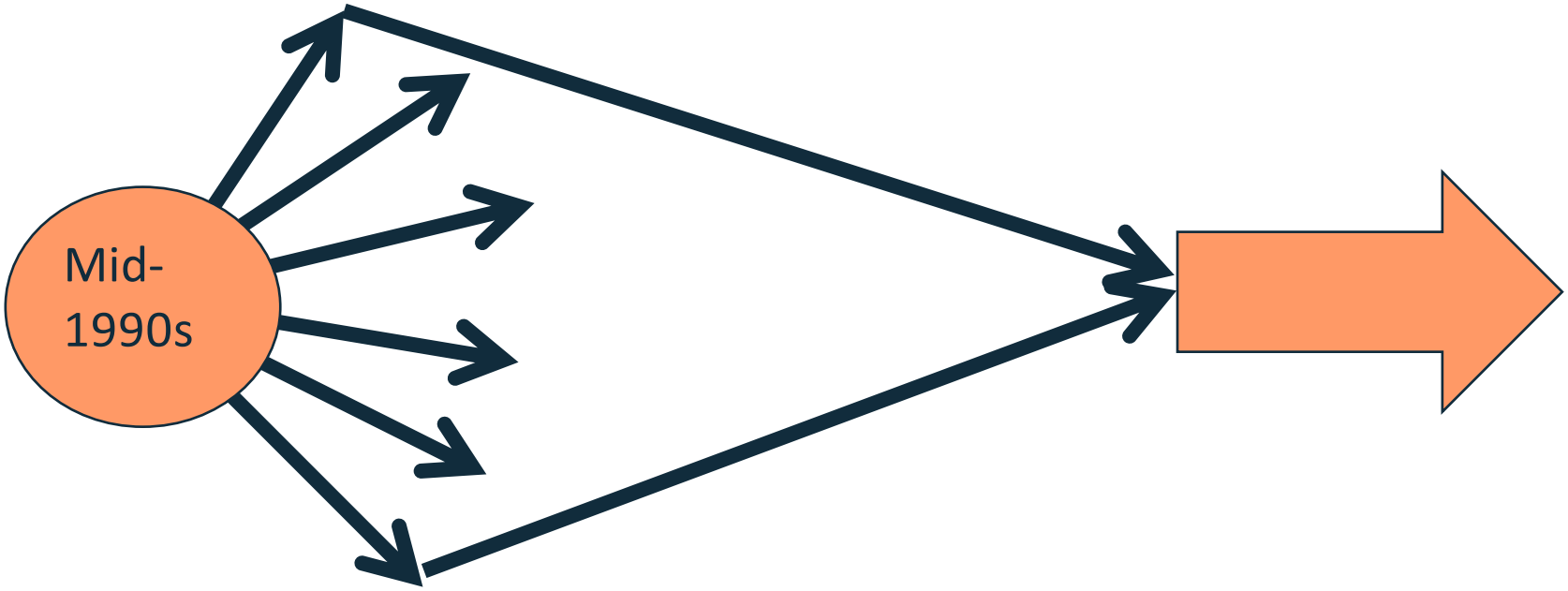
Performance-based Design - Experiences

- Alternative building design is only possible if the fulfilment of a functional requirement may be achieved by a set of solutions
  - Fire safety and energy efficiency

- Energy efficiency
  - Mandatory verification method
  - *Calculations of buildings' energy needs and heat loss figures shall be carried out in accordance with Norwegian Standard NS 3031:2014 Energy and Power Demand for Heating of Buildings -Calculation Rules.*

- Fire safety
  - No mandatory verification method

The performance of Fire Safety Engineering



Need to get the engineers on the same track!

FSE – Verification Methods

- Norwegian Standard
- *NS 3901:2012 Standard on requirements to risk assessment for fire in construction works*
- Nordic Technical Specifications
  - *SN-INSTA/TS 950:2014 "Fire Safety Engineering – Comparative method to verify fire safety design in buildings"*
  - *SN-INSTA/TS 9xx:2017 "Probabilistic Methods for Verifying Fire Safety Design in Buildings*" (ongoing work)
- International Standards and Specifications
  - ISO, BS etc.

Mandatory third party control

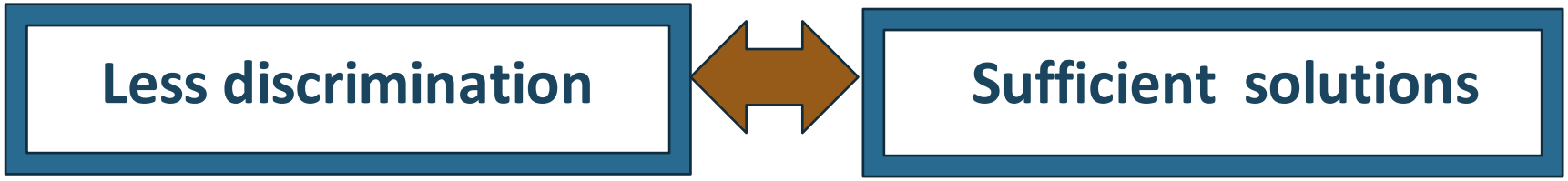
- As of 01.01.2013
  - Dwellings (focus on execution):
    - Moisture control in wet rooms in all dwellings and air tightness in new dwellings.
  - Larger buildings (design and execution):
    - Building physics (energy efficiency, air tightness, moisture control)
    - Structural safety (main loadbearing system)
    - Geotechnical safety (quality of initial surveys, how geotechnical tasks specified by accountable designer/engineer have been followed up)
    - Fire safety strategy

Experiences from two revision processes

TEK10
Initiated by two new Acts

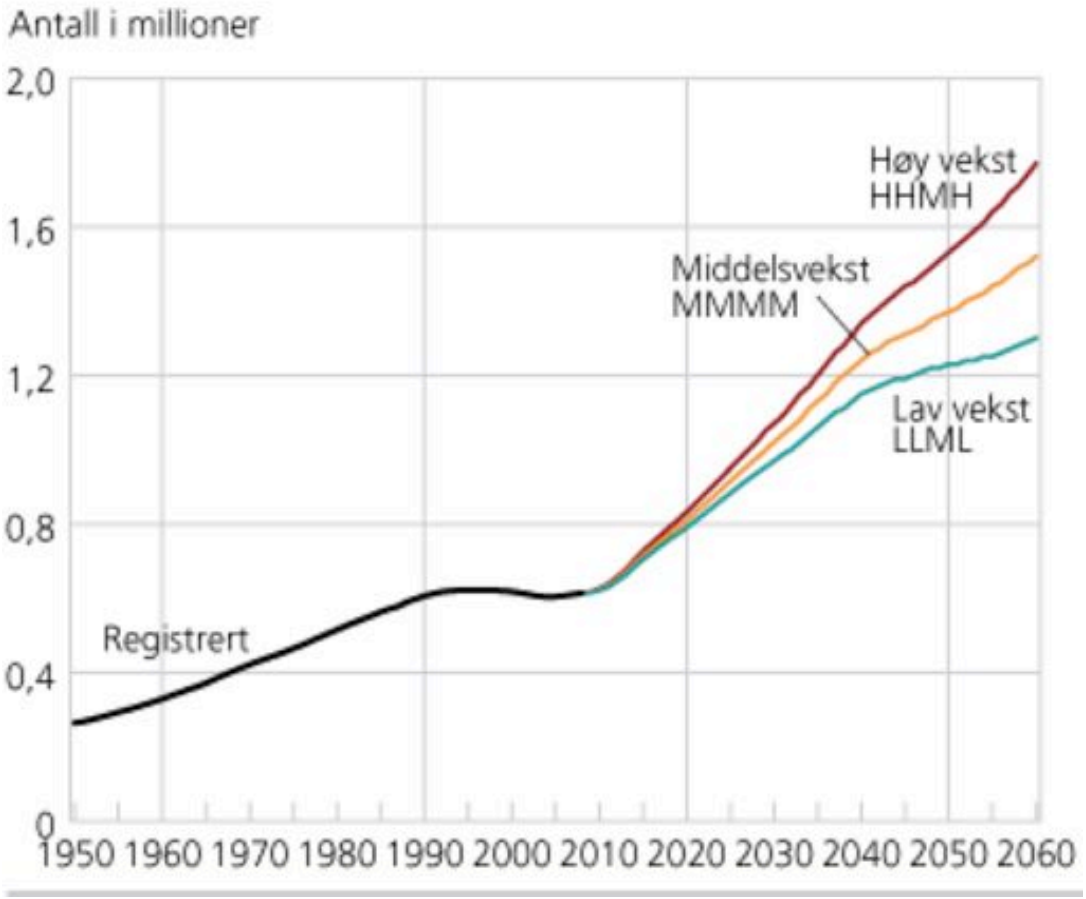
The Anti-Discrimination and Accessibility Act of 2009

The Planning and Building Act of 2008



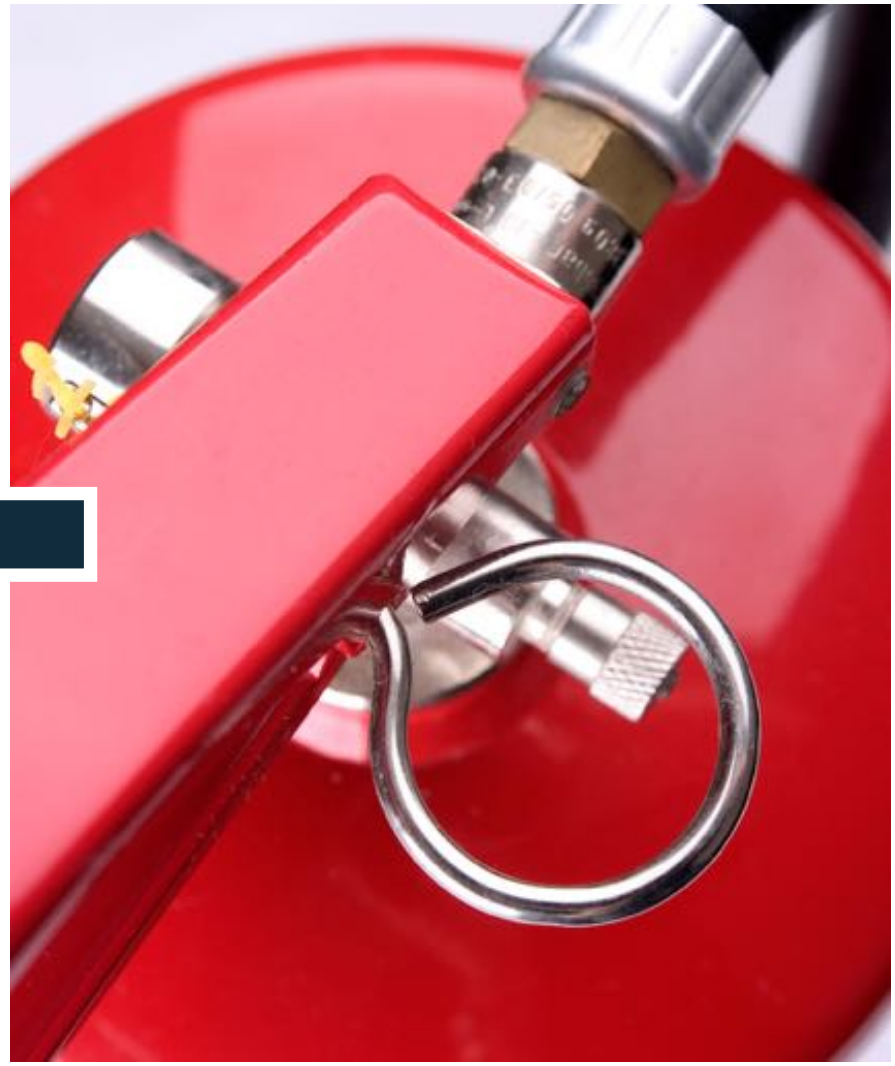
Ageing population

The number of persons in Norway aged 67 years and older. High, medium and low growth rate. (Statistics Norway)



Dementia and activities which are representing a fire hazard - a bad combination!

When limbs fail and every second counts ...
- a bad combination!



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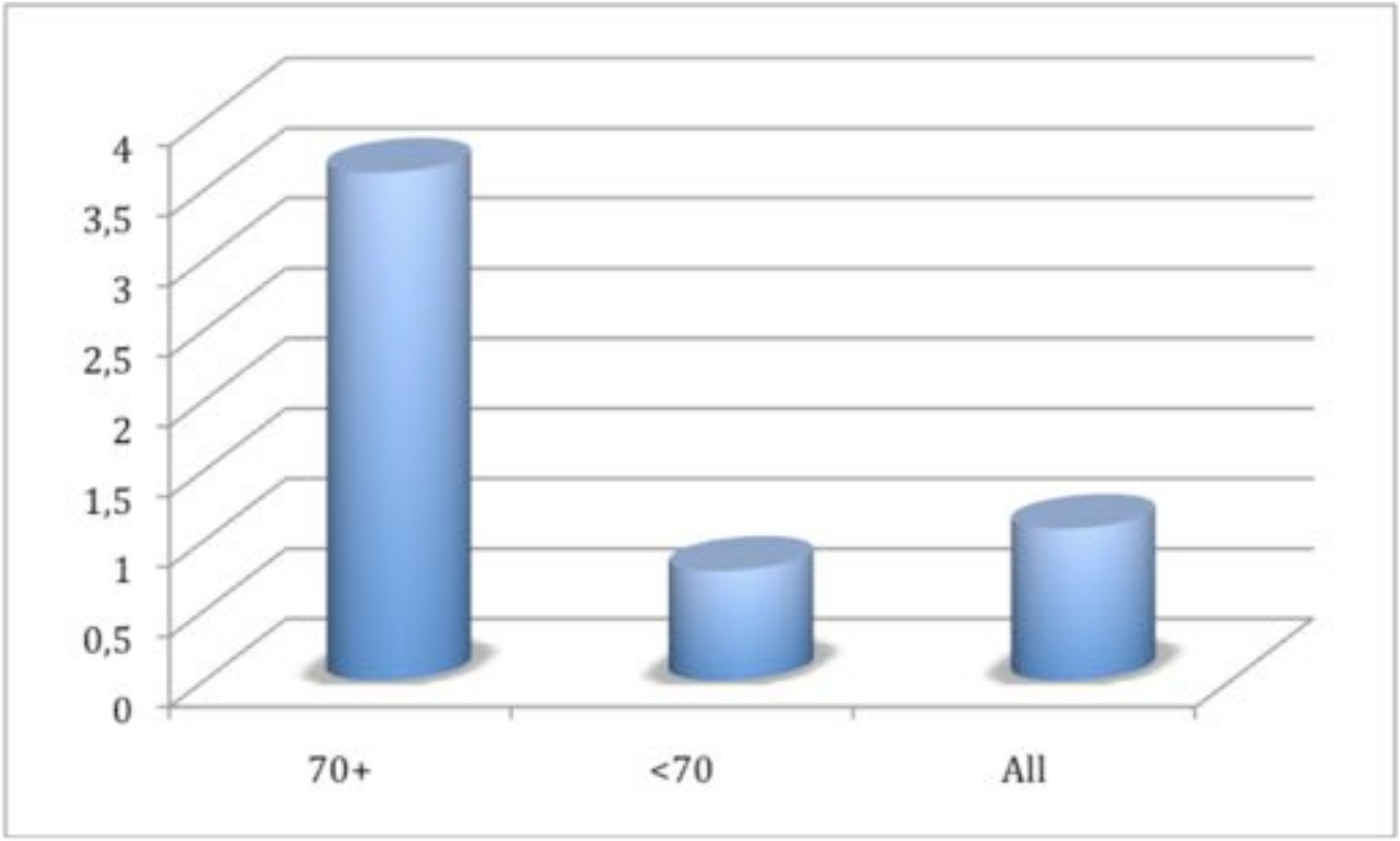
Fire risk



Death rates from residential fires, 2001-2007. Deaths per 100 000 population (SINTEF NBL)

Challenge:

“Live in your own home for as long as possible”

TEK10
New prescriptive requirements

- Accessibility (residential buildings) and universal design (public and work buildings)

- Fire safety
  - Automatic fire extinguishing systems
  - Hospitals, health care facilities, care homes etc.
  - Residential buildings where lift is required
  - Automatic smoke alarm systems or electric powered smoke detectors (row houses etc.)
  - Evacuation plans in most buildings except from residential buildings, industrial and storage buildings

TEK10

- Economic impact roughly calculated
  - Apartment buildings
    - Additional building costs estimated to be NOK 250 – 550 (€ 25-55) per m2
  - Public and work buildings
    - Additional building costs estimated to be 1 % + NOK 250 – 400 (€ 25-40) per m2
    - Costs related to outdoor area: 2 %
- Main benefits
  - Equal use, elderly people able to live at home longer
  - The cost savings for one person pr. year NOK 500 000 (€ 50 000)
    - Difference between home-based and institutional care
- No major objections from the bodies entitled to comment
  - "The benefits exceeds the costs"

TEK17

Initiated by new Government

- **New government as of October 2013**
  - Focus on deregulation
  - Both the procedural regulations and technical regulations
  - Reduced building costs; residential buildings primarily
    - Without changing requirements ensuring health and safety
  - Digitalization of the building process

TEK17 - The Process

- Initiative from the Ministry – 2014-2015
- Input meetings with the building industry – Spring 2015
- Proposal from Norwegian Building Authority – Nov. 2016
- Proposal presented to the building industry – Nov. 2016
- Public inquiry – Nov. 2016 – Feb. 2017 (Approx. 200 submissions)
- Final proposal from Norwegian Building Authority
- Completion in consultation with the Ministry
- Submission to Parliament
- Adoption in Parliament
- Into force – July 1. 2017

TEK17 – The main focus

1. Adjustments of prescriptive requirements in order to reduce building costs in residential buildings (primarily)

2. Clarification and simplification
   - Coherence between goals, functional requirements and performance requirements
   - Clear requirements and performance levels
   - Adaption for automatic rule checking
     - Unnecessary text and recommendations removed
     - Fewer qualitative requirements

TEK17

Proposed adjustments of prescriptive requirements (some examples)

- Alternative or reduced wheelchair turning area
  - Circle with diameter 1,50 m (student homes 1,30 m)

  or
  - Rectangle 1,30 m x 1,80 m
- Pedestrian access ways
  - Gradients shall not be steeper than 1:15
- Reduced requirements on storage rooms and storage spaces
- Reduced requirements on light and views (outlook)

Based on 23 official studies and reports

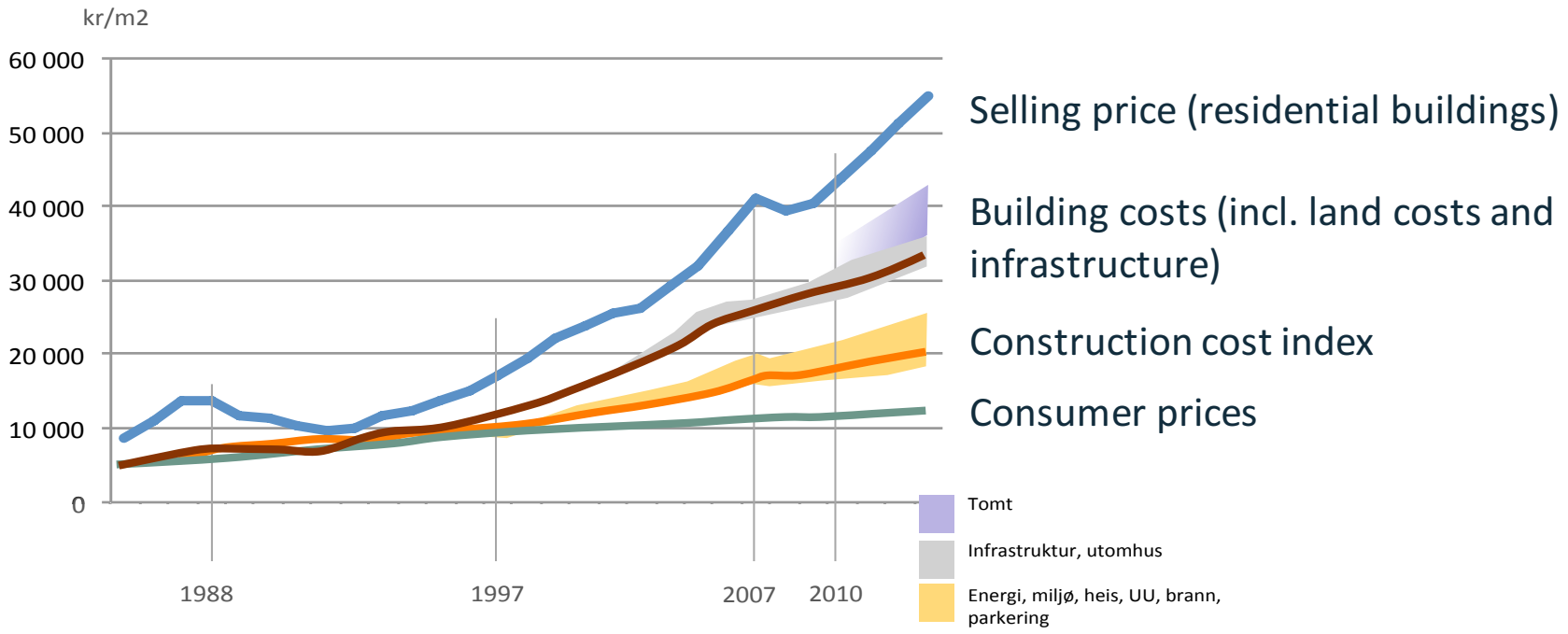
TEK17 - Lessons learned

- Challenging to remove or reduce prescriptive requirements
  - Major objections primarily from interest groups representing people with disabilities and from architects
- Balance between policy goals and professionally sound solutions
- Difficult to calculate reductions of building costs
  - Many parameters; building plot, size, layout etc.
  - Reduced building costs estimated to NOK 100 000 (€ 10 000) per dwelling unit

TEK17 - Lessons learned

- The building industry does not like frequent changes of the regulations
  - "All changes in building regulations are increasing the costs"
- "Homebuyers will not benefit from reduced building costs"
  - At least in todays market situation

Construction costs and selling price



Thank You!