

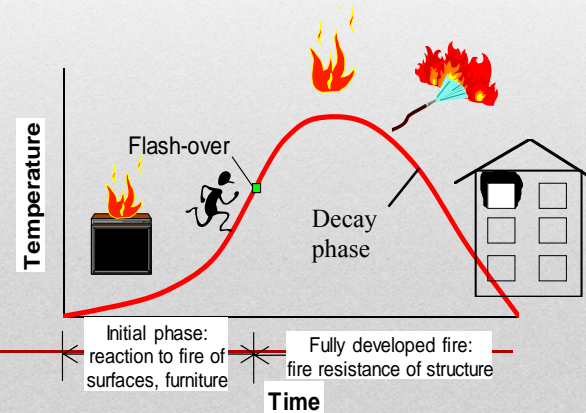
Execution and fire safety

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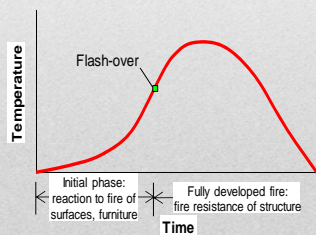
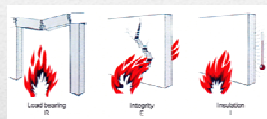
Fire requirements

- Escape in the case of fire
- Reaction to fire (Surface classes)



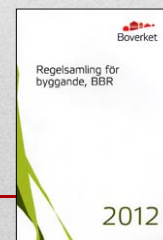
Fires

- There are 2 major scenarios to describe sufficient performance:
 - Natural (parametric) fire
 - Nominal (standard) fire



- Requirements are given mainly in national regulations
- Mostly national methods
- The building owner will usually not require a higher level than prescribed.

Requirements



Requirements

Without sprinkler With sprinkler



Wooden
bearing
structures

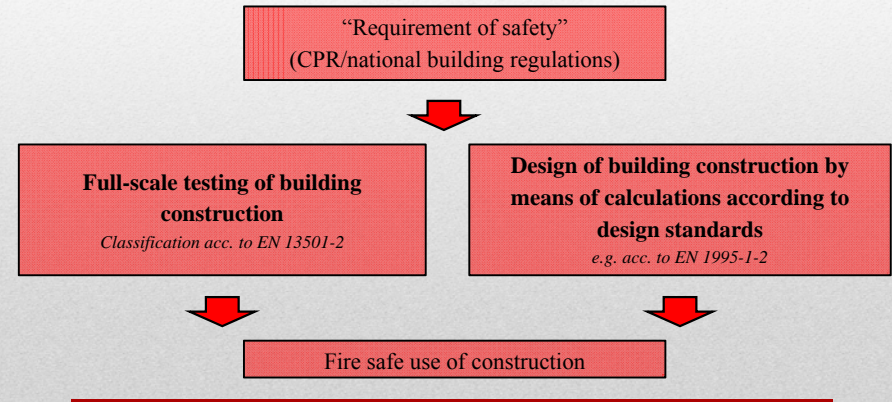
Wooden
facades

Wooden
interior

**Wooden
residential
houses**
Limits of storeys

■ ≥ 5 storeys
 ■ 3-4 storeys
 ■ ≤ 2 storeys
 ■ No information

European system



- Substitution by calculation is somehow harmonized through the relevant Eurocode parts on fire (EN 1991-1-2 and EN 1995-1-2) and further developed in the handbooks and guidelines (Fire Safety in Timber Buildings, Brandsäkra Trähus).

Design



- To ensure the safety of the final building
- To consider consequences of a fire during execution.

Execution



- Detailed solutions are important in all types of buildings, but may have greater impact in wooden houses than in other types of constructions.
- There are solutions and properties (quality of joints, limited gaps, sufficient tightness) that can only be controlled at building site

i.e. according to execution standard

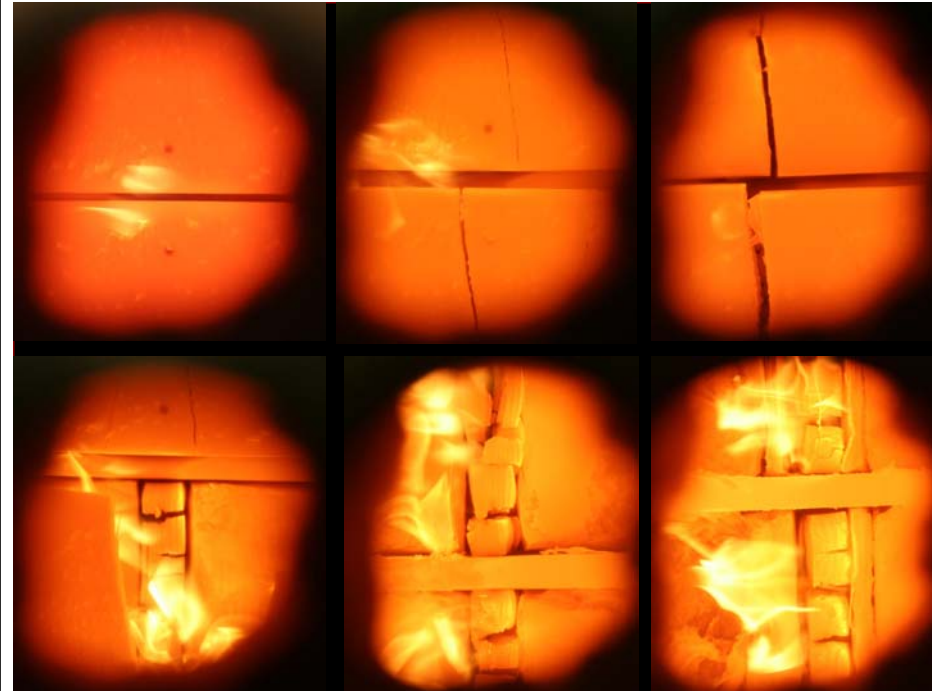
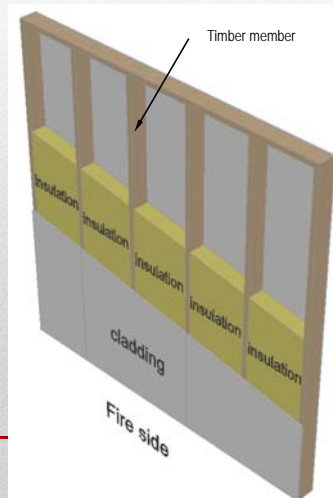
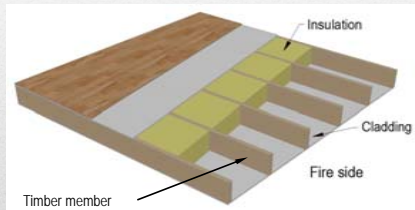


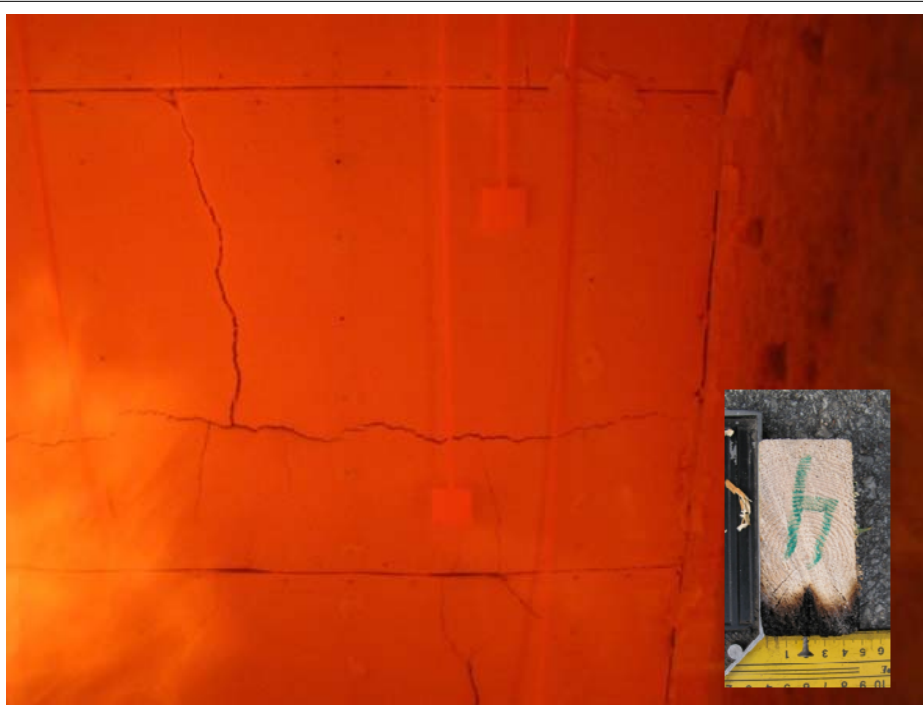
Execution

- Protective materials and details have to be sufficiently fixed during the required fire resistance time. This has to be controlled.

Details

Timber frame assemblies

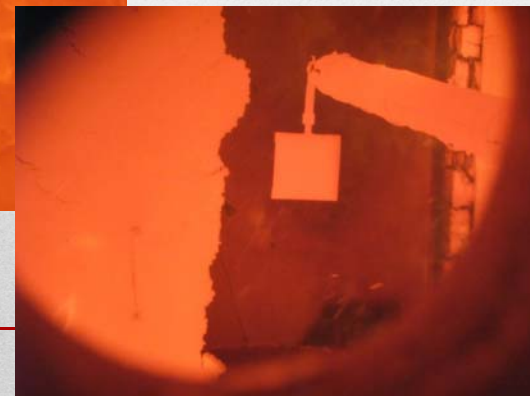
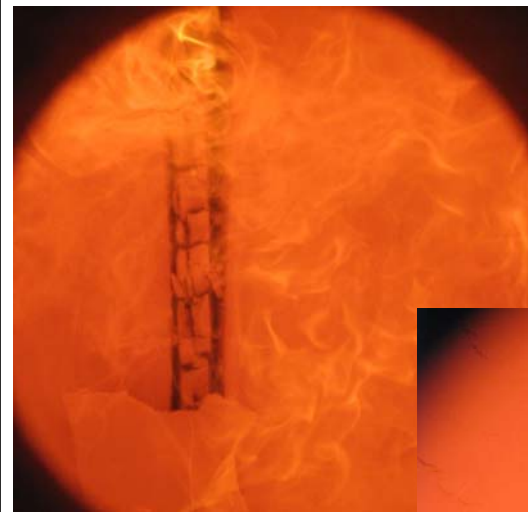
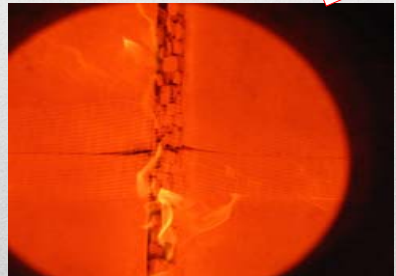




Fixing of mineral wool

- Overdimensions
- Gluing
- Fasteners
- Steelnet

If not properly fixed the insulation can not be taken into account in post-protection phase



- Air flow through the construction can reduce the protective properties of the mineral wool.
- Air leakage can cause local decompositions of the materials.

Air tightness

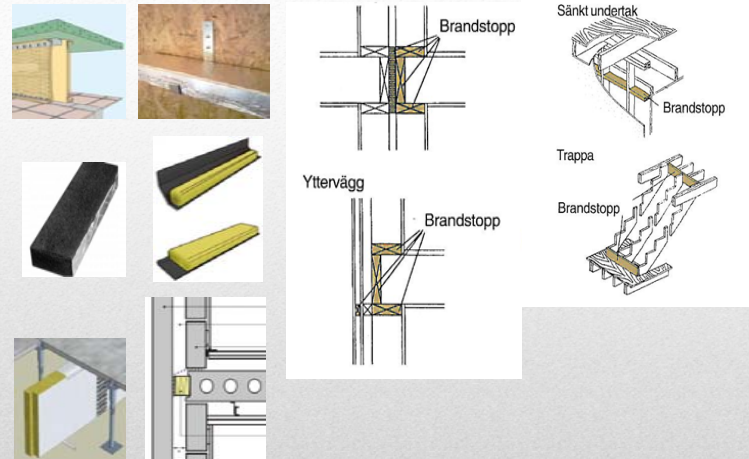


Air tightness

- Fire spread through the cavities in the walls and floors has to be limited.
- Proper control at execution is important!

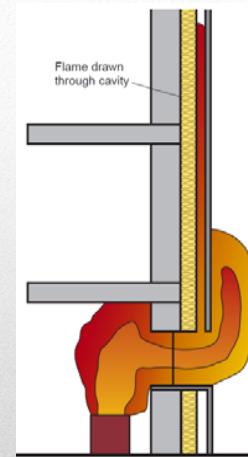
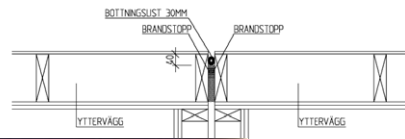


Details

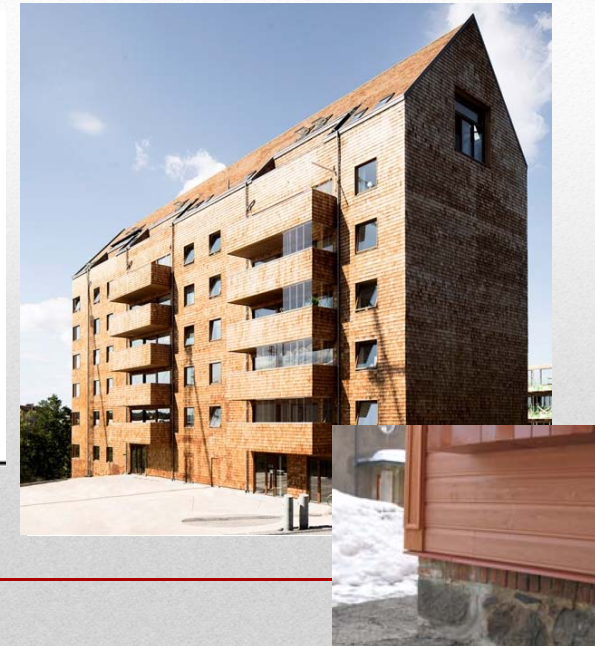


→ Checklists, BIM

Fire stops



Facades



Fire alarms and extinguishing

Fires on the building site

- Fire safety has to be followed and controlled at the building site.
- The reasons for a fire occurring are varied, ranging from arson to accident, some are related to the work processes on site.



- Preventing/controlling heat sources is implemented for example by
 - banning smoking on site
 - operating a regime of hot-working permits for close monitoring of activities such as welding and hot gas procedures.
- The management of building site waste is also an important factor.



Fires on the building site



Colindale housing development –



Summary

- **Following need to be considered on the execution standard:**
- Right materials with sufficient properties
- Proper work with detailing
- Extinguishing systems, alarms, fire safety installations
- Fire safety on the building site
- Whole chain from start to the complete building has to be fire safe

Execution and fire