

## Fire safety in timber buildings – State of the art

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New construction methods and new design tools have enabled effective construction of good quality timber buildings for affordable prices. It is generally accepted that timber buildings have a low carbon footprint and offer healthy and natural living environments. Furthermore, it is well recognised that construction sites of timber buildings are quiet and dry and, therefore, offer a healthy work environment for builders.

The combustibility of timber is one of the main reasons that many building regulations strictly limit the use of timber as a building material. As fire safety is an important criterion for the choice of building materials, the main precondition for an increased use of timber as a building material is adequate fire safety.

World-wide, several research projects on the fire behaviour of timber structures have been conducted over the past decades, which aimed at providing a basis for the safe use of timber. Novel fire design concepts and models (fig. 1b) have been developed, based on extensive testing [1]. Adoption of improved knowledge of technical detailing, e.g. implementation of encapsulation of structural members or fire stops (fig. 1a) leads to an increase fire resistance. Furthermore, the implementation of technical measures, such as sprinkler systems, smoke detecting systems, and well equipped fire services [2], allow the safe use of timber in a wide field of application (fig. 1d). As a result, many countries have started to revise their fire regulations (fig. 2), leading to an increased use of timber.

### References

1. Östman, Mikkola, Stein, Frangi, König, Dhima, Hakkarainen, Bregulla. *Fire safety in timber buildings - Technical guideline for Europe*. SP Report 2010:19.
2. INSTANTS 950. *Fire Safety Engineering – Comparative method to verify fire safety design in buildings*. InterNordic Standard, 2014.

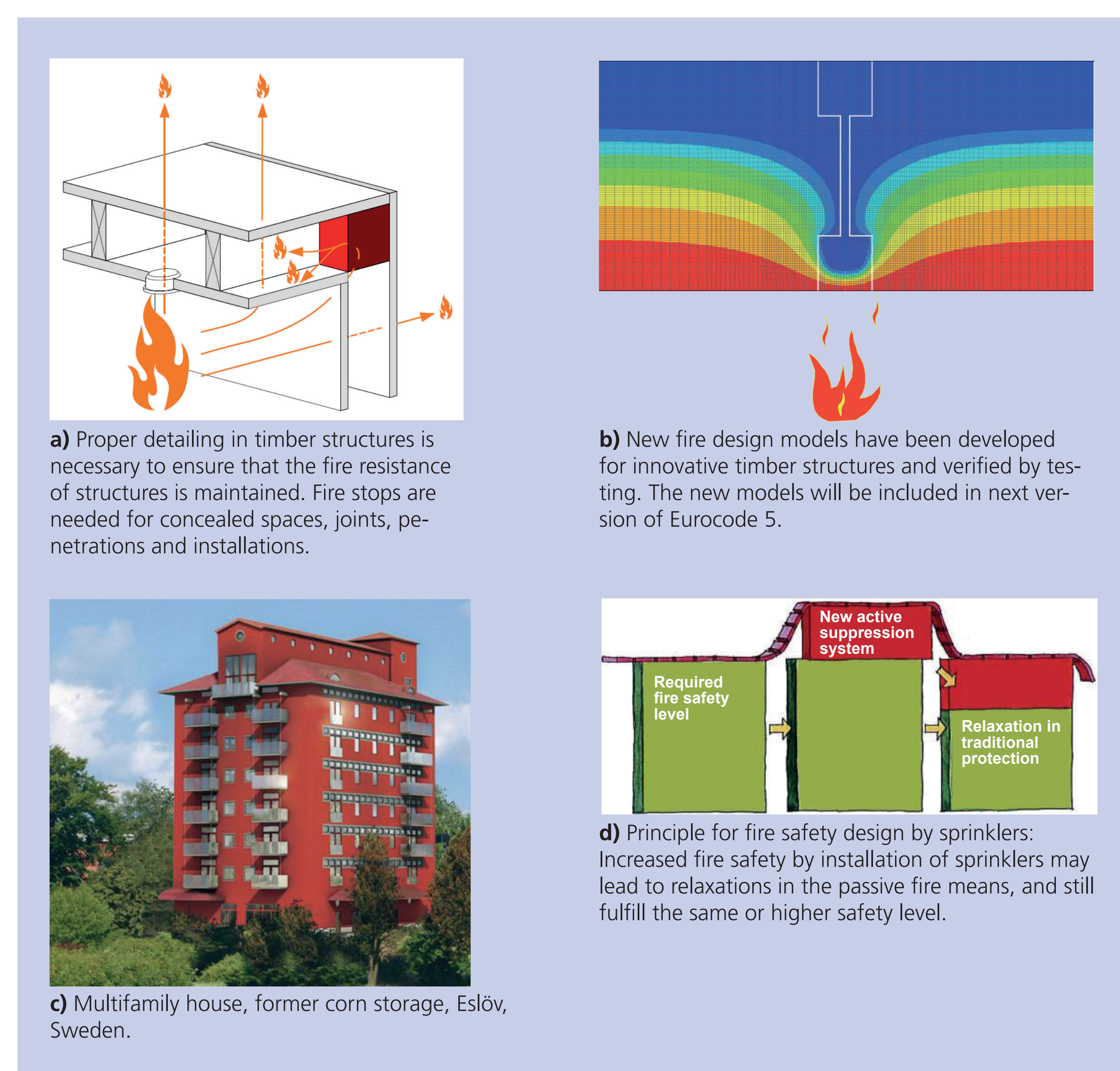


Figure 1 a-d.



Wood may burn and char from the surface, but normal wood remains below the pyrolysis zone for a long time. High fire resistance may therefore be maintained also for load-bearing structures.

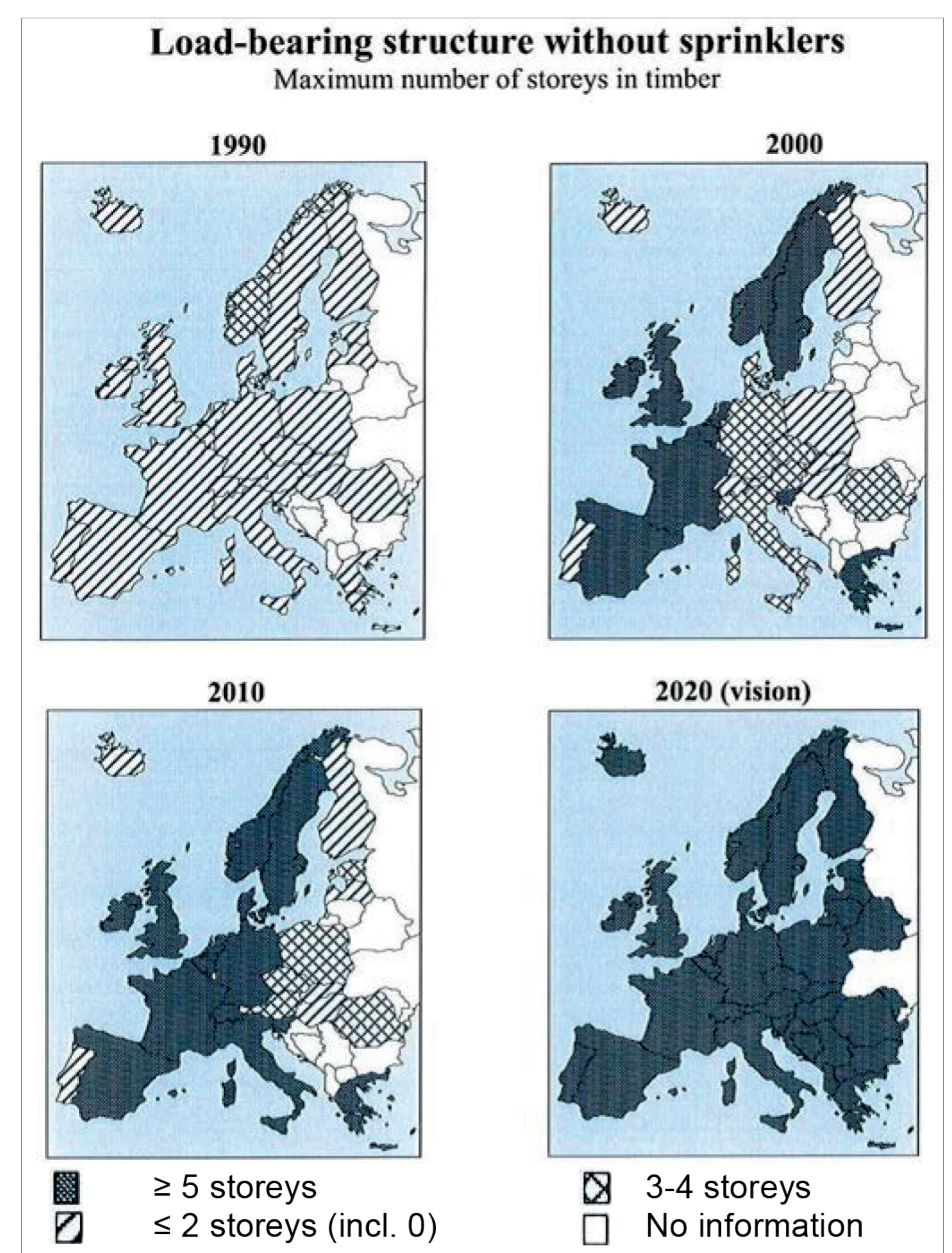


Figure 2. Restrictions of the use of timber structures for higher buildings, set by national prescriptive regulations, have been eased in Europe over the last decades. A further increase in permitted use is expected. [1]

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