

Title:	<b>Debating Tall: Tall Timber in 10 Years?</b>
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## Tall Timber in 10 Years?

Interest is growing in using wood as a building material for skyscrapers. Several 10-story-plus buildings have been constructed, and numerous academic, industry, and government research projects have been initiated recently to further study the prospect of using timber in tall buildings. But there are significant obstacles in the way of mainstreaming tall timber. So we ask, “Will wood become a predominant structural material in tall buildings within the next 10 years?”

### YES

**Carsten Hein**, Associate, Arup, Berlin

I believe timber will be used in more tall buildings in the future and become THE material for sustainable buildings. Why?

Public perception of timber as a construction material has changed in recent years. A few years ago, only public agencies, such as the European Union, asked for sustainable construction. Today, the requirement for “renewable materials” is cited much more frequently.

**Timber composites.** Combining properties of timber and other materials, e.g., concrete, provides very good performance, not only structurally in the form of a 50% weight reduction, but also in terms of acoustics, dynamics, and fire protection.

**Sustainability.** It’s widely accepted that timber is sustainable in terms of the environment, because its biodegradability makes it a natural store of embodied carbon. But its economic and social performance is also good and continuously improving. Its thermal performance allows effective building envelopes and its thermal storage capacity provides passive “room conditioning” for free.

In a nutshell: timber is a cost-effective, renewable construction material that is environmentally friendly and provides a very comfortable and aesthetically pleasant interior environment.

**Last obstacle.** Timber is still considered highly combustible. But while steel has to be

protected because the material loses structural integrity quickly in fire, timber burns very slowly and comes with integrated fire protection (a charcoal layer). Once the general perception can be influenced, there will be no reason not to use timber more widely. I think this can happen in 10 years.

### NO

**Carl F. Baldassarra, P.E.,**

Fire Protection Engineer - Wiss, Janney, Elstner Associates, Inc., Chicago

I believe there will be greater use of timber in more buildings – including tall buildings – in the future, but there are many hurdles to overcome. These include:

**Tradition.** Building codes have imposed limits on the use of wood materials as the major structural components of a building because of the perceived risk associated with its inherent combustibility and the potential for failure in the event of a major fire. Throughout history, major cities have suffered from conflagrations due to the use of combustible construction. Changing that perception will require strong technical information, a well-designed communication program, and time.

**Engineered Materials.** In recent years, the wood industry has developed new engineered timber products such as glue laminated wood, laminated veneer lumber (LVL) and cross-laminated timber (CLT). These products were developed to increase the strength of the structural members, provide a more precise and consistent

product, and to provide a more effective use of natural resources. But these products are different from traditional solid-wood products and have not had a long performance history. It will take time for them to become trusted.

**Connections.** One of the weak points associated with heavy timber construction is the connection between the various elements of the structure, often consisting of large steel plates and bolts, which can lose their strength in fire exposure and fail before the wood members. In some cases, connections have been protected through various means of insulation or encapsulation, but these approaches are not widely standardized.

**Fire Protection Systems.** The major element of a building’s fire safety strategy is the automatic sprinkler system. If all fires are kept small over the life of the building, the heavy timber structure will not be threatened. However, reliability is an issue for an “active” fire protection system such as this, and must be addressed.

**Systems Approach.** Fire safety must be described as a “system” in which a number of features contribute to a building’s safety, with some elements providing a deliberate redundancy in the event one feature fails to perform to its expected level. Various performance-based design methods will likely need to be employed on a project-specific basis when it comes to implementing timber-framed tall buildings.

All of the above suggests a longer path to the mainstream than 10 years.