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WILL SKYSCRAPES IN THE FUTURE BE MADE OF WOOD?

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Around the time your grandparents − or perhaps your great-grandparents − were children, the world was made of wood. Everything from weapons and wheels, barrels and houses, cooking tools and industry have been derived, at least in part, from materials taken from tree bodies. People were born in oak beds and cradled in poplar cradles, killed with walnut-barreled guns and buried in pine coffins.

Now a growing industry wants to bring back the golden age of wood starting with skyscrapers. “Look at this,” Antti Asikainen, an austere, affable Finnish forestry professor, says admiringly, pointing to a rectangular hole cut in the sheetrock of a 12-story apartment building, exposing the skeleton below.The frame inside is made of mass timber, a high-density wood product that is one of the new range of high-tech products the global economy relies upon forests to fill. Mass timber has a particular utopian appeal among a certain set of architects and designers, and its supporters predict that the cities of the future will be all-wood high-rises like the one Asikainen and I are standing in above the eastern of the Pielisjoki River.

Below us, the landscape bears the fruits of a style of forestry calibrated to reliably turn out the most trees possible. Piles of mostly spruce stacked in the rail yard stretch to the horizon. The day before, Asikainen says, the river and canals had been full of an enormous float of spruce logs on their way down from North Karelia or the Russian boreal forests, bound for markets beyond the Baltic Sea.If all new-model wood products have their acolytes, proponents of mass timber speak of it with a particularly evangelical zeal, because they see it as not only a chance to decarbonize the construction sector, but also a significant technical upgrade in its own right.

All of those products, from the paper fluff in diapers to the bones of skyscrapers, rest on a possible irresolvable contradiction: They all rely on the steady, controlled growth of trees, with harvests generally planned out decades in advance. For the past hundred years, that system of so-called scientific forestry, which grew up to counter the seemingly unstoppable deforestation of late 19th and early 20th-century Europe, has provided the wood products that a

growing population requires.That system, however, depends on something that is disappearing: a steady climate and forests that remain where they've been, a paradigm threatened by the very climate crisis that makes carbon-sucking buildings seem appealing.

Skyscrapers of the future may soon be made of wood. The next generation of skyscrapers in our cities may not be built from concrete and steel, but from a more ancient building material: wood.Today, the world's tallest wood-frame building is an 18-story student building in Vancouver called Tallwood House − but it will be dwarfed if the new generation of wood-framed skyscrapers makes the leap from the concept. to physical reality.

Last year, Perkins+Will architects began work on the River Beech Tower, an 80-story wooden residential block located on the riverfront in downtown Chicago.

Not to be outdone, London has followed suit with plans to build its own 80-storey wooden apartment building atop the Barbican in the city centre. Meanwhile, in Stockholm, architect Anders Berensson has unveiled plans for what will be the tallest building in the city – a 133-meter, 40-story block with decorative wooden rooms.

The Jonesuu apartment building is a case in point. Virtually anyplace else in the world, that exposed skeleton would be concrete reinforced with steel. Here in Finland it's wood: In fact, save for a two-inch concrete slab between each floor, the whole building is made of wood. Specifically, one of the high-tech, engineered materials collectively called mass timber or structural timber.That makes this building, according to Asikainen , the executive vice president of the Forest Research Institute at the University of Eastern Finland, the tallest all-wood building in the world.

"This is the beginning of the age of wood", British architect Andrew Waugh told Dezeen in 2015. But why wood? It's lightweight − about a quarter the weight of an equivalent concrete building − which means the foundation can be smaller.Mass wood is much easier to customize and assemble than concrete or steel: it allows designers to send plans directly to a factory to be built to specifications in a practice called file-to-factory. This means faster construction, lower labor costs and less disruption to existing cities.Wood is also environmentally friendly. it is a renewable resource that locks in carbon dioxide, and as a building material it has a much smaller carbon footprint than steel or concrete. And it certainly looks good.Concrete and steel − each of which requires several rounds of breaking, grinding, and (in the case of steel) melting rocks − cost of a great deal of energy and therefore carbon dioxide emissions. Approximately 8 percent of the world's total carbon emissions come from cement and concrete production, which releases about half a ton of the dangerous greenhouse gas carbon dioxide (CO_2) for every ton produced. The manufacture of steel, which accounts for around 5 percent of all emissions,

releases nearly twice its weight in CO_2.High-performance timber-frame houses are nothing new. However, when it comes to building upwards, the structural properties of wood have – until now – limited architects' options.

Mass timber, by contrast, promises to replace a material that releases huge amounts of carbon − if cement and concrete production were a country, it would be the world's third largest carbon emitter, behind the U.S. and China − with one that could store it. The spruce logs below Joensuu, like the overstocked production forests of Oregon and North Carolina, were largely made of carbon the trees had pulled from the atmosphere. That means that mass timber, in theory, could store that carbon long-term in the walls of buildings. On the plantation forests they'd come from, new trees would go up in their place.High-performance timber-frame houses are nothing new. However, when it comes to building upwards, the structural properties of wood have – until now – limited architects' options.

Therefore, it is perhaps not surprising that this revolution is taking place thanks to technological innovation. Today, architects have access to new materials such as cross-laminated timber, a type of plywood made using advanced adhesives with structural strength comparable to steel, and this has allowed them to start thinking big. The sky may well be the limit for the wooden buildings of the future

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