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This New Superwood Is as Strong as Steel and 6 Times Lighter

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It looks like wood, but it's as strong as steel—and now it's for sale.

Six years after engineers at the University of Maryland (UMD) discovered a way to make timber 12 times stronger and ten times tougher than natural wood, UMD spinoff company Inventwood LLC has just commercially launched "Superwood," as reported by CNN. The company hopes their product will one day compete with steel or even titanium alloys.

"Natural wood is a low-cost and abundant material and has been used for millennia as a structural material for building and furniture construction," the researchers wrote in a Nature study back in 2018. The team found "a simple and effective strategy to transform bulk natural wood directly into a high-performance structural material with a more than tenfold increase in strength, toughness and ballistic resistance and with greater dimensional stability."

Like carbon fiber but cheaper

The material is as strong as steel but six times lighter and takes 10 times more energy to fracture than natural wood. Liangbing Hu, lead author of the study and co-founder of Inventwood, said it's comparable to carbon fiber but cheaper.

The treatment involves removing the wood's lignin (the stuff that makes wood rigid and brown) and compressing the wood under heat of around 150 degrees Fahrenheit (66 degrees Celsius). This packs the cellulose fibers extremely tight, crushing together any faults like holes or knots, and making the wood five times thinner. Finally, it's covered in a coat of paint.

The researchers discovered that the compression presses the wood's fibers together so much that they can form strong hydrogen bonds. According to a University of Maryland statement, it's like a crowd of people who can't move and are also holding hands. The material is so tough that when the team shot a bullet-like projectile at it, the treated wood stopped it partway through.

"Soft woods like pine or balsa, which grow fast and are more environmentally friendly, could replace slower-growing but denser woods like teak, in furniture or buildings," Hu, who is now a material scientist at Yale University, said in the statement. But their ambitions go even further. "This kind of wood could be used in cars, airplanes, buildings—any application where steel is used," he added.

Less carbon intensive than steel

InventWood's first commercial manufacturing facility is in Frederick, Maryland. According to CNN, the company plans to target external installations like decking before tackling internal applications like flooring and furniture. While at the moment Superwood's manufacturing process is more carbon-intensive and costs more than regular wood, its carbon footprint is 90% lower than that of steel manufacturing, the company claims.

However, Philip Oldfield, an architect at Australia's University of New South Wales who is not tied to InventWood, sees a different challenge ahead for the company. "The barrier to more timber buildings isn't really the need for more strength," he told CNN. The real hurdle is that the "construction industry is risk averse and slow to change." To see an uptick in the use of timber in construction, there need to be pilot projects, better education, and improved regulatory frameworks, he added.

"But stronger timber products like this Superwood could allow architects to create larger spans and more durable finishes with timber, which would certainly be beneficial and could foster greater timber uptake," he concluded. It remains to be seen whether this new material has what it takes to transform the sluggish construction sector.