

A fireproof wood achieves the highest class in burning test thanks to an invisible coating

It can also solve the carbon intensity problem in the construction industry.

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Created: Aug 22, 2022 10:31 PM

INNOVATION

Researchers at the Nanyang Technological University (NTU) in Singapore have invented an invisible coating that can be applied to wood to make it fireproof.

Modern-day buildings are built largely using concrete, steel, and glass, which are at low risk from fires. However, the production of these materials is a carbon-intensive process. Mass-engineered timber is a solution to this problem as wood harvested from sustainably managed forests has a lower carbon footprint than steel and concrete. Additionally, it allows for faster construction at lower costs, making it the ideal component for future constructions.

However, as **past experiences have shown** us, used untreated, timber is highly flammable and combusts easily. Major cities such as London that heavily used wood in their construction have burned to the ground during fires. This is why modern construction standards require that wood be used only after treating it.

Protecting wood with an invisible coat

The wood used internally in buildings today needs to be either coated with fire retardant paint or covered with fire retardant boards made with gypsum and magnesia. This ends up hiding the natural grain and texture of the wood being used, taking away its aesthetic value.

Researchers at NTU came up with a solution that coats the wood giving it the much-required fire protection, but since the coating is transparent and just 0.075 mm thick, it is invisible to the naked eye.

"Most timber or wooden panels only have a transparent coat that protects them from moisture, weather corrosion, termites or pests, and are not designed to

withstand high heat," said Aravind Dasari, Associate Professor at the NTU School of Materials Science and Engineering, where the coating was invented.

"In our coating, we used technology to lock certain compounds and interact with the resin. They will actively participate in the chemical reactions in a systematic manner when exposed to high heat, thus leading to the formation of char," he added. When exposed to fire, the coating becomes a char that is more than 30 times its original thickness. The char is engineered to be heat-resistant and insulates the wood from the high heat.



How well does the technology work?

The coating was also tested in third-party laboratories to verify if it works as per industry standards. According to *TechXplore's* report, the coating achieved the highest -class that was possible in these tests.

Not only was the coating successful in preventing the flames from spreading, but it also produced very little smoke, which is critical to enable the safe evacuation of people inside a building that is on fire. When the char was scraped off, the wood was also found to be intact.

The coating offers the dual advantage of being fire retardant as well as transparent, something very few products in the market currently does. The team will now work to license, commercialize and adapt this technology to timber and **other industries** where it can be applied.

