

Thermoplastic carbon fiber composite aids seismic reinforcement

April 14 2016, by Nancy Owano



Scientists are looking at the next generation of materials and carbon fiber ranks highly on the list for further explorations. Inside the fabric laboratory of Komatsu Seiren, the focus is on carbon fiber for seismic reinforcement.

Their solution is called the CABKOMA Strand Rod. This is a thermoplastic carbon fiber composite. The solution uses carbon fiber as the interlining, while the outer layer is covered with synthetic fiber and inorganic fiber. It is finished by impregnation with thermoplastic [resin](#).

The use of textiles for building materials is interesting and the project has turned into an interesting case in point involving a building in Japan. It was recreated with a carbon fiber solution wrapped around it.

The [building](#) has taken on this new look which can be viewed in more detail on the Komatsu Seiren site.

The company site shows photographs of the building with the rods in place indicating how the exterior façade was designed using the motif of fabric. "The CABKOMA Strand Rod, which is arranged organically and softly, protects the building from earthquakes."

The site *designboom*, meanwhile, said the three-story building "serves as workspace, [exhibition](#) and research facility for Japanese fabric manufacturer Komatsu Seiren."

The architect Kengo Kuma and Ejiri Structural Engineers were recruited to collaborate on a visionary application for the headquarters, where they've used the Strand Rods as an [architectural](#) element, said *Gizmodo*.

Material on the exterior gives the appearance of a soft, organic lightweight curtain wrapped around an office building—a carbon fiber curtain which looks light but has considerable strength and can provide

"seismic reinforcement."

Ubergizmo said the carbon fiber strands have been created to help protect buildings from earthquakes. The material is strong said the lab, yet is the lightest seismic reinforcement in the world.

Commenting on the curtain's appearance, *designboom* said, "Functionally the rods serve as seismic support and visually, they instill a sense of weightlessness and transparency."

In a presentation video, the point was similarly made that carbon fiber is stronger than metal, and has the additional advantages of being thin and light—"not visually obvious." It manages to protect yet at the same time "secure the freedom of space and light."

The rod was described as interesting as a technology mix of the old and the new. Discussing the story of their design approach, *designboom* said that in the early design stages, Kuma approached the scheme by developing a hybrid, [carbon fiber](#) material called 'Kotmatsu Seiren's CF rod.' The design concept drew upon the local technique of rope braiding. The fiber rod created "combines together old and new technologies to create a knitted, light, rope-like rod that embodies strong and flexible properties."

Tyler Lee laid out the construction challenges involved in mixing the old with the new in *Ubergizmo*, writing "what about older buildings that were built with older technology? These buildings are retrofitted with the features needed, but it involves bracing and bolting the building to its foundation which can be troublesome, expensive, not to mention the look isn't particularly aesthetically pleasing." In contrast, the Komatsu Seiren Fabric Laboratory has come up with a "rather novel idea"—[carbon](#) fiber strands that could hold buildings down.

How might their construct affect the future of construction? Lee's observation: "it seems unlikely that the whole of Japan will begin covering its buildings with this 'string' as it would be impractical, not to mention impossible in more urban settings. Instead it might be more useful in more remote locations where space is available, or used to protect historical landmarks which might not have been reinforced."

More information: www.komatsuseiren.co.jp/cabkoma/en/

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Citation: Thermoplastic carbon fiber composite aids seismic reinforcement (2016, April 14)
retrieved 3 May 2024 from

<https://techxplore.com/news/2016-04-thermoplastic-carbon-fiber-composite-aids.html>

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