

Materials Innovations: What is Structural Engineered Bamboo (SEB)?



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Pretentious as it may sound, we can say with certainty that [bamboo](#) is one of the most promising materials for the future of the construction industry. [Neil Thomas, principal engineer](#) at atelier one, [says that if we were to design an ideal building material](#), it would look a lot like bamboo. This is because it grows very fast, is present in many countries around the world, has a highly efficient cross-section, and has impressive load-bearing strength. But beyond its structural use in its raw form, bamboo is also a material that allows a high level of processing and can be [laminated](#) for flooring, fixtures and, as we will see in this article, for Structural Engineered [Bamboo](#) (SEB) structures, which are very similar to Engineered Wood. We spoke with Luke D. Schuette, founder and CEO of [ReNüTeg Solutions, LLC](#), a company in St. Louis, Missouri, that has been working with this structural material technology.

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Engineered bamboo is made from raw bamboo culms, which through pressure and heat form a laminated composite that is then glued together to form structural parts. In ReNüteq's case, the slat preparation process and the finished product are patented specifically for structural building applications, called Radial Laminated [Bamboo. RadLam®](#) optimizes the highest performance fiber of the culm by removing the lower strength fibers from the inside of the culm slat before lamination takes place, while increasing the efficiency during production by reducing waste. The main applications of SEB are structural systems (columns and beams), structural glazing systems for buildings (for entrances, roofs, façade systems), as well as curtain walls and floor-to-ceiling frames.



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Although the uses are similar, according to Luke, “from a structural standpoint, SEB is much stronger than any Mass Timber on the market. The Modulus of Elasticity of ReNüTeg’s SEB is more than 4 million PSI, which is more than twice the strength of any engineered or glulam timber product. In tension, it is more than 10 times stronger due to the continuous silica fiber content throughout bamboo. The higher density of SEB is ideal for connection design as timber fiber will crush within bolted connections, whereas this maintains its form under higher compression.” Because it is 40% denser than engineered wood, it also means that bamboo structures have significantly better fire performance than wood, because its carbonization rate is much slower. “[Bamboo](#), at its cellular level, is more closed than timber fiber which makes it much more stable in moisture and temperature changes. SEB is more than 28% more stable than Mass Timber in volatile conditions, making it optimal for both structural and glass systems.”

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GLAZING SOLUTIONS

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In addition to its structural uses, bamboo also has advantages regarding its environmental impact. Luke points out that a bamboo plantation produces 37% more oxygen than traditional forests. “Guadua bamboo not only sequesters carbon, but it also produces oxygen as it grows, up to 37% more oxygen than trees. During the industrial revolution and even today massive quantities of natural tree growth has been removed around the world. Timber construction is considered sustainable when compared to concrete and steel, but it is nowhere near the sustainability case for bamboo, especially when accounting for the already depleted natural forests.” [Bamboo](#) has a geometric growth curve that makes it 10x faster than tree-based CO₂ removal. Harvested intensively, it can sequester up to 1.76 tons CO₂/group/year, or up to 362 tons/hectare/year on an optimally managed farm. ReNüTeg’s products are produced with the [Guadua species](#), cultivated in Latin America and certified by ASTM (American Society of Testing Materials).

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In addition, another factor to take into account is the quality of the soil, which is not always mentioned. According to Luke, “Guadua bamboo's root system stays intact throughout growth and harvest. When timber is harvested the root system dies and causes drastic soil instability, and the consequence is topsoil erosion. Extreme cases of this have occurred all over the world in places such as India, Asia, Africa, and Central/South America. When old growth and timber farms are removed the quality topsoil is lost and regrowth of any form of vegetation is limited. Replanting trees is not the solution. Let's cut down fewer trees.” To illustrate this, he recalls a quote from [Sahdguru, founder of Conscious Planet in India](#): “Save the Soil to Save the Environment. Soil degradation is the most pressing ecological challenge

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of our time. Agriculture can only thrive on rich soil – there is simply no other way. Regeneration of soil is invigoration of life."

The only obstacle, says Schuette, still lies in the access to knowledge about solutions and examples of buildings and product designs already completed with this material. Spreading awareness of the key performance and sustainability advantages of bamboo over other structural building materials will be an important part of ensuring its future use.

Learn More About The Following ReNüTeq Products:

- **Structural Engineered Bamboo Beams (SEB), (RLB, LVB, DLB)**
- **Glue-Laminated Beams - (GluLam) Beams & Columns**
- **Laminated Veneer Bamboo - (LVB) Components**
- **Cross-Laminated - Structural Engineered Bamboo**
- **Mass-Ply Bamboo Panels (CLB, DLB)**
- **Hybrid Aluminum & Engineered Bamboo Glass Roof Systems**
- **Engineered Bamboo Solar Structures and Canopies**
- **Engineered Bamboo EV Charging Stations**
- **Engineered Bamboo Curtain Wall and Glazing Systems**
- **Structural Glass - Spider Connected Glass Systems**
- **Industrial and Dimensional Components**
- **Site Support & Coordination**
- **USA - Europe - Asia Fabrication**
- **Engineering & Architectural Support - Design Assist**

Learn More About ReNüTeq:

ReNüTeq is committed to delivering renewable structural technologies & innovative building solutions.

Ultimate **aesthetics, performance, and sustainability** is achieved through the integration of [SEB \(Structural Engineered Bamboo\)](#) via proprietary technologies and processes. Visit: www.renuteq.com

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