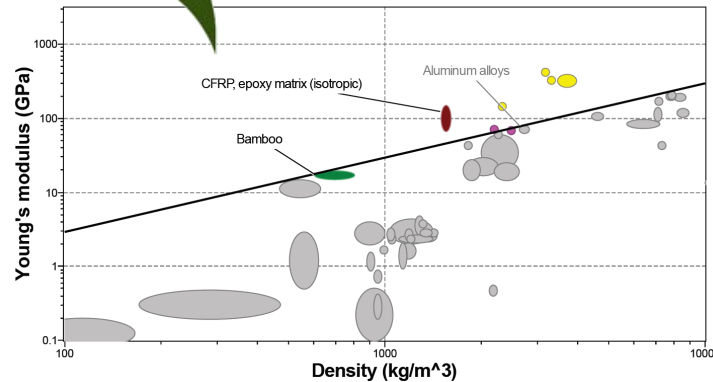


BAMBOO BICYCLE

Sustainable Engineering 2021 by Igor Sterner (is473)



Motivation to build bicycles out of bamboo

- ✦ Around 15 million bikes end up discarded by their owners every year, many of which end up in landfill or in piles in China
- ✦ For high-performance bicycles, a wasteful process is used to make carbon-fibre, only for it often not to be fully recycled at the end of its life span
- ✦ Bamboo is a highly recyclable material that matches many of the properties of high-end materials currently used, especially with fewer chemicals required for treatment than in other bamboo products
- ✦ It's also an abundant resource, in particular in countries of specific need for improved transport where bicycles and vehicles are currently almost all imported
- ✦ Ultimately yields a resilient, comfortable and beautiful bike

My project to build one

- ✦ Fascinating and great fun to construct the bike and assemble moving parts
- ✦ Highly scalable process that could certainly be streamlined to produce many, bespoke bamboo bicycles
- ✦ A stunning harmony of metal, carbon-fibre and bamboo, using each material to its greatest potential
- ✦ Spectacular final product that rides well and comfortably, whilst weighing only 7kg - comparable to a high-performance carbon-fibre bike
- ✦ Total cost of this prototype was around £500, but subsequent models could certainly be made for ~£200



Nature's gift to us

- ✦ Stronger than steel in terms of tensile strength due to its microscopic tubes in the culm
- ✦ High strength to weight ratio (as shown in CES graph above)
- ✦ Organic and recyclable, without a requirement for high levels of energy in extraction and manufacturing
- ✦ Grows fast and regrows naturally after harvesting without planting again - no excess tilling/soil erosion
- ✦ Abundantly available at low cost across the world in multiple varieties, each with different properties

A case study - Ghana Bamboo Bikes

- ✦ An initiative to create local jobs, promote low-carbon transport and increase mobility
- ✦ An emphasis is placed on employing women to build the bikes, more than 50% of the workforce are women. The enterprise gives young people technical skills allowing for wider social development
- ✦ Helps students save time by cycling, rather than walking long distances, to school. This can be transformative in enabling better access to education for children across the world
- ✦ Agreement reached to provide bamboo bike ambulance for Obstetric Emergencies. Hardly any running costs and yet, according to the World Bank, are able to save on average of 3 lives per month, each

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