

How bamboo could help build a sustainable future

March 5 2015, by Thomas Deane

Researchers from Trinity College Dublin's School of Engineering believe that bamboo could be used to build many things from bicycles to houses in the not-too-distant future.

Bamboo has long been used in Asia for everything from buildings to chopsticks but there is now an increasing interest in Europe to exploit it as a replacement for traditional structural materials. Because it is stiff, strong and grows very rapidly, the engineers say it can be 'a key' sustainable resource as it can substitute for more limited resources like hardwood, metal ores and [petroleum products](#).

To test its suitability, the engineers performed a detailed 'fatigue failure' analysis to see whether they could accurately assess bamboo's strength and durability, and predict the point at which it might fail due to [physical stress](#) or wear and tear.

Fatigue failure occurs gradually if a material is repeatedly stressed. To see fatigue happening all you have to do is take a paper clip and bend it. It doesn't break the first time, but if you bend it backwards and forwards a few times it will eventually break.

It turns out that [bamboo](#) is very strong when tested along its length, parallel to the growing stem, which is called a 'culm'. In this direction it doesn't suffer from fatigue at all, which is very useful to know from a constructor's perspective. Although it is much weaker when loaded across the diameter of the culm, where it splits easily, and suffers from

fatigue, the limits can be accurately predicted.

The work has recently been published in the peer-reviewed *International Journal of Fatigue*.

More information: The paper can be downloaded free of charge for a limited period, until 10th April, from the following link:

authors.elsevier.com/a/1QZhnWK0Q3SO8

Provided by Trinity College Dublin

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