Hydrology and Earth System Sciences Discussions

Interactive
Comment

Interactive comment on "Flexural behaviour of selected plants under static load" *by* F. J. Sutili et al.

Anonymous Referee #2

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Dear authors

The paper addresses an important subject of bioengineering and the presented results will help in finding appropriate solutions for hindering erosion along rivers in Brazil. Especially the figures are of very good quality and provide a well insight in the results. Finally figure 8 is a very good summary of the study and can serve as good single tool in comparing the different species.

However, a major revision of the paper is needed and should take into account the following items:

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1) Language
The language needs revision by a native English speaking person.

2) Structure and contents of the paper
It is suggested to add another one or two sentence(s) to the abstract, which more precisely describe the most important results.
In order to get a better overview the equations used should be numbered.
The title of chapter 2 should be changed to "Material and methods".
The reference in line 2 of page 1472 should be changed to "Fig. 8".

3) Technical terms
A lot of technical terms do not correspond to those being usual along the theory of the strength of material an of applied statics:

- breaking load –> ultimate load or failure load ... and respectively F_B –> F_u
- distance between the support points –> span
- support points –> supports
- elastic deformation –> elastic strain
- plastic deformation –> plastic strain
- breaking deformation –> ultimate strain ... and respectively ϵ_B –> ϵ_u
- maximum resistance (W) –> section modulus
- breaking stress –> modulus of rupture (MOR) ... and respectively σ_B –> σ_u
- stress x deformation diagram –> stress x strain diagram
- 3-point loading test –> 3-point bending test
- bending device –> bending test device
- bending point –> (plastic) hinge
- at rupture point –> at rupture, at failure, at ultimate load
- limit of rupture / rupture limit –> ultimate load

Furthermore it is suggested to:

- use the term "density" instead of "specific weight",

- use the term "proportional limit" not only in Fig. 1 but also in the text (e.g. in line 20 of page 1461),

- change "moisture content in wood" to "moisture content" only,

- to change the term "angle of flexibility" to "angle of rotation" since in the ultimate state the specimen is no longer flexible. The term "flexible" can only be used in the elastic range. A similar type of test is described in EN 409 "Timber structures - Test methods: Determination of the yield moment of dowel type fasteners". There the term "rotation angle" is used.

- to formally better distinguish between the parameters l (span) and I (moment of inertia) by taking clearly differing symbols or fonts.

4) Scientific comments

- The MOE-formula on page 1464, line 10 is wrong. In the denominator F_{est} should be replaced by f_{est}. Additionally f_{est} should be called "displacement at proportional limit" since taking any displacement value below the proportional limit would end up in wrong MOE values.

- It should be made more clear that the tests were carried out in green condition. Weren't they?

- The source of the formula in line 4 of page 1465 is not clearly obvious. It was calculated from MOE and σ_B some lines below and therefore represents the strain in the extreme fiber position of the cross-section. This should be explained in more detail. By the way: the correct parameter would be the curvature. However, this would lead to more complex formulas and I agree with the solution taken in the paper since with respect to the potential readers of the paper this is appropriate. However, the matter should be explained in more detail.

- The equation in line 20 of page 1465 is wrong. The moment has to be calculated from the force at the support (which is half of the load!) times half the span. Does

this take an impact on the MOE values listed in table 1? Should they be doubled and would then the difference to the quoted MOE of European species get smaller?

- Does "dry" mean MC = 0%? If yes: please mention this in the text.

- When calculating the density, was the volume measured in wet or dry condition? This should be mentioned in the paper since dry and wet volumes differ.

- The formula in line 16 of page 1467 is wrong. $\tan \alpha$ must be calculated from l divided by $2f$.

- In the caption of table 1 it should be added that the coefficient of variation is given in % and that the MOE values represent the green state (wet condition). From the low coefficients of determination it can be concluded that there is in fact no correlation. This should be commented.

- The angle α shown in figure 2 does not correspond to the formula in line 16 of page 1467 since the deformation f actually would be the vertical move of the loading head. Hence the diameter d of the specimen should be additionally taken into account and some further (but in fact unknown, since depending on level of load) vertical deformation. Therefore it is suggested to change the red lines in a way that they meet right at the contact between the loading head and the specimen.

- Why in figure 5 a non-linear regression model is used? What type of model was it actually? From the MOE equation on line 21 of page 1464 is can be concluded that it should be a model on base of d^4. Please explain this in more detail.

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