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The influence of selected factors on coefficient of bendability

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Abstract: The aim of this work was investigate an influence of selected factors wood species, thickness of testing samples and degree of pressing on coefficient of bendability - k_{oh} during bending in radial direction.

Keywords: veneer, pressing, compression moulding, conditioning, grade of pressing, coefficient of bendability.

INTRODUCTION

Wood is easy available and also domestic reproducible raw material with miscellaneous utilization. Wood has positive natural properties but also certain negative ones which we can to modify by different methods.

The materials creation only from natural wood substance has limits. These limits can be moved but significant changes can be providing by beneficiation of wood with various methods or also laminating of wood in combination with other different materials.

These materials have to fulfill requirements which are based on utilization purpose. In some cases the strength is priority, on the other hand can be priority of materials other properties as elasticity, thermal resistance, absorption capacity for sound etc.

Modification of wood properties by mechanical, thermal and chemical way we can to earn materials with required properties.

Next known method of wood properties modification can be creation of composites made of raw materials with different properties. Accurate knowing these initial materials and also its proper combination we can to create new materials with specific properties.

WORK METHODIC

This work is aimed at determination of selected factors influence on monitored characteristic – coefficient of bendability during bending in radial direction. Our selected factors are:

- wood species (Beech and Aspen),
- thickness of samples (10 and 20 mm),
- grade of compression (0, 10, and 30%),

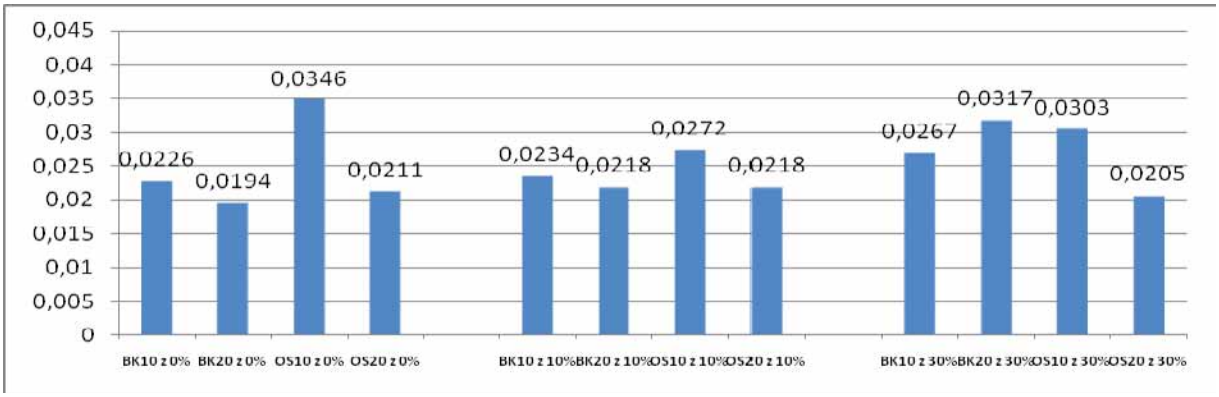
The experiments were realized at beech and aspen wood samples with thickness 10 and 20 mm. Earned results were compared with results from samples which were pressed about 10% and 30% of original thickness. Coefficient of bendability was determined from values of flexure during bending. Samples moisture was approximately 12%.

The flexure was monitored by indicators at shredding machine and at Dataloger device. From measured values we assigned a bending strength (σ_p) and proportionality bending strength (σ_u), critical flexure (R_{min}) and coefficient of bendability (k_{oh}).

RESULTS AND DISCUSSION

On the basis results at Fig. 1 we can to assert that:

1. Higher values of $\mathbf{k_{oh}}$ were earned at aspen wood.
2. The highest values of $\mathbf{k_{oh}}$ were earned at aspen with thickness 10 mm and 0% compression.
3. In all monitored cases we found out higher values of $\mathbf{k_{oh}}$ at thin samples with thickness 10 mm besides beech sample with thickness 20 mm and compression 30%.
4. We can to assert that:
   - compressing of aspen doesn't change statistically important a values of $\mathbf{k_{oh}}$ (Fig. 5),
   - with compression of beech wood the values of $\mathbf{k_{oh}}$ increases in general (Fig. 4), the highest increase was found at compressed beech samples with thickness 20 mm and compression 30%.
5. 30 % compression of beech wood provided significant increasing of $\mathbf{k_{oh}}$ values in comparison with 10% compression.
6. Increasing thickness of samples provided decreasing of $\mathbf{k_{oh}}$ values at aspen, at beech samples hadn't a thickness significant influence.



Obr.1 Coefficient of bendability k_{oh} in dependence on wood species, thickness and grade of compression.

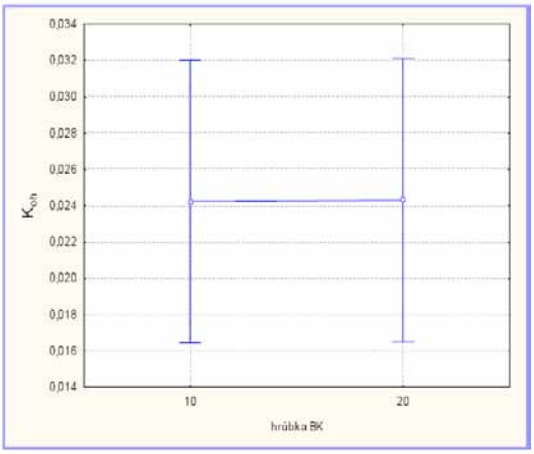


Fig. 2 Graph 95% intervals of reliability represents thickness influence on k_{oh} at beech testing samples

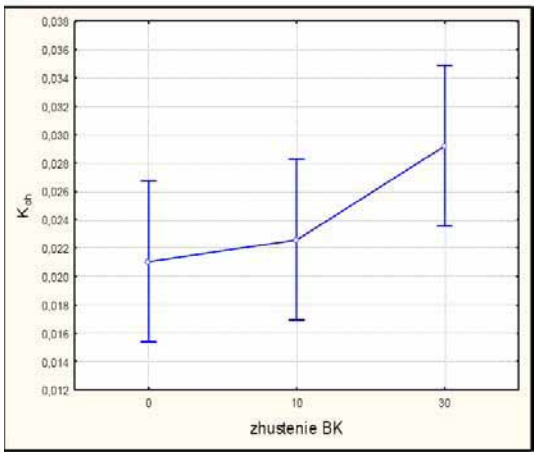


Fig. 3 Graph 95% intervals of reliability represents compression influence on k_{oh} at beech testing samples

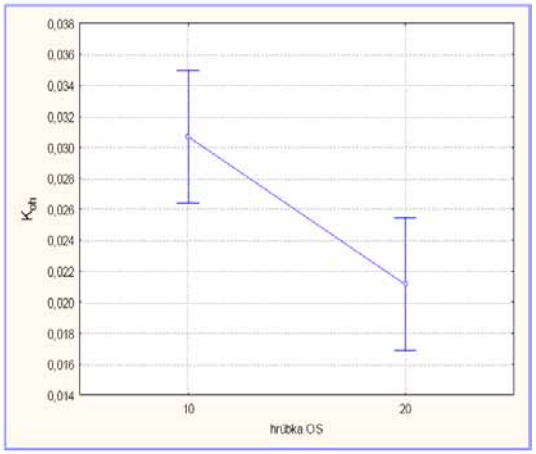


Fig. 4 Graph 95% intervals of reliability represents thickness influence on k_{oh} at aspen testing samples

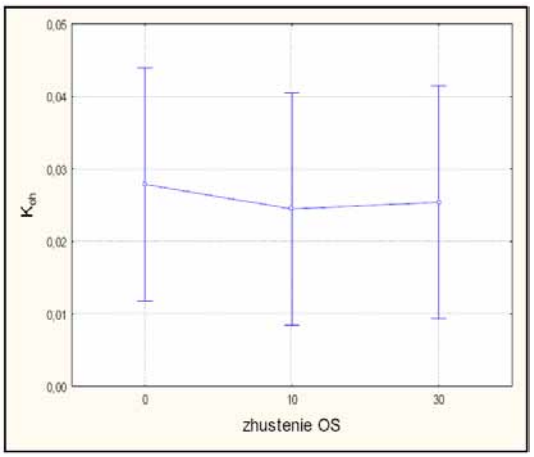


Fig. 5 Graph 95% intervals of reliability represents compression influence on k_{oh} at aspen testing samples

SUMMARY

These results represented a basic knowledge which are necessary for creation of laminated wood-based materials. Results can be used at creation of laminated materials from different wood species which are uncompressed and treated by compression.

This research can be helpful for creation an optimal technology for laminated material production.

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Streszczenie: *Wpływ wybranych czynników na współczynnik zginalności*. Celem pracy było kreślenie wpływu wybranych czynników (gatunku drewna, grubości próbek stopnia sprasowania) na współczynnik zginalności w kierunku promieniowym.

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