

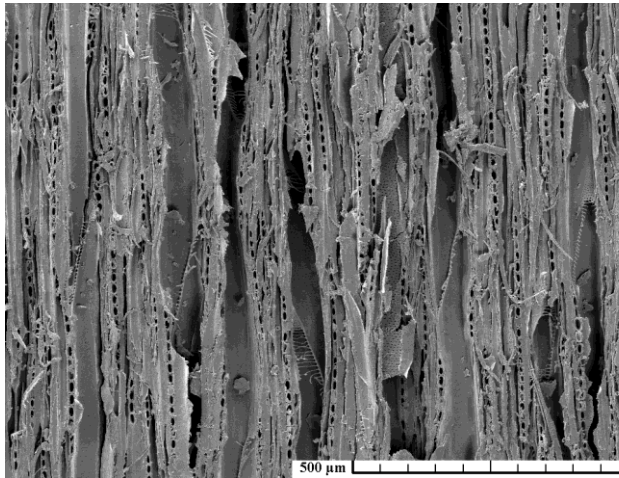
EVALUATION OF SURFACE QUALITY AND ADHERENCE OF THERMALLY COMPRESSED WOOD VENEERS

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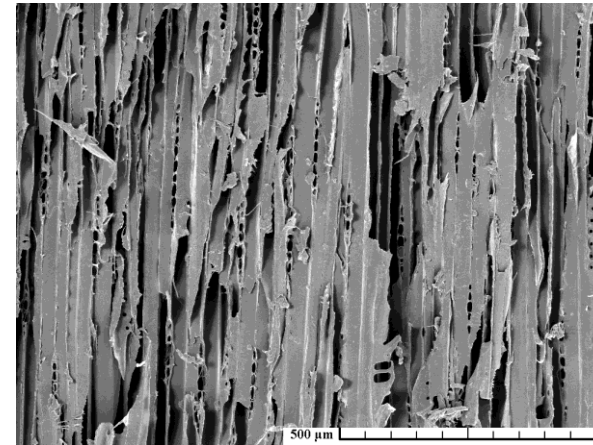
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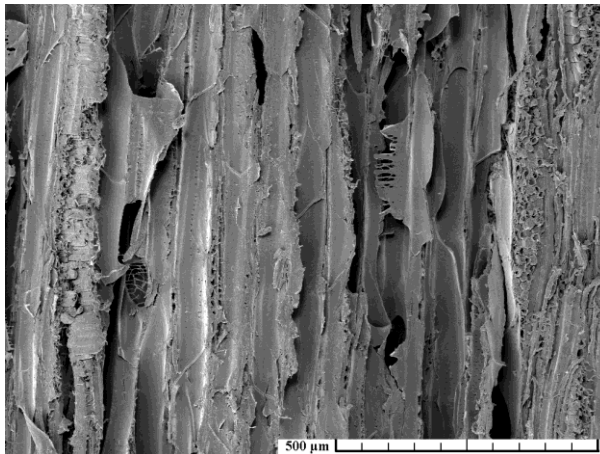
SEM images on longitudinal tangential veneer surfaces before densification



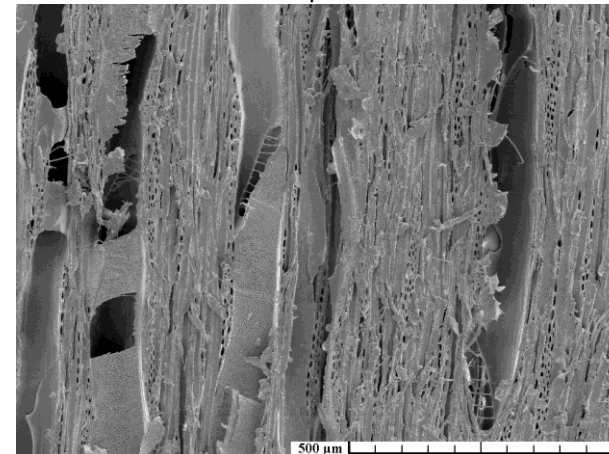
alder



pine



beech



birch

Wood veneer

- High surface roughness
- Surface porosity variation
- Thickness variation
- Moisture content variation
- Density variation
- Color variation

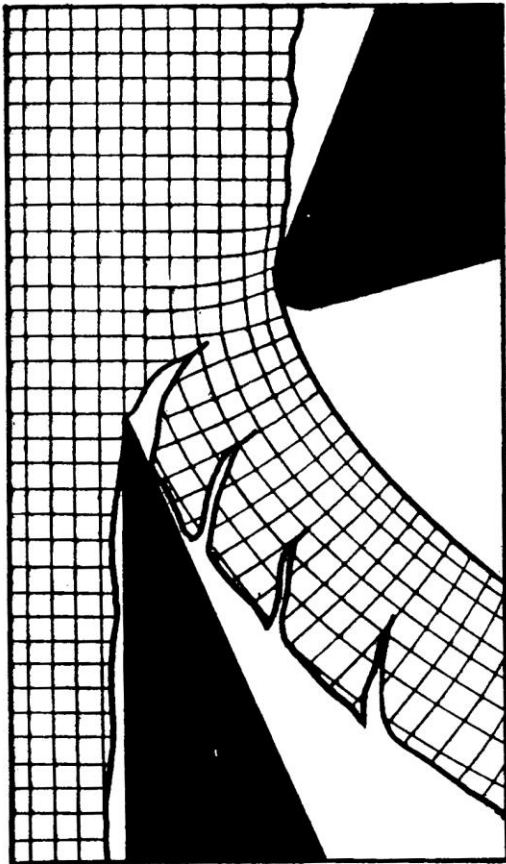
Rough veneers:

- Reduce contact between the layers
- Reduce bond quality by as much as 33% as compared to smooth veneer (*Faust and Rice, 1986*)
- Cause excessive resin use and may result in resin bleeding through the face veneer
- Need relatively much paint for coverage

Ways of eliminating disadvantages (in practice):

- overdrying of veneer
- higher pressure of pressing 1,8-2,2 MPa
- greater consumption of glue 150-200 g/m²

Wood veneer sheet



- Loose side with lathe checks
- Tight side

Objective

- the main objective of this study was to examine the effect that thermally densified surfaces of veneer (loose and tight sides) had on the surface quality of laminated MDF panels and adherence between thermally densified veneer samples and varnishes.

Materials:

- Rotary-cut birch veneer (*Betula verrucosa* Ehrh.)
- Solvent-based lacquer OLI-KS Parkettsiegel 7600
- Commercial MDF panels

Thermo-mechanical densification of veneers:

- Temperature: 150; 180; 210°C
- Pressure: 3 MPa
- Time: 3 min

Overlaying of MDF panels:

- non-densified veneer (control)
- densified veneer

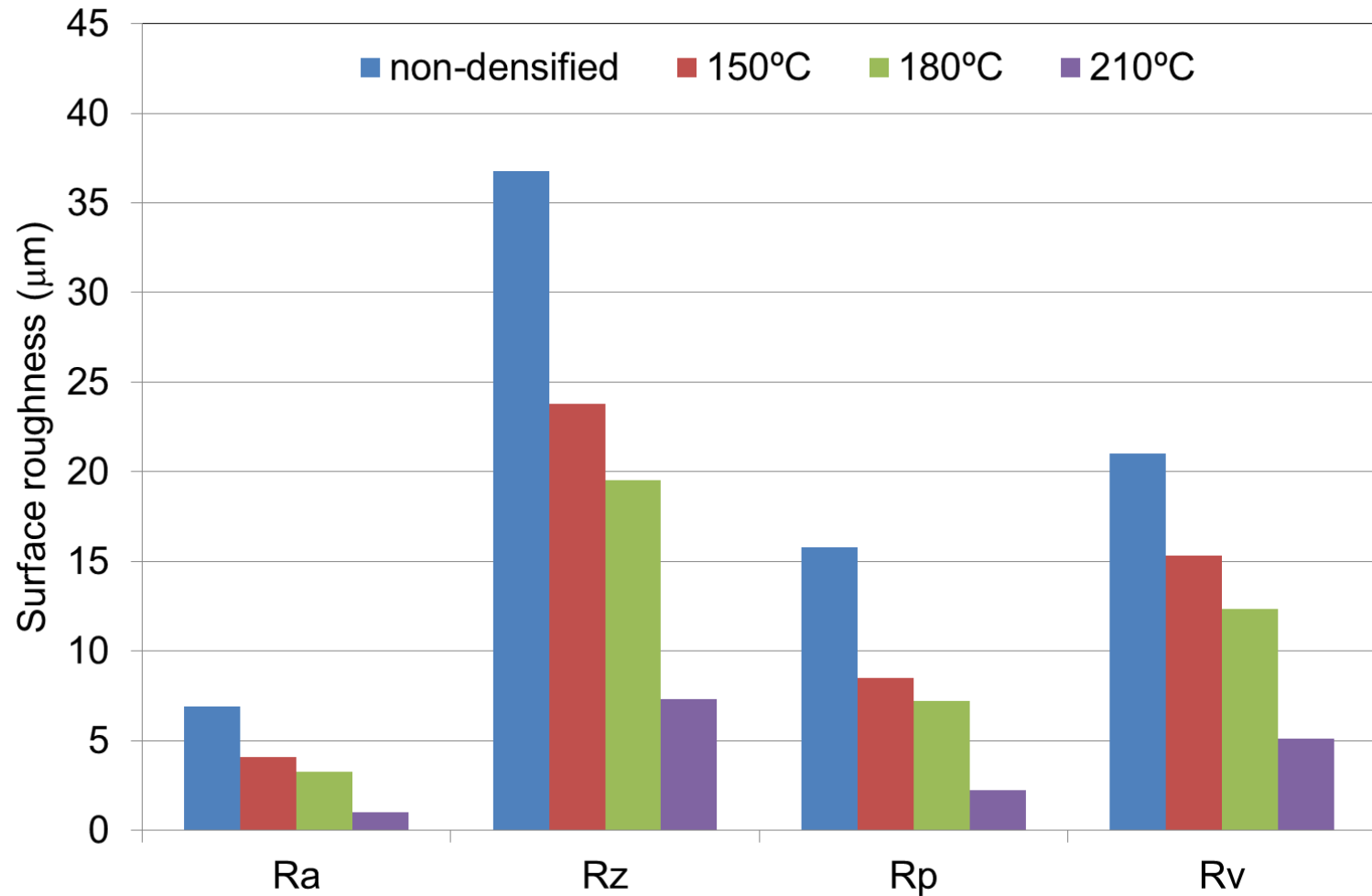
Surface coating process:

- number of layers 1, 2, 3
- spread rates of 50, 75 and 100 g/m²

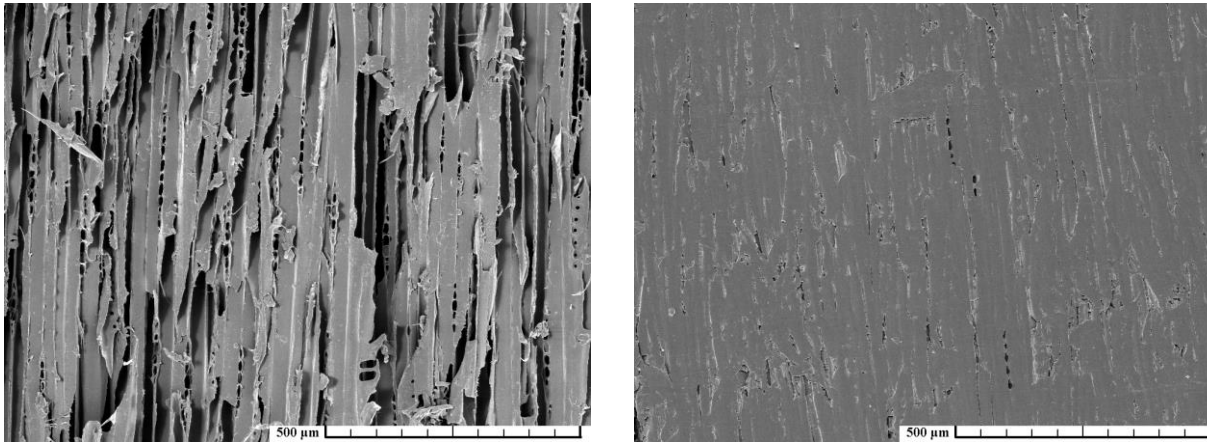
Studied properties:

- Surface roughness
- Gloss
- Adhesion strength

Surface roughness of overlaid MDF panels



SEM images on tangential surfaces of veneer (non-densified – left; and densified - right)



Bekhta P., Proszkyk S., Krystofiak T., Sedliačik J., Novák I., Mamonova M. (2016): Effect of short-term thermomechanical densification on the structure and properties of wood veneers. *Wood Material Science and Engineering*. doi: 10.1080/17480272.2015.1009488.

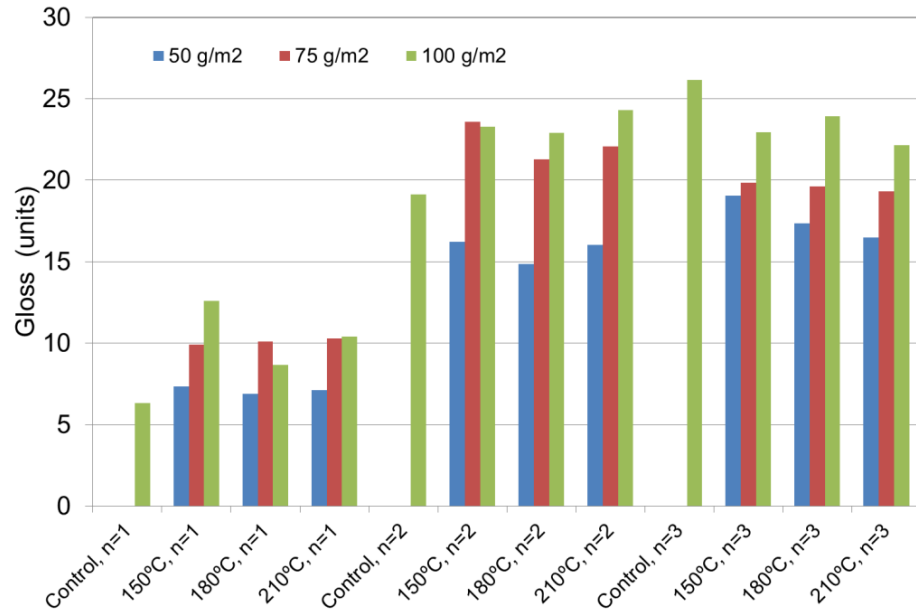
Effect of densification treatment on lathe checks



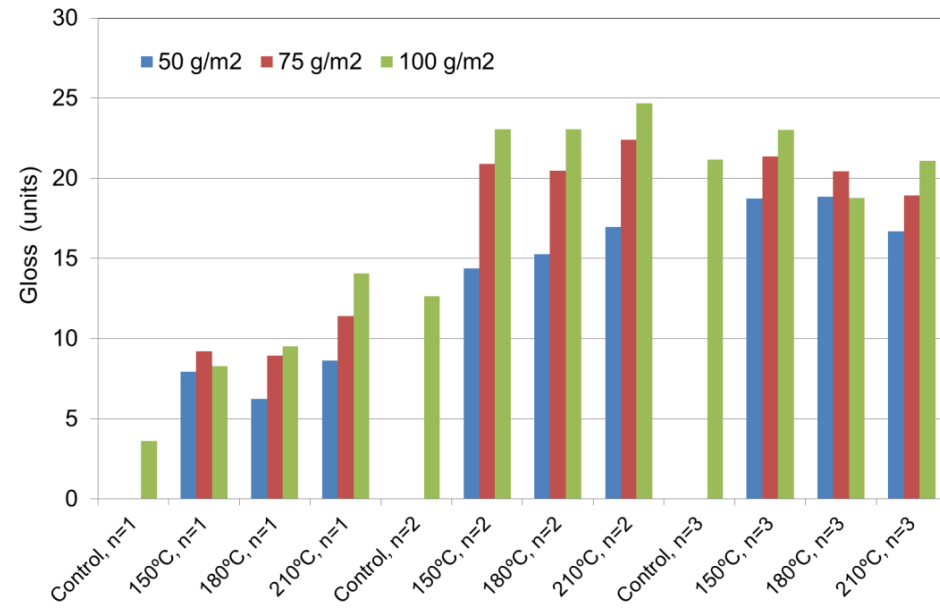
Fang C-H, Mariotti N, Cloutier A, Koubaa A, Blanchet P. (2012) Densification of wood veneers by compression combined with heat and steam. *Eur J Wood Prod* 70(1-3): 155-163.

Gloss (60°)

- Loose side

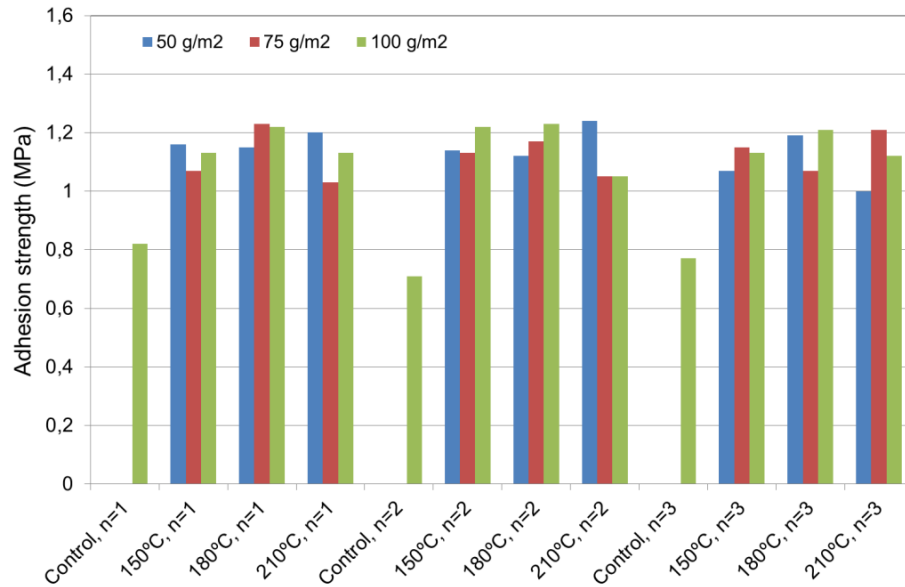


- Tight side

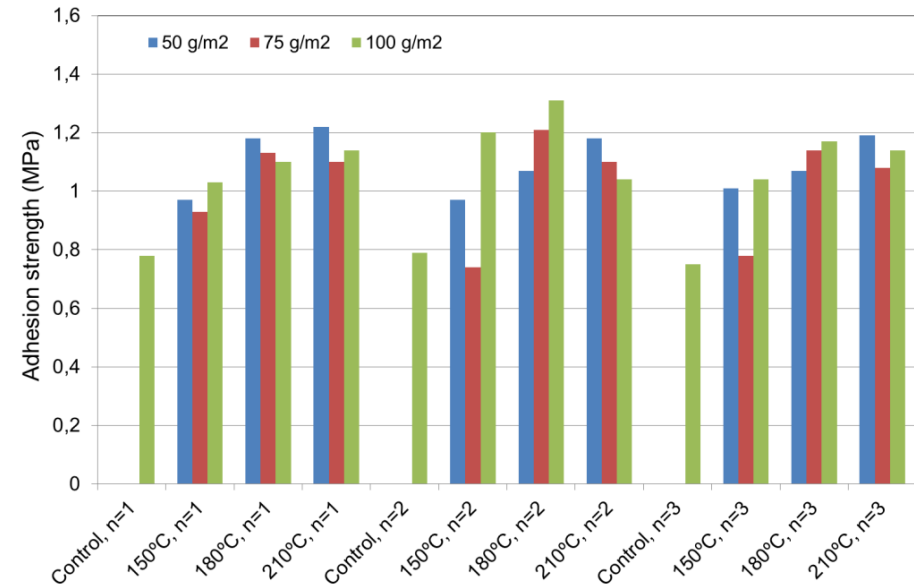


Adhesion strength between loose/tight side of veneer and coating

- Loose side



- Tight side



Conclusions

- The reduction in surface roughness values and an increase in the aesthetic qualities of coated MDF panels which were preliminary laminated with densified veneer can be observed. The surfaces of the overlaid MDF panels with densified veneer were much smoother and glossier than those with non-densified veneer.
- Adhesion strength between varnish and densified veneer (compared to non-densified veneer) was improved to 20-75% depending on the number of layers of varnish, varnish spread rate and temperature at which the veneer was densified.
- The preliminary findings of this study indicated that veneer thermally densified at different temperatures could be considered as an alternative way of producing coated MDF panels with satisfactory aesthetic and adherence properties.

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Thank you for your attention!