

Simultaneous Shaping and Fixation of Veneer by Specific Material Modification

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Background and objective

The application of veneer for decorative purposes creates most valuable products from wood.

Yet, the application of veneer onto moulded templates is restricted due to its naturally low shaping ability (figure 1). Therefore, the aim of this project is to develop a process to improve the shaping ability of veneer realizing a form fixation in a single process step.

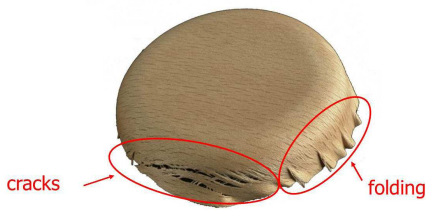


Figure 1: Sample after cupping test according to Erichsen.

For this purpose the veneers are impregnated with a two-component solution consisting of a furan component and a carboxylic acid anhydride. The solution plasticizes the veneer resulting in an increased shaping ability. The fixation of the shape is realized by a heat-induced polymerisation of the solution in the cell walls.

Still, knowledge has to be gained about the effects of the different parameter on the process. Different chemical and mechanical analyses are applied to differently prepared samples. The experimental setup is shown in figure 2.

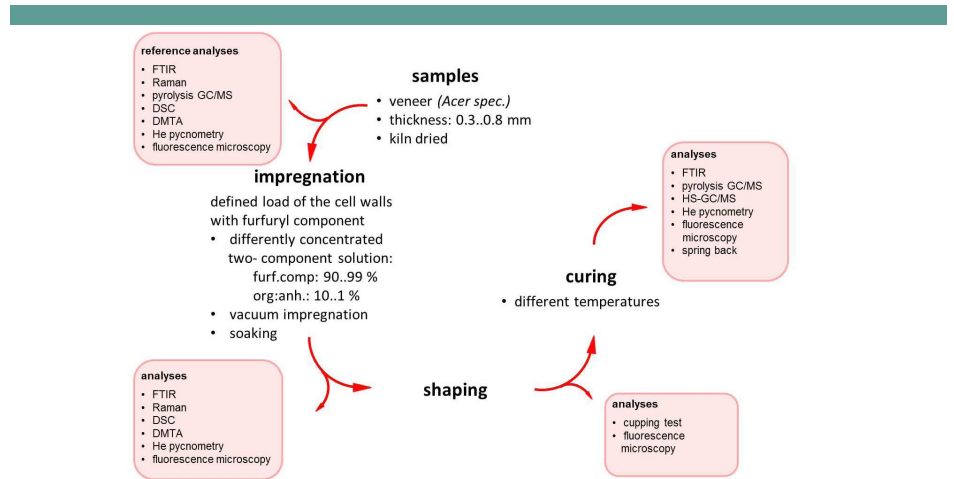


Figure 2: Experimental Setup

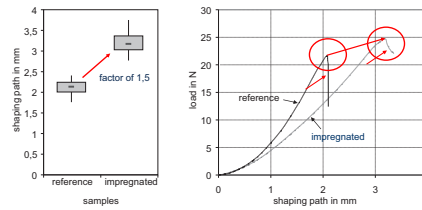


Figure 3: Improved Plasticization

Results

1. By shaping tests based on the cupping test according to Erichsen (DIN EN ISO 20482) could be demonstrated that the forming path can be increased considerably by the proposed impregnation (figure 3) realizing an increased shaping ability (figure 4).



Figure 4: Improved shaping ability.

2. With Helium pycnometry it could be demonstrated that the solution permeates the cell walls causing a bulking effect before curing.

3. Confocal Laser Scanning Microscopy (CLSM) validates an even distribution of the polymer in the cell wall (figure 5).

4. Chemical analyses (DSC, HS-GC/MS, Pyrolysis GC/MS, FT-IR spectroscopy) give more information about the reaction mechanisms and kinetics as well as the composition of the end product correlated to the varying process parameter.

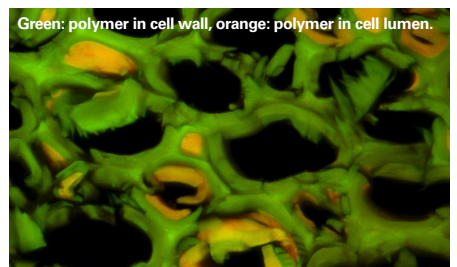


Figure 5: CLSM. Modified sample.

ACKNOWLEDGMENT

This project is financially supported by the German Research Foundation (DFG, PF 686/4-1).

A Short Term Scientific Mission - STSM at Scion, Rotorua, New Zealand is financially supported by COST Action FP0802 Experimental and Computational Micro-Characterisation Techniques in Wood Mechanics. COST STSM Reference Number: COST-STSM-FP0802-7691

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