

## RESEARCH AND EVALUATION OF LACQUER COATING HARDNESS APPLIED TO ARTIFICIALLY AGED WOOD SAMPLES

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The hardness of lacquer coating is one of the most important physical and mechanical features, which gives the ideas of its cohesion strength, degree of its drying and possibility of use of the product under variable conditions. Insufficient hardness leads to a loss of protective and decorative coating functions in the process of products use. The research of lacquer coating hardness are conducted on softwood samples. It shows that nature of the substrate significantly affects the strength of lacquered surface and determines specificity of coating hardness. Heterogeneity of softwood structure and lower hardness of early annual layers of wood affect quality of coating negatively.

The issue of coating hardness has been researched by Professor V. G. Sanaev (Moscow State Forest University). He developed a method of control which depends on the depth of penetration of spherical indentation and suggested standards of hardness for protective and decorative coatings. To create a better modern market for furniture new special effects such as brushing are used. The idea of this technique is to remove the outer layer of wood with a special soft brush, which enables to create a surface with pronounced structure of annual rings. But as a result the wood surface is disturbed and vulnerable to all kinds of damage such as decay, pollution and mechanical damage. Application of lacquer coating of higher hardness can protect this kind of surface. That is why the research of coating hardness is an important issue in order to extend the product's life.

The objective of the research is to determine the effectiveness of commercially available brands of lacquer coatings, applied to artificially aged samples. The experimental and statistical methods of research were applied for this purpose.

**Material and methods.** The samples were made of pinewood board with humidity level 10-12%. The brushing was done by "Makita" company. A total of three groups consisting of 10 samples were provided. Various brands of lacquer were applied. One group of samples was a control group. All samples were sprayed with stain-primer and patina. The samples of the first group were coated with Osmo brand oil-wax product. The second group of the samples were coated with water-dispersion lacquer of Kompozit brand. The samples of the third group were treated with yacht lacquer of Alpina brand. The samples of the fourth group were represented by unbrushed samples, coated with patina and water-dispersion lacquer of Kompozit

brand. Uncoated samples of brushed pinewood board were assigned as a control group. Hardness testing machine “Novotest” was used to determine the surface hardness of lacquer coatings. The device met the standards DIN 53505, ASTM D2240 [5], ISO 868, JIS R 7215.

**Research results.** Methods of mathematical statistics were applied for data processing. Figure 3 showed a comparative analysis of tested samples hardness. Coefficient  $V = 24 - 28\%$  was significantly high. This could not be explained by the fact that lacquer film of brushed surface did not have a homogeneous structure. The surface sagged more in early stage of annual growth rings because it had a lower hardness than in the late stage.

The maximum surface hardness, which was 0,59 HD was observed in samples, coated with yacht lacquer. The surface hardness of the group of samples coated with water-dispersion lacquer was less 7% compared to the above mentioned one. The lowest surface hardness less 27 % was obtained in a group of oil-waxed samples.

**Research conclusions.** Despite the fact that lacquer coating did not provide a solid film on brushed surfaces, even less hardness was determined for uncoated samples. This proved the importance and necessity of brushed surfaces protection with lacquer.