

Production of Solid Wood Panels with Foamed Adhesives

**WOOD PROCESSING AND FURNITURE MANUFACTURING
CHALLENGES ON THE WORLD MARKET
Within**



**ASTAREA hotel – Mlini near Dubrovnik, Croatia
October 7th-9th 2015**

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The main goal is to present:

- new trends of using materials in the wood processing industry;
- competitiveness - economics aspects in the production,

Theoretical aspects:

- **wood bonding** – changing wood shape and dimensions;
- **wood bonding** – improving the quality of products;
- adhesives play important role in WPI.

Foaming of PVAc dispersions

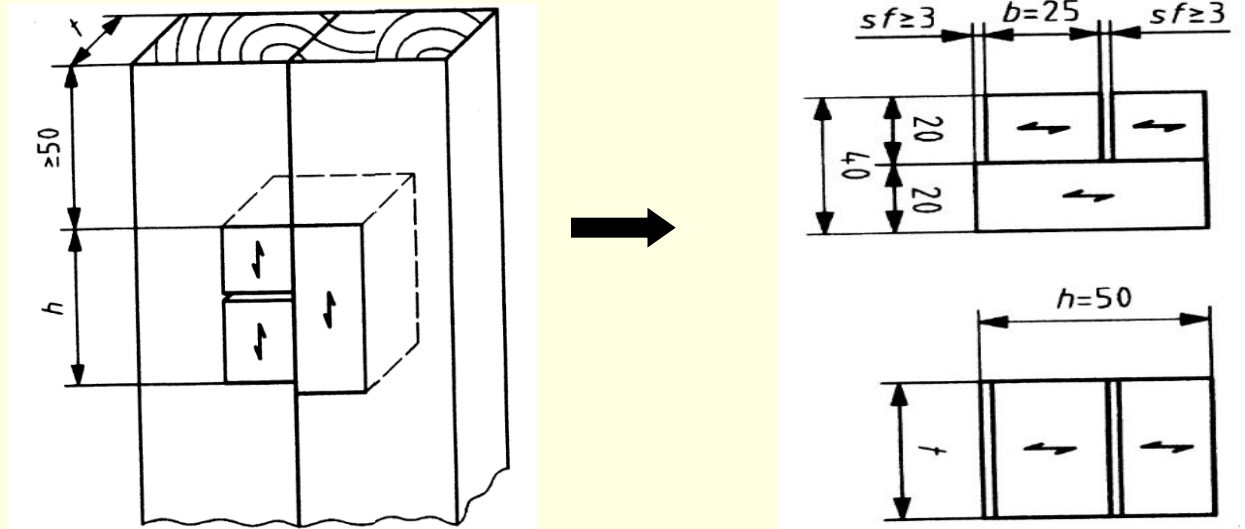
Advantages of foamed PVAc dispersion:

- **technology** = higher volume of adhesive by foaming process;
- **good wetting** of the adherent surface – due to better and more uniform adhesive spread;
- weaker, resp. **slower penetration of water** from glue into the cells of wood
- **cost savings** – in the bonding process, there is a potential for reduction of direct used material by reducing the amount of applied glue;
- **no formaldehyde emissions.**

MATERIAL AND METHODS

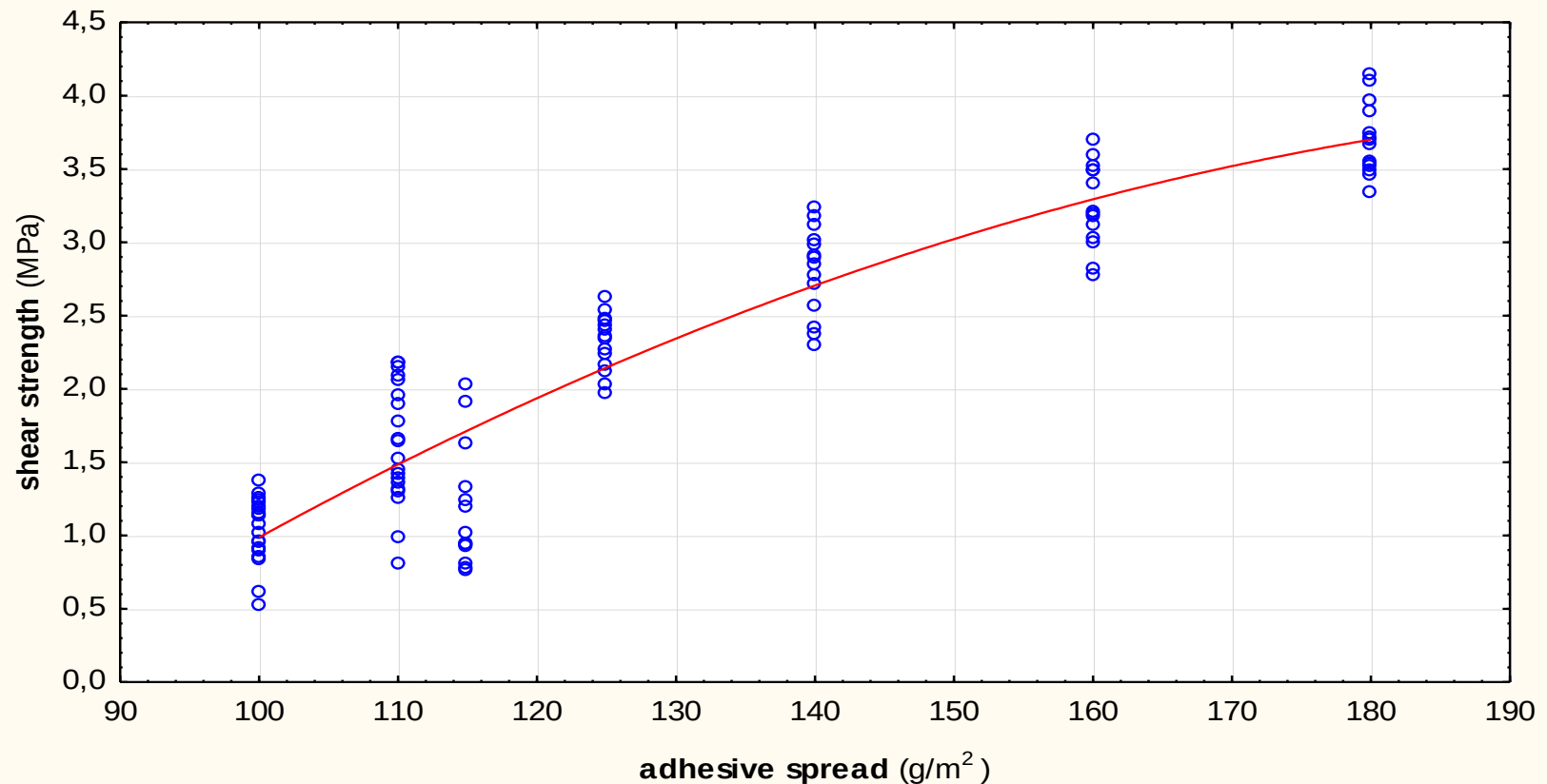
- conventional spread of adhesive: **180 g/m²**
- one component PVAc dispersion, RAKOLL® 4340 with perfect water resistantce (D4) were tested
- adhesives was foamed at 30% of its volume
- in our research were evaluated **7 levels of foamed adhesive amount:**
100g/m², 110 g/m², 115g/m², 125g/m², 140g/m², 160 g/m², 180g/m²
- according to the Standard EN 13354: 2009 Solid Wood Panels (SWP). Bonding quality. were prepeared and tested samples
- required shear strength of joints - lower 5 % percentile is 2,5 MPa.

MATERIAL AND METHODS



- preparing of testing samples according Standard EN 13354: 2009
- from each panel were prepared testing samples for minimally 10 valid values, totally 70 testing samples

The dependence of shear strength (Y) on the glue spread (X) within interval $<100 \text{ g/m}^2 ; 180 \text{ g/m}^2>$ by mathematic function was illustrated:



$$y = - 6,7262 + 0,0972 \cdot x - 0,0002 \cdot x^2$$

- adhesive spread **140,51 g/m²** can achieve such shear strength where lower 5% percentile is 2,5 MPa

CONCLUSION

- dispersion adhesive spread oscillating around 140 g/m² foamed at 30% = 180 g/m² unfoamed dispersion adhesive;
- savings of direct material = 22% of total used adhesive volume;
- positive impact also to the reduction of indirect costs – costs of storage, transportation...
- initial investment 35 000,- EUR (technological equipment);
- profitable mainly for wholesalers.

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Thanks for your attention.