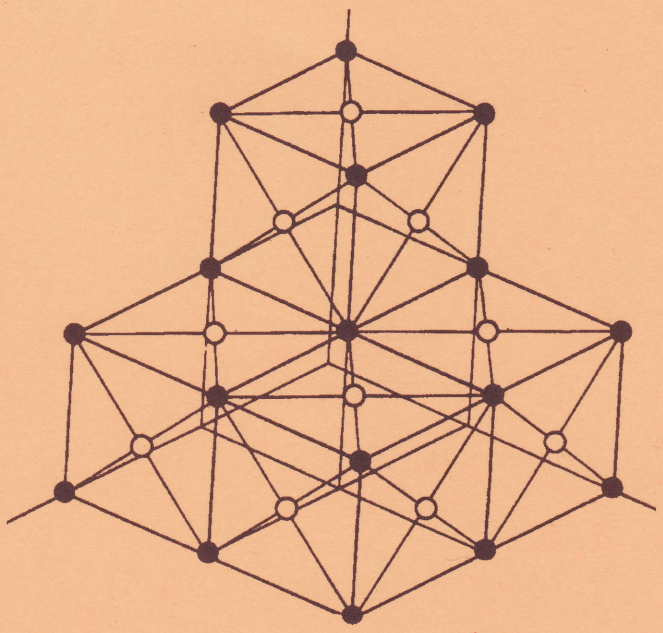

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ABSTRACTS

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ABSTRAKTI

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TEXTILE FABRICS REINFORCED PLYWOOD WITH ENHANCED MECHANICAL PROPERTIES

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The concept of the sandwich structures can increase the variety of products by tailoring the functional properties even for well established products as plywood. By merging different materials into one the spectrum of the material properties and its performance becomes attractive for different applications. In particular interest from the transport industry is associated with the concept of twinning the textile fabrics with the high performance plywood. Therefore deriving the weight efficient panel structure with enhanced vibration, thermal and electromagnetic damping properties are the prerequisites to enter new market sector. Textile fabrics are in particularly effective when impact energy absorption of the structures are required. Moreover combination of plywood and textiles made out of natural fibres contributes to eco friendly manufacturing philosophy of the European car industry.
The present research is focused on assessment of the mechanical properties of the laminate composed of 3D textile fabrics made of glass, flax or basalt fibres and the plywood. Textile fabrics made by twill, panama, satin, also leno (fig.1.a.) and multiaxial weave (fig.1.b.) configurations are most frequent ones. The production of multi fibre textiles is quite simple as specific configuration of fibres and fibre content can be done varied within each lay-up.

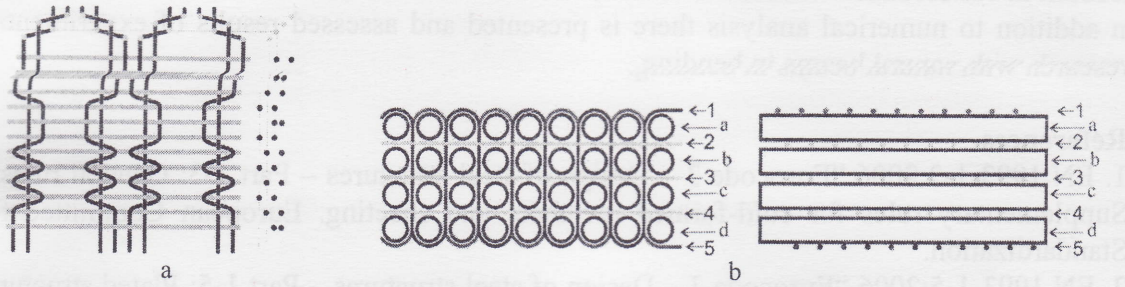

Figure 1. a - Leno weave; b - Multiaxial weaves (2; 3; 4 axial weft, a; b, c, d axial warp, 1; 5 stitching warp

Laboratory scale produced laminated plywood and fabric composites were tested in tension and bending together with the impact energy absorption tests in order to measure corresponding mechanical properties and evaluate overall advantages of the individual textile fabric type. These textile fabrics were attached to the plywood using wood adhesive glue or thermoplastic polymer film processed in hot pressing.
It has been shown that the energy absorption properties of the plywood laminates can be enhances by order of magnitude compared to the traditional plywood plates. Moreover most promising weaving procedure has been identified which enhance the most of the laminate properties.