



# **CIVIL ENGINEERING '11**

**International scientific conference**

**ABSTRACTS**

# **BŪVNICĪBA '11**

**Starptautiskā zinātniskā konference**

**ABSTRAKTI**

**Jelgava 2011**

# ENHANCED IMPACT PROPERTIES OF PLYWOOD LAMINATES

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Application of plywood materials is very wide and it is related to a wide range of industries: transportation, construction, marine etc. Plywood homogenises strength properties of wood, also significantly enhances bending stiffness. Additional value to plywood materials can be added by incorporating it into laminates with specific properties as enhanced crashworthiness, sound/vibration absorption, heat transfer insulation and electromagnetic shield properties.

This work is related to increase plywood crashworthiness or impact properties. Therefore laminates have been made of one and three veneer birch plywood joined with thermoplastic polymer to different types of glass fibre and natural fibre fabrics. Incorporation of thermoplastic polymer with melting temperature close to plywood processing temperature allows unite plywood and laminates manufacturing. Also thermoplastic polymer increases vibration and impact absorption while fibre fabric materials enhance strength properties. In this research polyethylene is preferred as processing temperature of it is close to plywood, however for biodegradable composite polylactide is preferred. Implementation of natural fibre fabrics and biodegradable polymer is of interest making fully biodegradable composite, therefore exclude problems with materials accumulation in waste disposals.

In this study experimental impact response evaluation of plywood/PE/fabric laminates has been performed using INSTRON 9250HV drop-tower. Impact force and absorption energy is compared between plywood products (1, 3, 9 veneer plywood) and different configuration of layers and fabric types of plywood/thermoplastic polymer/fabric laminates.

Experimental results show that single veneer of plywood has very poor impact properties. In combination with thermoplastic polymer and fibre fabric absorbed energy of plywood laminate can be increased 10 and more times depending on fibre fabric. Similar tests were performed with 3 veneer plywood where absorbed energy increased 2-3 times. Totally specific energy or absorbed energy per weight of plywood/PE/fabric laminates comparing to birch plywood laminates increases about 1.5 to 4 times.