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**Research area: General aims**

Production economy // Monitoring and control systems

**Key words:**

Direct printing, wood materials, quality

**Title: Investigating the surface structure influence of coated and uncoated wood materials on the quality of direct printing, and developing a methodology for print quality assessment****Background/Problem area**

Laminate flooring is a relatively new product with enormous development potential. Global sales have increased from 1,000m m<sup>2</sup> in 2003 to approx. 1,250m m<sup>2</sup> in 2007. A new generation of laminate flooring has been on the market since 2006: PDL – Printed Direct Laminate. PDL décor is printed on the primed wood surface by indirect gravure printing, and then sealed with several protective layers. The print quality of PDL is highly dependent on the quality of the high-density fibre boards (HDF) used as the substrate. Up to now, no measuring methods exist to evaluate the suitability of HDF surfaces for printing. To achieve the desired print quality, manufacturers invest relatively large amounts of time and money in pre-press stages (priming – primer, filler, stock).

Nothing is currently known about well-defined relationships between surface quality and the technological parameters of HDF production (material influence – wood species, binder, hydrophobing agent; process influence – SR freeness, residence time in the cooker, pressure in the refiner, compaction parameters). In addition, the influence of refining on the surface quality has not been fully clarified so far.

**Objectives/Research results**

Main result of the project is the development of two evaluation procedures for the printability of HDF – one based on a pre-defined method for determining the roughness parameters of untreated HDF, and one based on NIR spectra for primed HDF.

Conclusions about printability can be drawn from differences between the roughness parameters determined before and after moistening. Relationships could be established between roughness parameters, contact angles and selected density profile characteristics. The method can be used offline for final quality inspection in timber production, and for incoming goods inspection in printing.

**Application/Economic benefits**

Direct printing of wooden flooring has only recently been used in industry. No previous studies are known regarding the influence of material and process parameters on the surface quality and especially the printability of wood materials. Print quality assessments are mostly made empirically by printing tests. No method is currently available which could be used to control the surface quality of HWP structures. These deficits have enormous market potential for achieving economic effects by product optimization and for increasing the output or manufacturing efficiency of production plants. SME (plant manufacturers, metrology producers, supply firms) in particular will benefit from the project work, helping them to

- further improve the production lines for direct printing of wood materials,
- develop and market measuring devices for new applications or open up new markets,
- adapt new wood materials for other application areas, or
- offer improved coating formulations for various materials.

**Period of time: 1.8.2009 - 30.1.2012**

**Remarks**

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