

### **7.1.1: Composites - New Evaluations, New Species, and Recyclability of Non-structural Panels**

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#### **Abstract:**

Wood based panels (WBP) such as medium density fiberboard (MDF) and particleboard (PB) have evolved significantly in the last years in response to market demands. These evolutions, both on products properties and process, included changes on basic raw material (use of different wood species and recycled wood), changes on adhesive systems (different resins, new catalysts), inclusion of different additives (formaldehyde scavengers, fire retardants, moisture repellents, etc.) and even on its basic physical and mechanical properties (density, density profile, internal bond, stiffness, etc.).

MDF and PB are largely applied in furniture, cabinet manufacture and building construction.

For furniture, aesthetic appearance and processing cost are the most important requirements, which are closely linked to machinability (sawing, routing, drilling, etc.) and processing conditions (geometry and size of cutting elements, feed speed, etc.).

The introduction of new WBP gave designers the freedom to explore different uses and other criteria related to material properties and machinability must be fulfilled. Machining processes are usually assessed by surface quality, power consumption and tool wear. Edge quality is also a possible quality criterion for WBP, which has to be free of disruptions after milling or sawing.

A new methodology, based on the use of two different systems (artificial vision system for edge quality evaluation and a process monitoring system) is proposed and the results of a preliminary performance study (WBP with different resins, raw material mix and density as well as overlaid with melamine impregnated paper) are presented.