

## **Ultrasonic inspection of wood composites: How process parameters influence the transmission signal**

Ulrich Hilbers (speaker)  
Doctoral student, Dept. of Wood Science  
University of Hamburg  
Hamburg, Germany

Joerg Hasener  
R&D Manager, Measuring Technology  
GreCon  
Alfeld, Germany

The online air-coupled ultrasonic inspection for the detection of panel defects is an approved and widely applied technique in the wood based panel industry. The ultrasonic signal of the UPU 3000 from the GreCon Company can be used to visualize deviations from a smooth production process. The objective of this research work was to generate a fundamental comprehension of ultrasonic attenuation effects in wood composites and to examine how process and material parameters influence the ultrasonic signal. For this, the University of Hamburg and GreCon established a joint research project. While previous works only treated single parameters affecting the ultrasonic signal, it is the intention of this project to gain a broader picture of the interactions between input parameters and the transmitted ultrasonic waves. Investigated parameters were pressing time, adhesive type and content, panel density and type and thickness changes. In addition, the ultrasonic transmission was measured during cooling of the panels. All particleboards showed a stronger transmission signal for longer pressing times. Consequently, it is possible to increase the pressing time just below the point where blisters occur. Neither adhesive content nor adhesive type produced consistent trends. Temperature showed a highly significant effect on the ultrasonic signal in MDF and particleboard. Beside the detection of panel defects, the high resolution ultrasonic inspection system is capable to act as a trending system for process and panel parameters during the production of wood composites and, accordingly, to give the user an additional value for the process optimization.