

Woodtrusion – Compression of local thin wood to high-quality construction wood

Goal

The aim of the Woodtrusion project was to convert low-quality thin wood into high-quality structural wood by compressing it. Wood is a composite of cellulose fibers and lignin as a matrix. Due to the free volume of the existing pathways, wood can be compacted under pressure and heat. Depending on the degree of compaction, the mechanical properties, such as strength, can be increased many times over and the potential of the cellulose fibers can be better utilized. At the start of the project, extensive investigations were carried out to determine optimal parameters for compacting wood.

The project was initiated and coordinated by Niemeier Fahrzeugwerke GmbH, Lunzenau.



Results

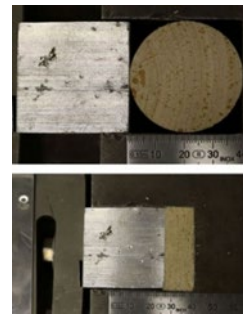
In the project, a system was developed and built on which round wooden profiles arranged in a ring are pressed into wooden tubes. The woodtrusion system complex includes a material magazine, automatic loading based on the turret principle and a heated press unit. In the press unit, the wooden profiles are pressed through a conical nozzle and compressed there. A winding unit is positioned at the nozzle outlet, which reinforces the exiting wooden tube with towpregs in an orbital winding process and thus compensates for the restoring forces of the wood. The temperature of the wood of 120 – 150 °C is used to harden the towpreg resin system. The plant works continuously and can produce pipes of any length.



CF-reinforcement against restoring forces



Wooden tubes with cross winding



Compaction of samples



Pressing plant

Outlook

The project provided proof of the feasibility of manufacturing hollow profiles from compressed wood and reinforcement from fiber-reinforced plastics. The material-technological solution can be transferred to other profile geometries and types of wood. Further research work and an optimization of the woodtrusion plant complex are necessary before the process can be used in series production.



Acknowledgements

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