

Side Impact Beam in Wood-Sandwich Construction

Current side impact beams are primarily built out of metal. Our researchers created a new, light, wooden side impact beam with a high stability and durability. The element acts in a similar way to the conventional metal ones and transfers impact energy into the vehicle structure via the A and B pillars and converts it into further deformation energy.

BACKGROUND

Side impact beams consist primarily of shaped metal tubes or metal profiles. Due to the ductile behavior of the material, the kinetic energy of the impacting body can be converted into deformation energy in the sill and doors. The side impact beam initially acts as a bending beam. During deeper impacts, the side impact beam also acts as a tension band between the A-pillar and B-pillar, allowing additional deformation energy to be introduced into the vehicle structure.

The task was to develop a side impact beam or side impact protection with the highest possible wood content. Other used components and materials should, if possible, be of biological origin.

TECHNOLOGY

A combination of two flanges and a low-density core was used to create a restrained beam made of natural components that initially exhibits a high moment of inertia when a force is applied. The pliability of the laminated wood elements allows them to be subjected to high deformation. When a body impacts, the element is subjected to strong bending and simultaneous lateral compression and shear. As a result of the failure of the core layer, the distance between the outer two laminated wood elements is reduced and the moment of inertia decreases sharply. This in turn leads to a significant reduction in the stiffness of the element, allowing small bending radii without failure of the flanges. The tension band attached to the inner side prevents tensile failure there, which means that the tensile effect of the element can be maintained for as long as possible. In addition, the tension band protects the laminated wood from splintering. It can be made of metal, as well as fiber or fiber composites or fabrics.

By using wood and bio-based materials, the tare weight of the element can be reduced by up to 30%. The use of new bio-based materials also leads to an improvement of the CO₂ balance.

BENEFITS

- Bio-based, natural components
- Long durability
- Reduction of tare weight by up to 30%
- Reduction of CO₂ emission



Universität für Bodenkultur Wien
University of Natural Resources
and Life Sciences, Vienna

www.boku.ac.at



Graz University of Technology
www.tugraz.at

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AVAILABLE FOR:
License Agreement
Patent Purchase
Cooperation

APPLICATIONS:
Bio-based side impact beam
for automotive industry

DEVELOPMENT STATUS:
Prototype, TRL 4

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INVENTORS:
Ulrich Müller
Alexander Stadlmann
Cedou Kumpenza
Florian Feist
Georg Baumann

CONTACT:

Lisa-Ariadne Schmidt
Research Support, Innovation
& Technology Transfer
Vienna, Austria
T: +43 1 47654 33034
lisa.schmidt@boku.ac.at