Federal Ministry
for Economic Affairs
and Climate Action

Best practice example

for lightweighting in Germany

Floor panels with foam core

To reduce their weight, many vehicles are equipped with foam-core floor panels.

Floor panels with foam core

Fields of application

Railway vehicle manufacturing

In this example, lightweighting allowed for the following reductions compared to the conventional plywood design:

Weight approx. -30 % Energy approx. -25 %

Application

Floor panels with a foam core are used as load-bearing floors in vehicle construction, e.g. in rolling stock, long-distance and local transport.

Challenge

The task was to develop a non-slip, heat-insulating and sound-insulating floor panel that meets the highest fire protection requirements while optimising its weight to lower the energy consumption of trains while in motion.

Solution

To realise these benefits, the plywood boards currently used were furnished with a foam core without impairing their high-quality properties. A further advantage that could be achieved is better thermal insulation while maintaining the fire resistance and durability of the surface.

Best Practice Example | Floor panels with foam core

Sandwich panel with foam core

Subway with foam-core floor panel

Other potential applications

Commercial vehicle construction

Shipbuilding

Other areas of application for foam-core sandwich panels include optimised sound and heat insulation.

For example, an 18 mm thick floor panel allows for energy savings of 5.4 kg/m² compared to the conventional plywood design.

Reduced energy consumption is achieved during use through lower weight and greater heat insulation properties. The thermal conductivity λ is 0.176 W/m²K for beech wood and 0.07 W/m²K for composite with foam core. The material used is a renewable raw material with a zero carbon footprint.

Compliance with all requirements relevant for the sector is being ensured. Research activities are being conducted so as to further improve health and safety, environmental protection and recycling.

The LIGHTWEIGHTING ATLAS

The LIGHTWEIGHTING ATLAS is an interactive web portal that pools information on those active in lightweighting and their skills across different industries and materials. The atlas is free to use and entries into the atlas are also free. You can find the LIGHTWEIGHTING ATLAS at www.leichtbauatlas.de

The Lightweighting Initiative

Modern lightweighting is of pivotal importance for German industry and its competitiveness. Federal Ministry for Economic Affairs and Climate Action has established the Lightweighting Initiative to support lightweighting in Germany. The Lightweighting Initiative Coordination Office in Berlin, which is financed as part of the initiative, pools all activities relevant to lightweighting and supports German companies, especially SMEs, as they implement lightweighting.

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