



- Title**
SANDWICH PANEL BASED ON HEMP SHIVES AND FIBERS, AND THE MODALITY OF OBTAINING IT, APPLICABLE IN THE BUILDING SECTOR
- Inventor/s - Contact**
IȘTOAN Raluca, TĂMAȘ-GAVREA Daniela-Roxana, MANEA Daniela Lucia, VASILE Ovidiu
- Patent/ Application number**
PATENT APPLICATION OSIM: a2019 00237/15.04.2019
- Short presentation**
The invention relates to a sandwich panel based on hemp shives and fibers, and the method to obtain it, which has the applicability in the construction sector. The sandwich panel is designed with three layers: a core and two sheets. The low-density core is obtained from hemp fibers and a cement binder, while the thin skin-layers which cover the core on each side are prepared from hemp shives and hydrated lime-cement binder. The panel is used as a partition element with significant acoustic and thermal properties while is responding to several sustainability requirements. The panel was analyzed in four ways: (a) without perforations, (b) with perforations of 1 cm diameter and 10% degree of perforation, (c) with perforations of 1 cm diameter and 20% degree of perforation (d) with perforations of 1 cm diameter and 30% degree of perforation.
The physical characteristics of the sandwich panel are:
 - (a) without perforations: sound absorption coefficient $\alpha_{\max} = 0.56$ at 350 Hz, thermal conductivity $\lambda = 0.068$ [W/mK], density $\rho = 413$ [kg/m³].
 - (b) with perforations: sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 650 - 1080 Hz, with $\alpha_{\max} = 0,97$ (810 - 860 Hz)
 - (c) with perforations: sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 970 - 1350 Hz, with $\alpha_{\max} = 0,85$ (1090 - 1200 Hz)
 - (d) with perforations: sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 880 - 1740 Hz, with $\alpha_{\max} = 0,95$ (1140 - 1250 Hz)
- Applicability**
The problem solved by the invention is to obtain an accessible sandwich panel based on hemp shives and fibers. The raw materials obtained from the hemp and used to design the panel are considered waste, which is collected from the removing process of hemp textile fibers. The design of this low-cost panel was define to the use of common and accessible mineral binders, which allowed the panel to obtain acoustic and thermal performances.
- Images**



Figure 1. Sandwich panel based on hemp shives and fibers

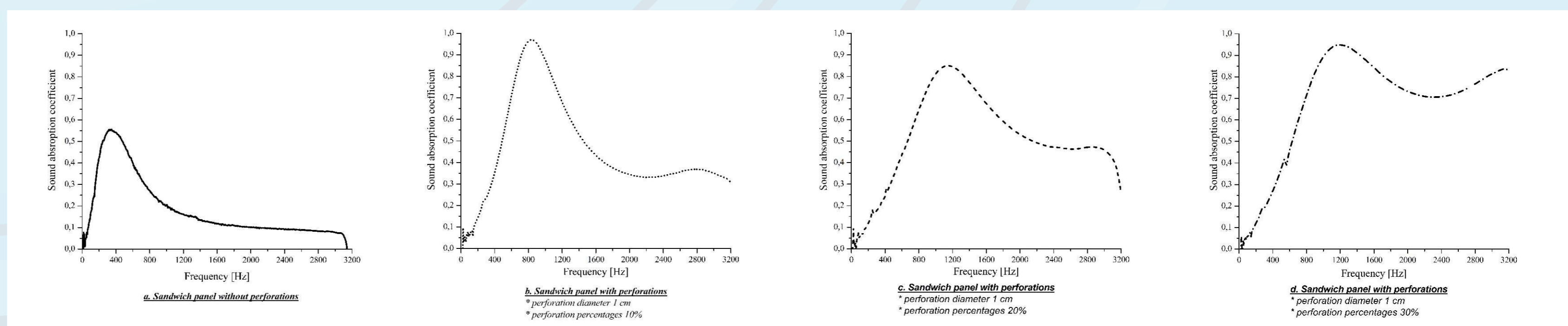


Figure 2. Sound absorption coefficient of the sandwich panel
(a) without perforations, (b) with perforations of 1 cm diameter and 10% degree of perforations,
(c) with perforations of 1 cm diameter and 20% degree of perforations, (d) with perforations of 1 cm diameter and 30% degree of perforations