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EXPERIMENTAL STUDY CONCERNING THE THERMIC TRANSFER INFLUENCE TROUGH DOUBLESTRATIFIED INSULATED PANELS USED IN HOUSING CONSTRUCTION. PART I.

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Key words: *wood, wood materials. thermic transfer, structure.*
Abstract: *The paper present the results of studies and researches performed by authors in field of wood construction, more precisely in the concerning the heat transfer through panels which might consist the external walls foe wooden prefabricated buildings.*

1. INTRODUCTION

The thermic insulation is made by putting an insulated material stratum, with a minimum thermal conductivity (λ<0, 12), to prevent heat flow from outside to inside or vice versa, and consequently, to lessen the heat transfer coefficient.
I did theoretical and experimental researches in many "sandwich” structures which can be largely used in prefabricated wood housing.
The achieved results can be used as a rough guide for thicknesses larger than those studied in the thesis. The aim of the research is the possibility to compound some indigenous thermal insulator material (i.e. mineral wool, polystyrene, PAL) in order to obtain a "sandwich” structure with thermo-physical properties which matches the author preoccupations.
By using the constructive solutions adopted for the version of doublestratified structures the study of the influence of the thickness of the PAL sheets on the thermal transfer coefficient was considered.
For this purpose, the data obtained experimentally and the calculated data were put together in table 1 in order to explain graphically this influence.

Table 1. *Table of cumulative data for doublestratified sample*

Sample	Thickness (mm)	Thermal transfer coefficient determined experimentally λ_e (W/mK)	Thermal transfer coefficient determined theoretically λ_t (W/mK)	Thermal resistance determined theoretically R (m^2K/W)	Correction coefficient $c = \frac{\lambda_e}{\lambda_t}$
PpvP 16,20,20,16	72	0,060	0,066	1,089	0,909
PpvP 16,20,30,16	82	0,058	0,062	1,333	0,935
PpvP 16,20,50,16	102	0,050	0,056	1,821	0,892

PpvP 16,20,80,16	132	0,044	0,052	2,552	0,846
PpvP 16,20,20,16	72	0,060	0,066	1,089	0,909
PpvP 16,30,20,16	82	0,057	0,062	1,322	0,919
PpvP 16,50,20,16	102	0,050	0,057	1,787	0,877
PpvP 16,80,20,16	132	0,046	0,053	2,484	0,867

By maintaining the layer of polystiren consistent in the middle and modifying the layer of mineral wool but keeping the 16 mm PAL sheets, the results are presented graphically in figure 1.

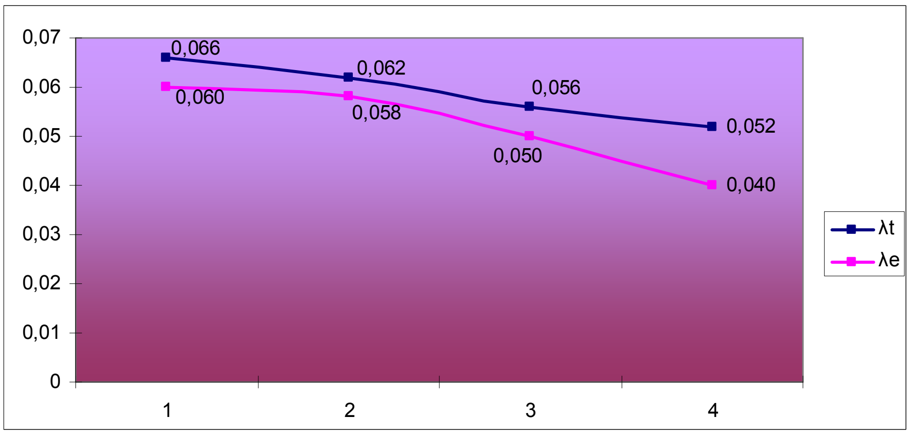

Figure 1. The variation of the thermal transfer coefficient λ_e şi λ_t function of the thickness of the sample (layer of mineral wood)

The variation of the thermal transfer coefficient determined theoretically shows a liniar decrease, while due to the lack of homogeneity of the component layers, the thermal transfer coefficient determined experimentally shows an almost sinusoidal variation.
By maintaining the thickness of the PAL consistent (16 mm), we modifying the thickness of themal insulation layer. In this case we maintaining the layer of mineral wood consistent in the middle and modifying the layer of polystiren. Figures for the thermal transfer coefficient that are very similar to the previous ones, their variation being indicated in the graphic below.

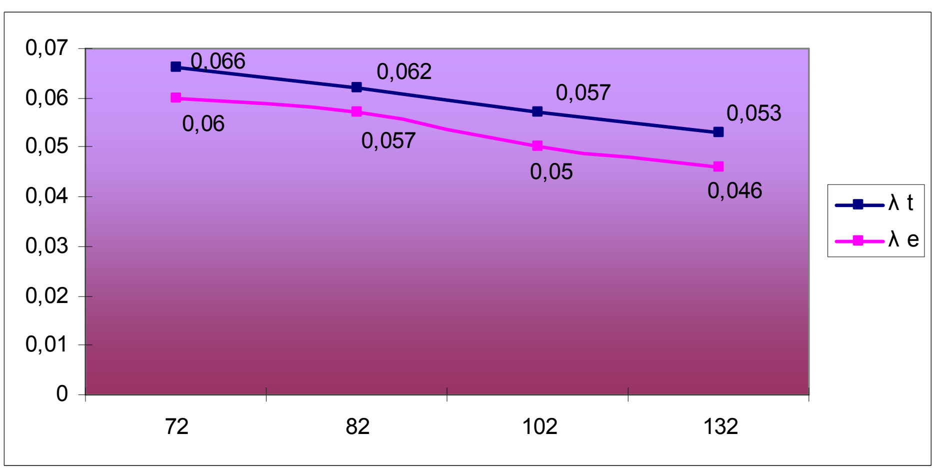

Figure 2. The variation of the thermal transfer coefficient λ_e şi λ_t function of the thickness of the sample (layer of polystiren)

Having the graphic representations separately for each category of sample (of the double stratified type) and considering that the thermal insulated layer is consistent, it was possible to represent on the same graphic the variation of the thermal transfer coefficient determined experimentally.

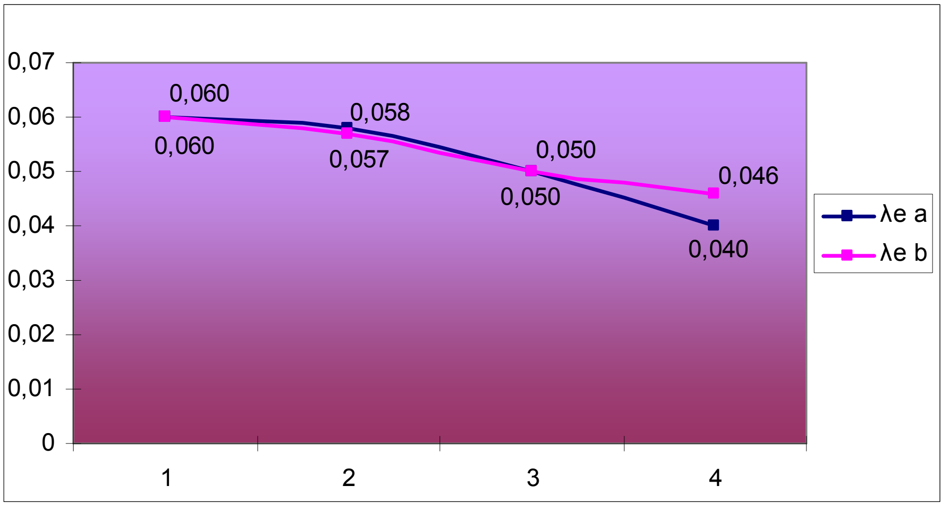

Figure 3. The variation of the thermal transfer coefficients λ_e function of the thickness of the mineral wood (a) and function of the thickness of the polystiren (b)

CONCLUSION

The very small difference between the variation of the thermal transfer coefficient in the two categories of structures and also the close figures of these coefficients justifies the fact that by replacing the mineral wood sheets with polystyrene sheets has not got a significant influence on the heat transfer through these types of sample.

The achieved results can be used as a rough guide for thicknesses larger than those studied in the thesis. Te aim of the research is the possibility to compound some indigenous thermal insulator material (i.e. mineral wool, polystyrene, PAL) in order to obtain a "sandwich" structure with thermo-physical properties which matches the author preoccupations.

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