ANNALS of the ORADEA UNIVERSITY.
Fascicle of Management and Technological Engineering, Volume VI (XVI), 2007

ASPECTS CONCERNINIG THE THERMIC TRANSFER TROUGH INSULATED PANELS USED IN HOUSING CONSTRUCTION

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Key words: *thermic transfer, wood, structure, wood materials.*
Abstract: *Taking into account the multiple advantages of wood houses (villa), using the resistant structure and other elements with remarkable performances, the scientists are more and more concerned in multiple opportunities to mix wood and other materials and wood materials with different characteristics.*

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 structures (the triplestratified ones) 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 6.1 in order to explain graphically this influence.

Table 6.1. Table of cumulative data for triplestratified 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 $c = \frac{\lambda_e}{\lambda_t}$
PpvpP 16,20,50,20,16	122	0,046	0,053	2,285	0,867
PpvpP 16,30,50,30,16	142	0,041	0,052	2,749	0,788
PpvpP 16,40,50,40,16	162	0,044	0,050	3,215	0,880
PpvpP 16,50,50,50,16	182	0,041	0,049	3,706	0,836
PpvpP 18,20,50,20,18	126	0,049	0,055	2,302	0,890
PpvpP 18,30,50,30,18	146	0,042	0,053	2,766	0,792
PpvpP 18,40,50,40,18	166	0,040	0,051	3,233	0,784
PpvpP 18,50,50,50,18	188	0,042	0,050	3,700	0,840

By maintaining the layer of mineral wool consistent in the middle and modifying the two layers of polystiren but keeping the 16 mm PAL sheets, one can notice slightly lower figures for the thermal transfer coefficient than in the former case (double stratified structures).
The results are presented graphically in figure 6.1.

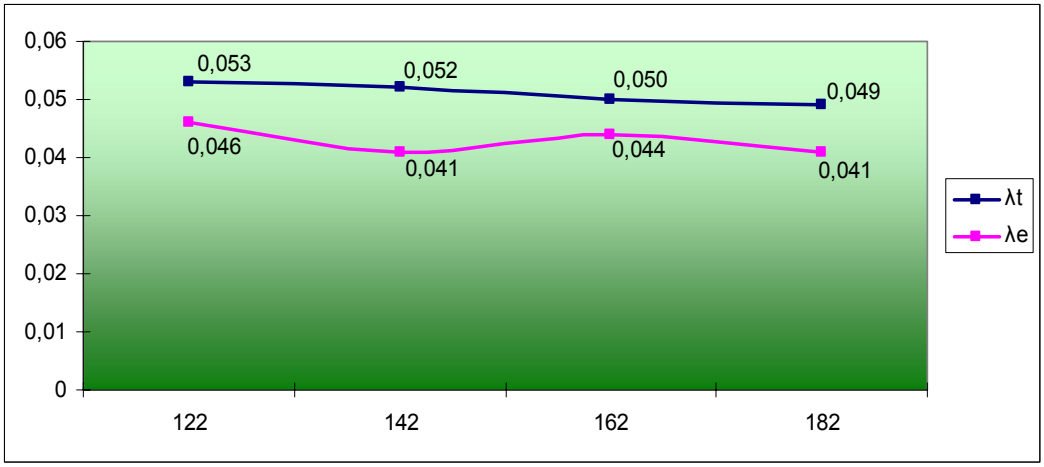

Figure 6.1. The variation of the thermal transfer coefficient λ_e şi λ_t function of the thickness of the sample (for PAL of 16 mm)

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 themal insulation layer consistent, but modifying the thickness of the PAL from 16 mm to 18 mm, one can notice figures for the thermal transfer coefficient that are very similar to the previous ones, their variation being indicated in the graphic below.

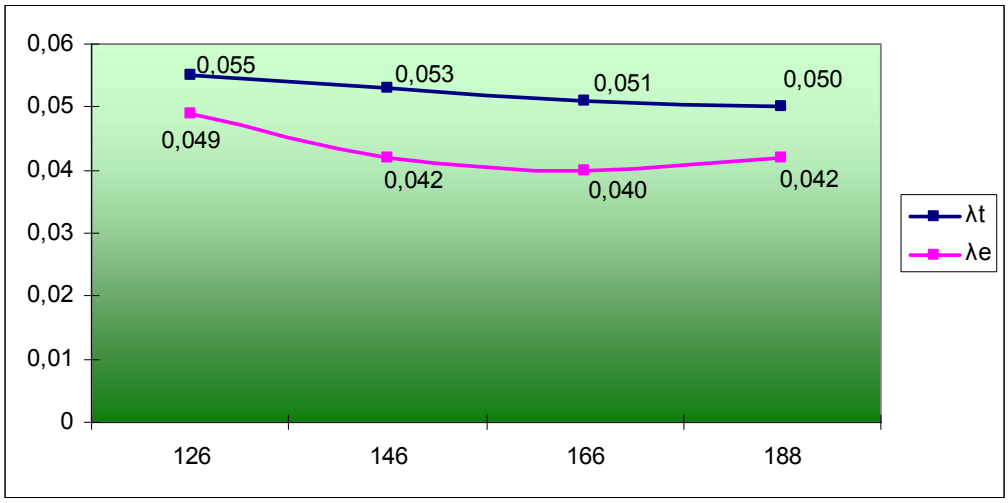

Figure 6.2. The variation of the thermal transfer coefficients λ_e şi λ_t function of the thickness of the sample (for 18 mm PAL sheets)

Having the graphic representations separately for each category of sample (of the triple 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.

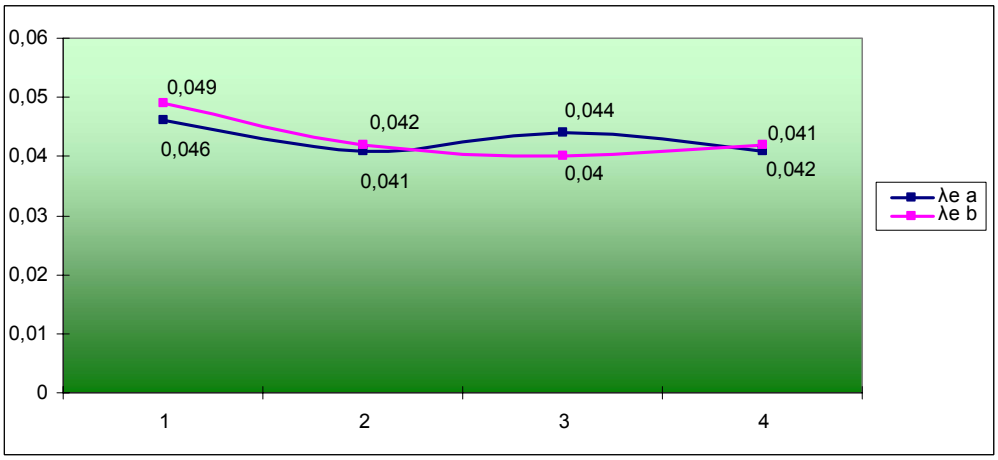

Figure 6.3. The variation of the thermal transfer coefficients λ_e function of the thickness of the sample: a – for 16 mm PAL; b – for 18 mm PAL

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 16 mm PAL sheets with 18 mm PAL 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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