Technical environmental system – Weekly submission III
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1. In this week's assignment you should first finalize the composite wall question by finding the heat transfer rate, and then solve the same question while the thickness of the brick is increased to 32 cm and comment on the results.
2. You should solve again the simplified wall calculation procedure replacing the glass fiber one with urethane rigid foam and while replacing the fiberboard with plywood and find the two R unit value
3.

- Considering the thickness of the brick is increased to 32 cm:

$R_i = 1/H_1 \times A$ = 1/10 x (0,25) =0,4C/W

$R_{foam} = Lf/k_f \times A$= 0,03/0,026 x 0,025=4,615C/W

$R_{plaster1} = L_{plaster} / K_p \times A$ = 0,02 / 0,22 x 0,25 = 2,272 C/W

$R_{pc1} = R_{pc2} = L_{pca}/K_{plaster} \times A_{pc1}$ = 0,16/0,22 x 0,015 = 48,48 C/W

$R_{brick} = L_{brick}/k_{brick} \times A_{brick}$ = 0,32/0,72 x 0,22 = 2,02 C/W

$1/R_{total} = 1/R_{foam} + 1/R_{plaster1} + 1/R_{brick} + 2(1/R_{pc1})$

$1/R_{total}$ = 1/4,615 + 1/2,272 + 1/2,02 + 2 x (1/48,48)

$1/R_{total}$ = 0,753 C/W

R_{total} = 0,001 C/W

- Calculation procedure replacing the glass fiber one with urethane rigid foam and while replacing the fiberboard with plywood and find the two R unit value

Material	A (wood)	B (insulation)
Outside air	0,03	0,03
Wood level I	0,14	0,14
Plywood	0,45	0,09
Urethane	0,78	0,2
Wood studs	0,63	0
Gypsum board	0,079	0,079
Inside surface	0,12	0,12
Total	2,229	0,659