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WEEK 3

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

- 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 values.

h_1=10 w/m2. c°

h_2=20 w/m2. c°

high = 3 meter

wide = 5 meter

k plaster = 0.22 w/mc°

k f = 0.26 w/mc°

k brick = 7.2 w/mc°

A = 0.015+0.22+0.15*1=0.25

R convection 1 = 1/h_1*A = 1/ (10*0.25) =0.4 C/W

R f = L f/K f * A = 0.03/ (0.026*0.25) =4.615 C/W

R p= L p/K p * A= 0.32/ (0.22*0.015) =96.969 C/W

R b= L b/K b * A= 0.32/ (0.72*0.015) =96.969 C/W

1/R totp = $\frac{1}{R\ totp} = \frac{1}{R\ b} + 2 * \frac{1}{R\ p} = \frac{1}{2.02} + 2 * \frac{1}{96.969} = 0.515$

R totp = $\frac{1}{0.515}$ = 1.941 C/W

R p= $\frac{L}{K\ A} = \frac{0.02}{0.22*0.25} = 0.363$ C/W

R o = $\frac{1}{h\ o*A}$ = $\frac{1}{40*0.25}$ = 0.1 C/W

R total= R 1 + R f + R tot p + 2*R p + R o = 7.821 C/W

Q°= (t_1-t in) R tot = 20+10 /7.821 = 3.835

By comparing this result with the previous one (6.811 c/w), we notice that by doubling the brick thickness, the R total didn't change that much.

- #Question No 2

$R_I = 0.03+0.14+0.11+0.11+3.528+0.079+0.12=4.007$ m2c/w

$R_w = R_{outside\ air} + R_{wood\ bevel} + R_{plywood} + R_{wood} + R_{gypsum} + R_{inside} =$

0.03+0.14+0.01+0.63+0.76+0.12=1.109 m2c/w