

Impact of Dynamic Thermal Conductivity Change of EPS Insulation on Temperature Variation through a Wall Assembly

Maatouk Khoukhi

College of Engineering, United Arab Emirates University
PO Box 15551, Al Ain, United Arab Emirates
mkhoukhi@uaeu.ac.ae; Tel.: +971-56950-6883

Abstract - This paper evaluates the effect of dynamic thermal conductivity (λ) change of EPS insulation on temperature change through a conventional wall assembly at varying positions of the insulation within the assembly in question. According to the findings, in the case of the application of the variable λ -value of the insulation, compared to that obtained when the constant λ -value for polystyrene (EPS) insulation is adopted in the same conditions, the temperature profile through the wall assembly during the daytime is greater. In the event of applying the constant and variable λ - values, the temperature shift on the inside is seen to decline as the location of the insulation material is positioned towards the surface of the inner wall. These results suggest that considering betterment in the insulation's thermal conductivity would provide the best dynamic thermal efficiency by placing the material in the middle of the wall assembly, taking into account the change in the thermal conductivity of the insulation.

Keywords: heat transfer; net thermal effect; dynamic thermal change; insulation material; variable thermal conductivity