

Resolution to Wall Surfaces Condensation & Mould Growth Issue in a 24 Hours Air Conditioned Room

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ABSTRACT

This project tackles the problem of wall surfaces condensation and mould growth issue in a 24 hour air-conditioned room. Firstly, the project consists of the types of insulation materials that are common in the market. In order to design a wall with insulation to prevent water condensation on wall that leads to mould growth requires knowledge of heat transfer and thermodynamics. The scope of the project is to determine insulation materials that provide the best insulating effect considering parameters such as installation method, cost and maintenance cost, lifespan, sustainability and health and safety issues. Literature reviews from Oxford University reviews the art of aerogel applications in buildings supports the idea of having aerogel as the insulation material that can prevent mould growth on wall surfaces. Computational Fluid Dynamics helps to simulate the actual problem by using a program known as FloEFD with a given set of parameters. The comparison of insulation materials proves that aerogel is the best choice among the others. The project challenge is to discover the relationship between Reynold's Number and the Nusselt Number in order to determine heat transfer coefficient for both internal and external wall surfaces thereby finding the surface temperature of both inner and outer wall surfaces. The calculated Nusselt Number shows that the convection plays a more important role than conduction. Last but not least, the conclusion states that aerogel insulation seems to have the most potential and will definitely replace other insulation materials in the near future.