PERFORMANCE EVALUATION OF THERMAL INSULATION MATERIALS COMPOSED OF NATURAL RESOURCES

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Master of Science in Building Services Engineering

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree

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Abstract

In building construction industry thermal insulation plays a vital role as it helps to reduce the energy requirement for cooling the indoor environment to keep the building thermally comfortable for occupants and energy efficient. Some of the widely used insulation materials nowadays are mineral wool and foam insulation sheets based on polystyrene and polyurethane. Several issues were identified when it comes to the manufacturing process of thermal insulating materials. Manufacturing of mineral wool consumes a large amount of energy during the process of melting of raw materials. Typically, this process consumes between 3.5 – 6.5 GJ per tonne of mineral wool produced. The manufacturing process of foam insulation sheets emit toxic gases such as styrene, benzene, toluene, and ethyl benzene. These hazardous gases contribute to environmental pollution by contaminating air, water bodies and soil. Another major issue with these insulation materials is that when it comes to the disposal phase these cannot be discarded to the environment as these are not bio-degradable materials. Due to these reasons, it is imperative to find materials which are environmentally friendly, readily available, bio-degradable, and economical thermal insulation materials for buildings. Through this research it was identified that materials such as clay, beach sand and straw can be used as suitable substitutes.

Keywords: Thermal Insulation Material, Energy Efficiency, Environment Pollution, Bio-degradable Materials

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Table of Contents

List of Figures

List of Tables