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Faculty of Engineering
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Application of locally Available Natural Material In Thermal Insulation

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Statement

This thesis is submitted to Faculty of Engineering, Ain Shams University, Cairo Egypt, for the degree of Master of Science in Structural engineering.

The work included in this thesis was carried out by the author in the department of Structural engineering, Ain Shams University, from 2014 to March 2018

No part of this thesis has been submitted for a degree or qualification at any other University or Institute.

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Noha Zaki Hareedy

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Abstract of the M.Sc. Thesis Submitted by

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Title of the thesis

**APPLICATION OF LOCALLY AVAILABLE NATURAL MATERIAL IN THERMAL
INSULATION**

ABSTRACT

Looking to the rice straw as an environmentally friendly and renewable material, rice straw thermal insulation boards are of considerable interest for energy saving purposes when it is used as building thermal insulation material for walls or ceilings. Development and performance evaluation of new thermal insulation boards manufactured mainly from locally available rice straw and cement mortar is the main aim of this work. This study consists of developing a treatment method of rice straw aiming to enhance its bond with the surrounding mortar, manufacturing of thermal insulation boards from rice straw and investigating the physical and mechanical properties of the produced boards. The bonding efficiency between rice straw and mortar was analyzed through testing the compressive strength and flexural strength of boards with different rice straw contents and different types of additives to the mixtures used to enhance the boards properties. Thermal insulation properties and fire resistance of the produced boards have been investigated as well. The results indicated that the optimum physical and mechanical properties of boards are obtained with rice straw content of 20% and 30%.it was found that the thermal insulation boards had fairly low thermal conductivity, ranging from 0.21 to 0.25 W/ (m.K). The fire resistance of rice straw boards was found to be much better than the conventional industrial and commercial types of the thermal insulation boards.

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