RAMMED EARTH CONSTRUCTION BUILDING MATERIAL STUDY AND EFFECTIVNES IN EGYPTIAN URBAN HOUSING

By

REHAM SAAD MAHMOUD ELSAYED HASSOUNA

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Architectural Engineering

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Title of Thesis:

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Key Words:
Rammed Earth ;Stabilized Rammed Earth; Soil Material; Earth Construction; Urban Housing; Egyptian Urban ; Sustainability; Low Cost; Comfort Thermal; Alternative building material; Formwork; Rammed earth process.

Summary:

Rammed earth is an ancient, traditional construction technique used worldwide in the past and still invention for the future to the low cost and sustainable construction with a successful thermal comfort compared to alternative building materials. It is one of the most important constructions for modern earth architecture with unique aesthetics monolithic walls. This thesis first forth chapters of the theoretical part include a literature review and background about the rammed earth from the soil material, properties, characteristics, environmental and sustainability of the earth walls, which is formed by compacting moisture soil in layers inside temporary formwork after testing to be suitable for building construction, that will be investigated in the next chapters with the RE process. Also discussed the architecture details, different earth techniques, tools used, and the aesthetics of rammed earth and various systems of it, as stabilized rammed earth and insulated ones by provinces of its durability and properties by additives for stabilizing the soil to be more innovated. The thesis last two chapters of analytical and practical part reviews and argues criteria and different case studies of using rammed earth as alternative building material construction compared to the conventional ones for urban housing construction in Egypt and worldwide. Also investigate the low cost and potential challenges of it and last the conclusion, recommendation obtains from the thesis study and future vision of rammed earth construction effectiveness in our urban housing regions developments.

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Dedication

To My Parents who dedicated all their lives, love and care for me and my respectably sister and brothers.

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