بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــســـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

CAIRO UNIVERSITY
INSTITUTE OF AFRICAN RESEARCH AND STUDIES
DEPARTMENT OF NATURAL RESOURCES

NATURAL RESOURCES AS STRUCTRAL ELEMENTS IN EGYPT AND MOROCCO

BY

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Abstract

This research aims at study the abilities of using natural resources which are found at Egypt and Morocco to construct buildings and constructions, both countries have substandard natural materials which may be used such as stones, sand, silt and clay, where old builders have a deep experience in this field .The study use some of formulas and equations of concrete and/or masonry constructions to estimate similar ones for this type of constructions which may be named as natural constructions or natural buildings. Straw, clay, silt and sand are found in this study as structural materials, but the study have recognition about straw and sand, this because tests and equations gave encourage results to use them with suitable structural statements, both of them is founding with inexpensive price, either the price of the material itself or the price of trucking, and both of them have easy method to use with no need to proficient or very skilful labors in use, this system of natural material constructions have a good environmental affect, (specially if we note that some kind of straw such as rice straw is deflagrating and adding more pollution every season) , sound insulation, low fire risk, and simple statements to build.

Straw of rice may be used to construct about 27000 local houses per year for farmers, there are mainly five different methods of building with using straw which are named as:

1 – Load bearing method
2 – Light weight frame and loading
3 – In fill and timber frame
4 – Hybrid design
5 – African style

Where every method have its advantages and disadvantages, suitable foundations, plastering, and its specifications due to the founded codes and

tests that written or done by builders and engineers. The study tries to make spot on the African style with its zigzag where not enough references had been written about this style especially from the engineering view; here we must note (with big respect) the trails of Mr. Eng. Hasen Fatehy and Mr. Col. Debis about the mixtures of soils with or without straw where these tests and results may give us the suitable materials and data for preparatory African CODE of the natural buildings.

Sand, silt and clay were also used as structural elements in foundation, concrete, stabilized earth, rammed earth, gunearth, plaster and reinforced plaster. The tests on the mixtures of stabilized sand gave superior substantiations to use those materials for constructions and buildings, where the mixtures may achieve about 50 kg/cm² for compressive strength.

Forces act on the building such as wind, temperature, earthquake, water, snow, dead and live loads were defined, the actions and reactions were analyzed, making equations, (under the codes were used) to get suitable statement for constructions, these forces act on the building without asking about the kind of the materials used in construction, it'll be act and the builder take his responsibility of his building and its materials.

The results of tests were very stimulus to have one real building constructed due to these system, so we built the Beny Salama house with 120 m², three bedrooms, two halls and one floor only. It built according to the specifications and rules of this study, its photos and drawings were added. Also other house with two floors two was building at Tamieh in Fayoum, but with stony and rammed earth foundation and walls. As example of design that may help other attentive, sample calculations for straw house and stabilized wall house were added at the end of chapter four and chapter five.