Sudan University of Science &Technology

College of Graduate Studies

Plant Redesign for Production of Soil- Cement Blocks

BY

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بسم الله الرحمن الرحيم


صدق الله العظيم

سورة الحديد الاية(25)

Dedicated To

The soul of my father

My father

My brothers

My sister

My wife

My children

My friends

With my love & respect

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Abstract

Sudan as one of the underdeveloped countries is in need of development and rehabilitation in the field of buildings. Nowadays building materials are one of the problems of buildings in Sudan for its scarce and high price. Also using of burning wood in fired –brick manufacturing process affect the environment and future energy. This research is designed to study the technical and economical benefits to

produce alternative for the existing material (fired -bricks), and also to redesign and manufacture a complete production line consists of a vibrator mixer and hydraulic press to produce soil-cement blocks which contain soil and percentage of cement and water in high quality and productivity level .An available machines were redesigned, and soil samples were taken from omdurman and Khartoum North. The produced blocks were tested in the laboratories of the institute of technical research for water absorption and in the laboratory of highway researches-university of Khartoum for compressive strength, An evaluation for the operation of the redesigned machines and economical study showed that the produced soil-cement blocks are of higher quality and lower cost than the available fired-bricks.

ملخص البحث

السودان كاحد البلدان الناميه في حاجة الي التنمية والتعميرولكن مواد البناء تشكل هاجسا في سبيل التنميه العمرانيه بالبلاد نسبة لندرتها في بعض المناطق وتكلفتها العالية. كما أن استخدام حطب الوقود في حرق الطوب الاحمر يشكل تعديا علي البيئه والطاقه الحيويه. لذا صمم هذا البحث لدراسة الجدوى الفنية والاقتصادية لإنتاج بديل لمواد البناء الحالية يتكون من المواد

المحلية (تراب ونسبة قليلة من الأسمنت والماء) تكون ذات جودة عالية وتكلفة منخفضة. تم اعادة تصميم وتنفيد خط الانتاج باستخدام الاساليب العلمية الهندسيةبعدالاطلاع علي واقع الدراسات والتجارب العالمية والاستفادة من الامكانات المحلية حيث تم تصميم وتنفيد خط إنتاج مكون من هزاز وخلاط وماكينة ضغط هايدروليكي من المواد المحلية كما تم إنتاج طوب من أنواع مختلفة من التربة أخذت من منطقة امدرمان ومنطقة الخرطوم بحرى وأجريت عليها عمليات اختبارات ضبط الجودة بمعامل معهد أبحاث التقانه(امتصاصية الماء) ومعهد أبحاث البناء والطرق بجامعة الخرطوم (قوة الضغط) وقد تم التوصل الي أن الطوب المنتج أكثر جودة كما تم اجراء حسابات الكلفة وتطبيق مبادئ دراسة العمل ودراسة الوقت وبمقارنة كلف الانتاج تم التوصل الي ان الطوب المقترح أقل تكلفة مقارنة بالطوب الأحمر مما يشكل بديلا ناجحا لمواد البناء الحالية.

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CHAPTER ONE

Introduction

CHAPTER TWO

Literature review

CHAPTER THREE

Technical study and equipment redesign

CHAPTER FOUR

Redesigned machines, plant and product evaluation

CHAPTER FIVE
Results and discussions

CHAPTER SIX

Economical study

CHAPTER SEVEN

Conclusions and recommendations

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