OPTIMIZATION OF POWER REQUIREMENTS FOR THRESHING WHEAT AND RICE FOR LOCALLY MANUFACTURED MACHINE

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A thesis submitted in partial fulfillment

of

the reqirement for the degree of

MASTER OF SCIENCE

in

AGRICULTURAL SCIENCE

(AGRICULTURAL MECHANIZATION)

Department of Agricultural Mechanization
Faculty of Agriculture
Ain Shams University

1994

Approval sheet

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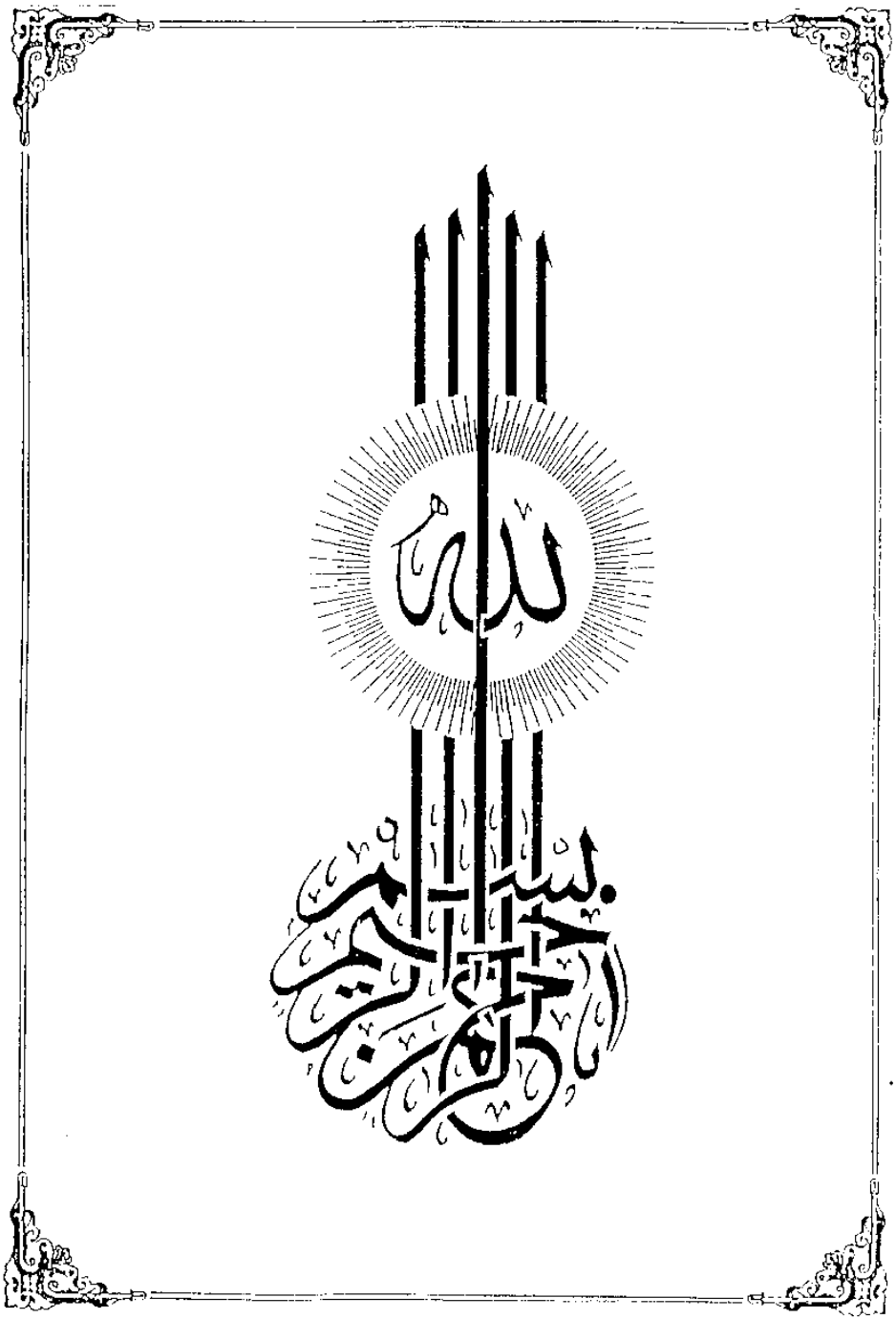

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ABSTRACT

The aim of this study is to investigate the optimization of power requirements for threshing wheat and rice for a locally manufactured machine and its economics under different factors affecting machine operation;

Threshing drum speed, grain moisture content in wheat as well as the feeding rate of crop to the machine.

From the results the following is concluded, the machine power was inversibly proportionate with drum speed , feed rate , moisture content and grain damage. The machine power was reversibly proportionate with unthreshed grain. Total losses were significantly affected by application power. The optimum threshing cylinder speed is 850 rpm for wheat , the optimum threshing cylinder speed is 650 rpm for rice, the optimum machine power for threshing operation of wheat is 9.15 hp, the optimum machine power of rice is 4 hp, the machine investment cost is 4.594 L.E./ h and total cost for threshing operation is 16.844 L.E./h.

KEYWORDS.
Threshing - winnowing - rice - wheat - power - drum speed - feed rate - moisture content - fuel consumption - grain damage - unthreshed grain - total losses.

ACKNOWLEDGEMENT

I gratefully achnowledge the guidance of Prof. Dr. Mubarak Mohamed moustafa, professor of Agric. mechanization, Ain Shams Univesity, for suggesting this research, his help and supervision.

I`m deeply indebted to Prof. Dr. A. F. El-Sahrigi, Director of Agric. Engineering Research Institute for his advices and supervision.

I would to thank Dr. A. S. Hamam head of Design Section, to Dr. H. Abdel Razik head of Animal production Mechanization Section, M. A. Baiomy Assist. Res. at Design section for their support, advices and help to continue this work.

I would like to express my deep thanks for my colleagues at Agric. Engineering Research Institute, specially the Design Section.

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INTRODUCTION

1- INTRODUCTION

Simple beater type tractor powered threshing drums gained much popularity for threshing wheat. Since these machines did not have any grain straw separating mechanisms, farmers had to spend much labor in separating grain from Tibn either manually or with simple air- screen cleaners, these threshers were however quite simple and easy to fabricate by small rural workshop.

A large amount of these threshers were commercially produced and are still in use in Egypt for threshing wheat. Threshers have been developed to efficiently thresh many crops and to cover wide range of crop conditions. Types of threshing and winnowing machines were imported to the local market during the last decade. The advantages of the imported threshers motivated the local manufacturers to produce local threshers similar to the imported ones. Most of machines are driven by means of 60 hp tractors. This power is more than what is required to drive the machine.

At the present time, there is still a shortage in the number of tractor required on Egyptian Farms. In fact the expansion in the use of threshing machines is limited by the number of available tractors to do the job. If however, the actual power requirement of the machine is determined, it will be possible to operate the machine using a smaller engine of a suitable power. Also using small engine attribute to the recent escalation of fuel prices. So tractors can be used at different agricultural operations in the same time of threshing. Also small engines can be used with different farm machines such as reapers, water pumps and sprayers etc.

This investigation aims to determine the optimized power requirements for threshing wheat and rice for a locally manufactured machine and its economics under different factors affecting machine performance such as threshing drum speed, grain moisture content and crop feed rate.

REVIEW OF LITRATURE