BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION ENGINEERING

DETERMINATION OF THE APPROPRIATE REPLACEMENT TIME FOR FARM TRACTORS USING ECONOMIC ANALYSIS. CASE STUDY:FEIL

By

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A project report presented to Busitema University in partial fulfillment of the requirements for the award of a Bachelors degree of Agricultural Mechanization and Irrigation Engineering.

ABSTRACT

The present study was conducted to build up a module for the replacement of agricultural tractors. The objective of the replacement module was to identify the ideal length of time that a tractor should be kept before replacement.

The formulation of the strategy adopted to implement the replacement module was based on economic analysis otherwise to develop repair and maintenance plan to keep up the unreplaced tractors.

The data was collected from Farm Engineering Industries Limited Bunga yard Makindye division in Kampala. The model was developed using MS access package and Visual Basic package (version 2010).

Based on the study in order to determine optimum life or economic life for MF385 at farm engineering industries limited, Repair and Maintenance costs, annual depreciation and Interest on investment in the study period were calculated. The total annual holding costs of the tractor were obtained and used to determine the economic life. Finally replacement time for the study tractor 9391 hours was predicted.

A maintenance schedule for unreplaced tractors is also provided so that the tractor can continue performing to its expectations.

Proper performance in this case can lead to timely, high quality farm operations which in turns results in considerable decrease in product expenditures and also more income.

DECLARATION

I, BWAMBALE ERION, hereby declare to the best of my knowledge that this project report is an outcome of my own work and has not been presented for any academic award in any university, college or higher institution of learning. Throughout the work I have acknowledged all sources in its compilation

SIGNATURE.....

Date.....20/5/2016.....

APPROVAL

This project report has been submitted to Faculty of Engineering for examination with approval from the following supervisors:

MR.OKIRYA MARTIN

MAIN SUPERVISOR

Date: .....

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CO-SUPERVISOR

Date: .....

DEDICATION

I dedicate this project report to my dear parents Mr. and Mrs. Baluku Misaki of Kasese, my sisters Juliet, Loice and Janet not forgetting my uncles Oniz whose love, care, support, encouragement, patience and belief in me got me this far.

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Additionally special regards go to Mr.Eriau Emmanuel for the time offered during consultation.

ACRONYMS.

FEIL-Farm engineering industries limited.

Z -fixed length of time (hr)

Nr-Number of failures

T_d -Down-time or dead-time (hr)

T_a -Available time (hr)

T -Total time (hr)

M-Number of observation

D-Depreciation (UGX).

P -Purchase Price (UGX).

S -Salvage Value or selling price (UGX).

L -Time between selling and purchasing, years.

n -Age of the tractor in year at beginning of year in question, year.

x -Ratio of depreciation rate used to that of straight line method.

SFP-Sinking fund annual payment (UGX)

Di-Initial depreciation rate (%).

Ds-Subsequent depreciation rate.

Y -Accumulated repair and maintenance costs as percent of initial price (ugx).

X -Tractors or machine cumulative hours.

λ -The failure rate (%).

MTTF -Mean time between failures (hr).

R_c-repair cost (UGX).

I -Inflation rate

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INTRODUCTION

1.1 BACKGROUND

Agriculture may be one of the oldest professions, but the development and use of machinery has made the job title of farmer a rarity.

Agricultural machinery is one of the most revolutionary and impactful applications of modern technology.

The truly elemental human need for food has often driven the development of technology and machines. Over the last 250 years, advances in farm equipment have transformed the way people are employed and produce their food worldwide. With continuing advances in agricultural machinery, the role of the farmer will become increasingly specialized and rare (Culpin, 1975).

The ability to manage machinery is an important skill that must be mastered by farmers and ranchers who want to compete in our complex worldwide commodity marketplace. Machinery management must contribute to total management in a cost effective manner. There are a number of strategies to follow that will enable the farmer to achieve maximum life from his machinery. A combination of practices can have a large impact on costs, improve machine reliability for many years to come and finally, increase profit margins.

On most farms, the cost of owning and operating its machinery exceeds all other costs except the cost of land use; in some cases it is the most expensive part of the business. Efficient selection, operation and maintenance of this machinery are absolutely critical to the viability of the farm.

The ability of the farmer to select the proper machinery is a valuable function as many farm activities relate to it. In the final analysis, the selection must increase yields and must add value to the total farm business. This makes machinery management the most complex function of farm management as it involves owning and operating the machine. Owning the machine involves capital and this capital must return a profit. It will only return a profit when the capital is active, but operating the machine involves costs. This then, is the fine balancing act of machinery management: invest the correct amount of capital to do the farm operations in the most effective way at the lowest cost. This may sound simple but it means that the

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