EFFECT OF DEGREE OF ACCURACY OF LAND LEVELLING ON PERFORMANCE AND EFFICIENCY OF SOME FARM MACHINERY

BY

SALAH EL-DIN ISMAIL EL-KHATIB

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of
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IN

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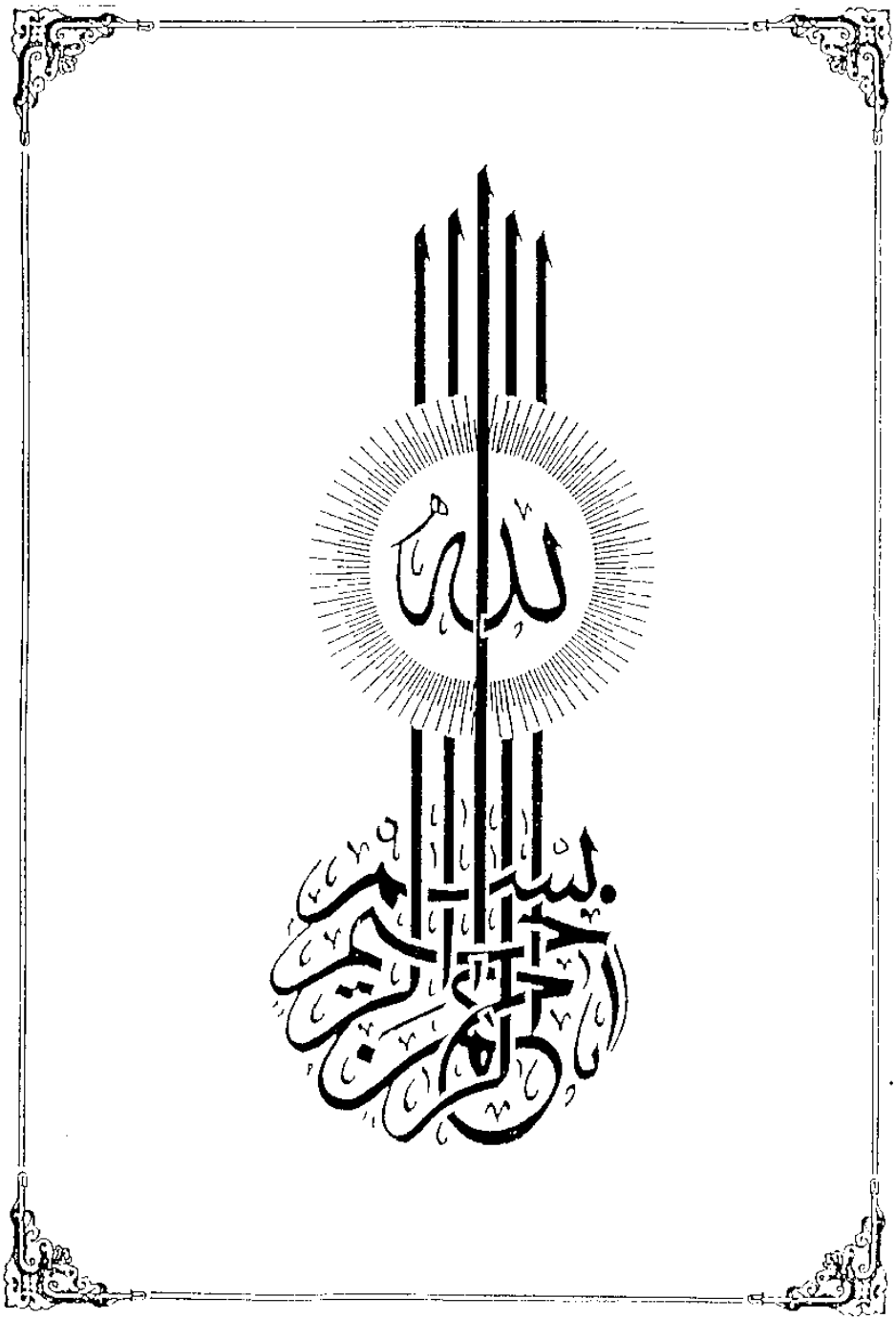

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

" قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ "

صَدَقَ اللَّهُ الْعَظِيمِ
(سورة البقرة - الآية ٣٢)

APPROVAL SHEET

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BY

SALAH EL-DIN ISMAIL EL-KHATIB

B.Sc. Agric. Sci. (Agric. Mechanization) 1983

Faculty of Agric. Cairo. University

This thesis for M Sc degree has been approved by:

Prof. Dr. S.A. Hamad..S.A.Hamad.....
Prof. and Head of Agric. Eng. Faculty of Agric.
Mansora University.

Dr. M.M. Hegazi.....M.M.Hegazi.....
Associte Prof. of Agric. Eng.
Faculty of Agric. Ain Shams University.

Prof. Dr. M.M. Mostafa.M.M.Mostafa.....
Prof. of Agric. Eng. Faculty of Agric.
Ain Shams University.

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Under the supervision of :
Prof. Dr. Mubarak Mostafa: Prof. of Agric. Mechanization
Faculty of Agric. Ain Shams University

Prof. Dr. Abed EL-Ghany EL-Gindy: Prof. of Agriculture
Engineering Department, and Prof. Dr. Mohamed
Nabil Saif-Elyazal, Deputy of Agricultural
Mechanization Research Institute.

ABSTRACT

The present work was carried out to study the effect of Land levelling accuracy on the performance of some farm machinery under local conditions.

The field experiments were conducted in sandy loam soil. The obtained results can be summerized as following :

1) Precision Land levelling index after Laser and manual levelling was 1 and 2.86 cm respectively,while for unlevelled field precision Land levelling index was 7.07.

2) The applying drawbar pull curve to scraper loading indicated that the scraper can easly loaded untill 40 % and after then the drawbar pull increased sharbly.

3) The highest rolling resistance horse power was obtained when the tractor moved on unlevelled Land, this is may be due to the mainly humps and other obstacles existing in the field.

4) The power required for Laser Land levelling operation was 60.15 hp, whiel for manual Land levelling was 58.39 hp under the same conditions.

5) The field capacity earth work volume for Laser was 17.3 m^3/hr and manual Land levelling was 14.5 m^3/hr, results

revealed that the power required for unit cubic meter earth work volume with using Laser system decreased power by 13.4%.

6) The moving capacity of Laser Land levelling scraper was 17.3 m^3/hr and field efficiency 77 % in average, while the moving capacity of manual Land levelling was 14.5 m^3/hr and field efficiency 61 % in average, the higher difference in the value of field capacity and efficiency for Laser Land levelling were due to the use of Laser control techinque which principal increases operating efficiency by improving scraper loading and swell factor for scraper shifted can vary according to different depth cut.

7) The ploughing operation after Laser Land levelling consumped less fuel per unit area compared with the other two Land levelling methods. This finding may be due to that in case of Laser Land levelling less drawbar pull is needed. Higher field capacity and lower brake horse power was required comparing with the other two types Land levelling.

8) The effectiveness of different Land levelling methods on the performance of seed drill showed that there are relation between pericsion Land levelling index and the values of brake horse power, working speed and fuel consumption. We needed to increase the actual speed by decreasing the precision Land index value. Decreasing the precision Land index from 2.8 to 1 cm the actual speed was increased by 7.03 %, while brake horse power and fuel consumption were decreased by 54.3 % and 52.38 % recpsectively.

9) Ploughing operation take place seasonly following by manual Land levelling, while ploughing followed by Laser Land levelling need every two years at least. The result indecated that the cost per unit earth work volume manualy equal 5.4 LE/m^3, while for Laser Land levelling equal 1.54 LE/m^3.

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I-INTRODUCTION

The predomenant type of irrigation in the Nile valley and the delta is basin irrigation. Basin irrigation is primary used on level or near level land which are inundated with irrigation water. This type of irrigation has a potential for being high efficient. Efficiencies depend on the intake rate of surface irrigation used in Egypt consists of amerwa which runs the lenth of the field and small basins on either side. This method is a result of tradition which may have been influenced a great deal by the discharge available and levelness of fields.

The design of basin irrigation system involves a complex set of interaction between soil and hydroulic properties of the irrigation event itself. Balancing discharge rates with the dimensions of the field is the heart of irrigation design.

The existing of farm practices have compensated for the variables by using much small basins. In fact mechanization is one of the prime reasons for modifying the existing system. The systems described above are not suitable for the use of most existing system. The systems described above are not suitable for the use of most existing machinary due to the many humps and other abestucles existing in the field.