بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

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

DESIGN OF FARM MACHINERY ATTACHABLE TO A POWER UNIT APPROPRIATE FOR MEDIUM AND SMALL-SCALE AGRICULTURE

BY

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B. Sc. Design and Production Dept.
Fac. of Mech. Eng., U. of Aleppo
Syria, 1986

Thesis submitted in partial fulfillment

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Abstract

AL-Najjar, Fayez Mohammed. Design of Farm Machinery Attachable to a Power Unit Appropriate for Medium and Small-Scale Agriculture. Unpublished Master of Science, University of Ain Shams, Faculty of Agriculture, Department of Agricultural Mechanization, 1996.

This work is to study some design factors necessary to develop simple farm machines appropriate for the Egyptian, and developing countries, including :

1) Planter: suitable for cereals and small grains. The designed planter can be operated using a power tiller, power unit, or manually.

2) Trailer: drawn by power unit for in farm transporting.

Another principal aim of this work is use of materials existing on the local market to enable country work-shops to manufacture and maintain the designed implements.

Two groups of experiments were carried out to study the effect of design factors on the planter performance:

1) Laboratory experiments: the most important results obtained are:

1: The largest seed friction-angle was 29° for peas because of increasing surface roughness and wrinkles.

2: The planter-feed "seeds/hill" decreases nonlinearly with speed. It decreases sharply at low metering-wheel speeds, up to 60 rpm. Beyond this speed the curves flatten out with slighter rates of decrease.

3: Gain of up to 40 % will exist in the necessary amount of seeds per feddan, over that needed in manual planting due to accurate metering and placement of seeds.

4: Increasing the feeder flute width, the ratio of visible damage increased with speed because seeds fill in disarray.

2) Field experiments: showed the following:

1: Whenever the speed increased 100%, the seed scattering on ground increased "6-12" %.

2: The planter driver-front wheel slipped at 16.27% for 3 km/h speed and 5 cm depth for pulled.

3: The draft force and power requirement to pull the planter ranged from (100-270N), and (0.008-0.225 kW) respectively.

Therefore it is recommended to pull more than one planter unit.

4: Fuel consumption was positive linear relation with speed and depth of seeds, ranged from (0.785-0.958 L/h).

5: Draft force and power requirement for trailer increased linearly with speed but decreased with pneumatic pressure, ranged from (140-205 N), and (0.58-0.256 kW) respectively.

3) Estimating the costs of using the machines: the cost decreased from (5.1 to 4.5 L.E/h) when planter and trailer added to power tiller.

4) Economical feasibility: the cost for feddan was 82.8 L.E/Fed. by using power tiller and manual planting , since it decreased to 38.16 L.E/Fed. by using planter pulled by power tiller with trailer.

Key words

Power tiller - Planter - Trailer - Feeder mechanism - Seed damage and germination - Seed discharge - Uniformity of seed distribution - Varying the flute width of feeding-wheel - Draft force and power requirement - Forces upon the planter Fuel consumption - Costs of using the machines.

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