

B.

SUMMARY

Title of Project : Development of swinging Lugs reversible Cage wheels for small and medium power Tractors

Institute where Research is being carried out :

Dept. of Agric. Engineering

Faculty of Agriculture , University of Ruhuna .

Chief Scientific Investigator : Dr. P. L. A. G. Alwis

Period of Contract

Date of award of the grant : 15th January 1997

Date of completion : 15th January 1999

Objectives :

Design and develop a suitable mechanism for a folding type cage wheels for small and medium power tractors.

Experimental Method

A folding type cage wheel for small and medium power Tractors were designed and developed to provide facility for road transportation and to improve performance in Wet land operations. Two pair of Cage wheels were constructed for small and medium power tractor after testing first wheel and implementing necessary modifications.

The main advantage of this cage wheels were its capability of road transportation since the cage wheel diameter was smaller than the tire in the retracted situation and an improved traction while puddling as the cage wheel diameter was greater than the tire in and expanded situation, so that the lugs can touch the hard pan before the tire.

(2)

Two experiments were conducted in two location (On station Trial under controlled field condition and farmer trial under practical field conditions) to compare the performance of above designed cage wheels with conventional cage wheels. Effective field capacity, Time per hectare, Travelling speed and travel reduction were considered as criteria for the evaluation of Cage wheels. In additionally Cost analysis also was affected.

Results obtained :

The results of farmer trial shows that the effective field capacity and Travelling speed of designed cage wheel were 0.36 ha/hr and 2.05 m/s respectively. Above observations of the conventional cage wheel were 0.23 ha/hr and 1.6 m/s respectively. Therefor the effective field capacity and Travelling speed of Four wheel tractor equipped with designed cage wheel were greater by 60.8 % and 28.08 % respectively.

Time per hectare of designed cage wheel and conventional cage wheel were 2.74 hours and 4.72 hours respectively. So , time per hectare to plough the field with design cage wheel has decreased by 41.68% .

According to the test results of on station trail it was observed that the travel reduction of designed cage wheel was significantly different from conventional cage wheel. Mean travel reduction of designed cage wheel was 9.7 % and that of conventional cage wheel was 24% . Hence travel reduction of designed cage wheel was lower than conventional cage wheel.

(3)

Cost of production of conventional cage wheel and designed cage wheel was 5846 Rs. and 6020 Rs .for two wheel tractor and 5846 Rs. and 6020 Rs .for four wheel tractor respectively. Considers the benefits of designed cage wheel, this difference is not concerned. By considering about test results It can conclude that the performances of the designed cage wheels were significantly higher than conventional cage wheel.

Conclusions :

The developed folding type Cage wheel was tested in the field , obtaining efficient performances comparing with the conventional cage wheel. But it should be still further developed to improve its performance in order to find the possibility of adapting in more difficult soil condition. It is evident from the farmer survey that the key requirements of the modification or redesign of new cage wheels are:

1 Low cost and simplicity

2.Quick mounting and dismounting system to facilitate road transportation

3. High Floating ability.

To achieve the above requirement, First model of **Multipurpose Cage Wheel** was designed and tested in a field. The test was successfully finished and smooth operations were obtained. Therefor it can be recommended that the "**Multipurpose Cage Wheel**" is a new suitable traction aid for small and medium power tractors which is used in the high and wet land conditions. The cage wheel has simple construction , good serviceability, high field performance in different soil condition , and low cost.

C.

Title of submitted papers

**Name of journal or
Scientific gathering**

* Development and testing of Folding type Cage Wheels for -SLAAS 55th
sessions

Four wheel Tractor.

* A Multipurpose Cage Wheel for Two wheel Tractor -SLAAS 55th sessions

* Development and testing of single ring retractable lugged cage wheels for Two
wheel Tractor- Journal of the AESSL