

Quick Adjustment Of Ridger Cultivator Using Hydraulic Cylinder

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Abstract

- Ridger is a tractor mounted machine used for cutting and turning the soil in two opposite direction simultaneously for forming ridges. It is used for initial soil preparation and levelling operations. It is generally used for deep tillage of land, to help turn over the upper level soil. Here we used adjustable Ridger which helps to keep ridger in the path of tractor's wheel and reduces operators' efforts directly. The Hydraulic Cylinder gives reciprocating motion to the slider, so one can adjust the position of follower ridger behind the referral wheel.

In raised bed formation process, the common problems are occurred such as, uneven sized beds, land wastage, more time consumption and it needs highly skilled operator. In this project we have tried to develop the mechanical arrangement of hydraulic ridger. This project aims to overcome the above-mentioned problems and results the effective cultivation. With tractors of high Horse Power and multiple ridges more number of beds can formed of excellent quality which will reduce the time in large scale.

available ridger cultivators. With the hydraulic ridger cultivation quality is improved. The operator's efforts and chances of land wastage are reduced in great amount.

The land preparation is one of the very highlighted issues. For effective irrigation, sowing as well as for planting, forming of furrows and beds or ridges as per proper requirement is essential. In the market today, different ridger cultivators are available. For formation of beds people uses plough, ridger or power-tiller. But these equipment having limitations like, plough is used to form beds of width only under 36 inches, cultivators with two or three ridgers are used to form beds of width ranges between 48 inches to 60 inches, but it becomes complicated with different tractors and hence not able to form unique furrows and beds every time. For beds of width above 66 inches mostly power-tiller is used, but here again some drawbacks comes out, that marking on land, highly skilled operator is required and slow work is also a drawback of power-tiller.

1. INTRODUCTION

The first step and in fact the most crucial one in farming is the preparation of land. In layman's terms it is the process of setting up the soil for crops to grow. The steps in land preparation are ploughing or tilling, harrowing, levelling etc. Generally, for traditional crops just levelled land was necessary, But in advanced agriculture raised beds are essential.

Since raised bed forming is very important in land preparation, different methods are preferred as per different types of land, requirements and crops to be taken. In India, from last centuries, animals like bulls or male buffalos were used for traditional farming cultivation. Wooden or iron equipment like ploughs and cultivators, made by local carpenters and blacksmiths were use. Since, only traditional and seasonal crops were taken at that time, it was ok to compromise with preparation of field But, from last 5 to 6 decades Indian agricultural field turned towards advanced farming. From 1960's and onwards tractors of various multinational companies are introduced in India. With different equipment tractors had taken charge on cultivation technique. From that time, the large improvement is seen there in agriculture sector. Now a days, from last few years people are focused at very advanced farming and following new technics used in countries like Germany, Israel, and some American countries.

In the market today, different ridger cultivators are available. Local firms, workshops as well as multinational companies are working for development in

2. RELATED WORK

Small tractor operated bed-maker was developed. The working width was 180 cm and depth were 4.83 cm, average speed was 2.22km/hr for range of 18.5 HP tractors.[1] Bed re-maker is used to maintaining beds already formed. In this model, tillage blade is analysed to new design constraints with change of its geometry.[3] The effect of dynamic behaviour of hydraulic cylinder mounted on hydraulic reversible plough is analysed, effect of hydraulic cylinder movement during tillage of ploughshare, especially on share point, for this uniform motion of hydraulic cylinder is considered. [4]A combining machine with seed-bed maker is rotating soil loosener and exceeds with passive tillage tools and has higher productivity at lower energy capacity in comparison with rotary cultivators..

3. METHODOLOGY

We used three furrow Surry Ridgers of heavy-duty blades having special-wear resistant steel bottom with points of heavy duty for ploughing up to 12-inch consistent penetration and gives better fuel efficiency and less tyre slippage due to pointed plough profile. The main hub of this ridger is used as a slider having length 217.5 cms. The double acting hydraulic cylinder of capacity 3 ton , stroke 65cm , and can work under 40-50 psi pressure is used. Observe valve is direction control type of valve used to give reverse and forward motion to cylinder rod by means of hydraulic oil

4. EXPERIMENTAL RESULTS

•DATA RECORDED DURING MACHINE TRIAL:

Table No. 1 – FOR TWO RIDGERS

Sr. No.	Type of Soil	Moisture % (Drainability of soil)	Time (minute per Acer)	Mileage (litre per Acer)	All over Performance
1.	Alluvial Soil	Less than 10%	60 to 70	6	Good
		10% to 20%	60 to 90	6.2	Better
		More than 20%	60 to 90	6.2	Better
2.	Red Soil	Less than 10%	45 to 60	5	Excellent
		10% to 20%	50 to 60	5	Excellent
		More than 20%	80 to 90	5.5	Better

3.	Black Soil	Less than 10%	60 to 70	5	Good
		10% to 20%	60 to 90	5.5	Good
		More than 20%	--	--	--
Sr. No.	Type of Soil	Moisture % (Drainability of soil)	Time (per Acer)	Mileage (per Acer)	All over Performance
4.	Laterite Soil	Less than 10%	90 to 120	4.5	Good
		10% to 20%	50 to 60	4	Better
		More than 20%	90 to 120	4.5	Excellent
5.	Peaty Soil	Less than 10%	60 to 70	5	Good
		10% to	60 to	5.5	Good

		20%	90		
		More than 20%	--	--	--

		More than 20%	70 to 80	3.5	Better
3.	Black Soil	Less than 10%	50 to 60	3.5	Good
		10% to 20%	50 to 80	4	Good
		More than 20%	--	--	--
4.	Laterite Soil	Less than 10%	80 to 110	3	Good
		10% to 20%	40 to 50	3.5	Better
		More than 20%	80 to 110	4	Excellent
5.	Peaty Soil	Less than 10%	50 to 60	3.5	Good
		10% to 20%	50 to	4	Good

Table No. 2 – FOR THREE RIDGERS:

Sr. No	Type of Soil	Moisture % (Drainability of soil)	Time (per Acer)	Mileage (per Acer)	All over Performance
1.	Alluvial Soil	Less than 10%	50 to 60	4	Good
		10% to 20%	50 to 80	4.5	Better
		More than 20%	50 to 80	4.5	Better
2.	Red Soil	Less than 10%	35 to 50	3	Excellent
		10% to 20%	40 to 50	3.5	Excellent

			80		
		More than 20%	--	--	--



Fig -1: Figure

Table No.3 Cultivation Rate: 1 Acre= 4047 Square meter

Sr.No.	Types of Soil	Time Required (Square acre/ hr)
1	Black Soil	0.8
2	Red Soil	1
3	Alluvial Soil	1.2
4	Laterite Soil	0.6
5	Peaty Soil	0.8

•For 3 Ridger Avg. Mileage =3.5 L/Acre

•For 2 Ridger Avg. Mileage = 5 L/Acre

In case of black soil and peaty soil when moisture percentage is more than 20 % then operation is possible

5.CONCLUSIONS

As we learnt from all the researches work that there are some important aspects and points that are essential to consider while designing a Hydraulic Ridger. The very first thing is the double acting cylinder of capacity 3 ton is required to adjust all the set up. In manufacturing or say fabrication of hydraulic ridger the previously used designs of different manufacturers are helpful and up to 60 % is same.

The results and output from the observations of Hydraulic Ridger during actual practice are excellent and able to satisfy the motive behind its design and manufacturing.

ACKNOWLEDGEMENT

We take this opportunity to express our gratitude towards those who directly or indirectly helped us in completion of **Project Phase-II**. First of all we would like to express deepsense of gratitude towards our Guide **Prof. H.P.Gawade** for his valuable guidance and encouragement throughout Project Phase-II.

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