

Conversion of Bike into Mini-Tractor



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Abstract

The conversion of bike into a line digging tractor, the idea of using bike instead of tractor is to save lot of digging cost, labour cost and time saving. Now converting is done in rear part of bike. The rear axle is removed to fix line digger with the help of two supporting wheels. The line digger is attached to rear portion of bike, the wheeling system i.e. chain is arranged for newly adopted wheels. The lifting up and down of line is done by lever system which helps to lift up and down the line digger.

There is scarcity of tractor in villages due to high cost of tractors. So in order to overcome this problem this bike line digger helps to do same work as tractor in less cost and labour cost also decreases. The main advantage is that fuel used for the bike is very less. Labour cost is reduced. It is suitable for small vegetables plants. Maintenance cost is very low.

INTRODUCTION

Mini tractor was made in view of the small & individual farming need. It was made to eliminate the problems created by the usage of bullock carts in the fields. Mini tractors reduce the working hours of the farmers.

The tractors which are having less than 20 HP are considered to be the mini tractors. 82% of the people do not have tractors and land holdings are smaller, for small farmers it is 0.4 hac & for marginal farmers it is 1.4 hac.

Thus they need a tractor which is not bigger in size. The mini-tractor is of 12 HP and hence it would be best suitable for small and marginal farmers due to its low cost and lesser fuel consumption with more utility and less maintenance.

150 CC BIKE

The original Pulsar came with a 150 cc air-cooled, single-cylinder, petrol, spark-ignited four-stroke engine which made 13 HP of maximum power. They featured a single spark plug to ignite the air-fuel mixture fed from a carburettor, simple spring shock absorbers, round head lamp dome and 1,265 mm wheelbase. A disc brake as standard equipment was a novelty in Indian motorcycles of the early 2000s. Other standard features were parking lights and an aircraft-type fuel tank lid.

The 180 cc version made 15 HP of maximum power and came with a twin-tone horn, which was optional equipment on the 150 cc version. Electric Start (ES) was offered as standard feature in the 180 cc model and optional on the 150 cc model.

The second generation Pulsars featured Bajaj Auto's newly developed DTSi technology, which increased the power rating of both versions by 1 hp (0.75 kW) each and also increased fuel economy. These models also introduce a new headlamp assembly, 1,320 mm wheelbase, and standard twin-tone horn and trip meter.

CULTIVATOR

Perfect machine for the stubble cultivation

Tine Cultivator - A perfect stubble cultivation implement suitable for light and medium soil conditions

Tine cultivator is a perfect solution for stubble cultivation with an objective to provide a thorough and complete mix of soil and straw to the required working depth, incorporation of crop residues and organic fertilizer into the soil.

Rear axle

The new rear axle is adapted to a mini tractor by changing single tyre rear axle to double tyre rear axle, for the new axle system a new pair of tyres, hub and their respective components are used.

Soil, Draft and Traction

Soil

The knowledge of soil, draft, and traction is very important in tillage. Unfortunately few soil science texts cover these subjects in a practical, integrated manner. In this technical note we shall examine these subjects, their practical significance to tillage, and to the power requirement in farming.

For example, lower ground speeds are typical of primary tillage tools such as moldboard plows and heavy disks. Higher ground speeds are required for harrows and cultivators that pulverize the soil and produce a fine tilth, and for mechanical weed control.

Drift

The force required to pull a tillage tool through the soil is called *draft*. The *draft force* is located at the point where the tool is attached to the power unit, called the *hitch*. The power unit is usually a *tractor*, a name coined from the more ponderous word *traction engine* that translates the power developed by the internal combustion engine into forward motion (this definition is also applied to draft animals, such as oxen and horses). The direction of the draft force is in the direction of travel and the unit to measure it are pounds force (lbf, English units) or kiloNewton's (kN, metric units). When using physical terms such as power, force, and work, we should understand that these words have different meanings, but are related to one another.

Traction

When a tillage tool is pulled through the soil, the power unit (tractor) must overcome draft forces created by soil resistance in order to move forward. This can be done because modern tractors are designed to transmit large amounts of power to the soil.

Power is transmitted to the soil by way of the drive axle on which the wheels and tires are mounted. Transmitting that power requires large frictional forces, or *traction*, at the soil surface which converts the torque, or rotary motion of the tractor's crankshaft, into forward motion. In other words, traction is the force of forward motion derived from contact between the

actor's tires and mediums such as soil, concrete, macadam, etc.

REMODLLING OF BIKE

Creating new frame

The Rear wheeling system is changed in this process. Single tyre is replaced with two tyres in the rear part of the bike.



Attaching cultivator

Then cultivator is attached at the rear part of the Bike and there are levers to pull up and down the ploughing equipment.



Cultivator attached to remodeled bike

The cultivator attached to the frames arranged with pulleys on left and right side of the seat so that cultivator can be lifted up and down. There is a locking system for cultivator to keep it in a steady position.

INTRODUCING SIMPLE PLOUGHING

The bike ploughing machine

By using bike ploughing machine there is a simple way of ploughing introduced to the cultivation system. There is no assistance required while using the machine. There is no wastage of time on waiting for a big tractor, no need of spending lot of money for cultivation.

By using the bike ploughing machine farmer can plough a large area of land and increase in the mileage and performance of bike with ploughing system. The work which cannot be done and covered by tractor can simply be done by the mini-tractor.



Advantages & disadvantages

Advantages

- So by replacing tractor by mini tractor work can be done .
- Affordable price.
- Lower operating cost.
- Low maintenance & easy repairs.
- Smaller wheel base & turning radius.
- Accessibility to smaller areas.
- Multitasking.

Disadvantages

- Cannot plough in hard soil.
- Gives less millage than previous.
- Speed is reduced.

- Time taking for ploughing is high when compare to normal tractor.
- Cannot plough high depth.
- There are no brakes for rear axle. Brake is applied only at front wheel.

RESULT

- Works at speed of 10-20 kmph.
- Millage 1liter per 25 kilometres.
- Turning radius - 5 meters
- Can pull load up to 260kg.
- Ploughing can only do at soft and wet soil.
- Cultivator can plough up to the depth of 3-4mm.

CONCLUSION

The project work is designed and developed successfully. For the demonstration purpose a bike is taken and remodelled to rear axle of two tyres and attached a handmade cultivator and fixed at back portion of bike.

Cultivator can lift up and down by lever which is beside of the seat. The mini-tractor will move at low speed of 10-15 kmph.

The ploughing process should also be done in soft or wet soil because at hard soil it cannot be plough.

This concept fail at speed when compared normal tractor and by using this concept a good mini tractor can be made by using a very heavy cc bike and a good cultivator with tillage tool.

Future scope

By using this principle the mini-tractor can be made by using heavy cc bike of 350cc to 500cc followed by the required length of cultivator. By using heavy cc bike instead of small cc bikethus the power required will be more sufficient for the cultivation purpose.

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