

Research Paper :

## Performance evaluation of grass cutter

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Accepted : March, 2010

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### ABSTRACT

The grass cutting machine is available in the various types like reel (cylinder) mower, rotary and mulching mower, hover mower, riding mower, professional mower etc. but these are very costly and unaffordable. It required a skilled person to operate. Hence, it was found necessary to have a grass cutter which can be operated by electricity (motor) with minimum initial cost and can be operated by unskilled labour. The newly developed grass cutter was able to operate at an average speed of 2km/hr without disturbance in operation. The effective field capacity of the machine was 0.07 ha/hr (*i.e.* to move one hectare in 14.30hr) with an efficiency of 70 per cent. 1 hp single phase electric motor was sufficient to operate at working width of 500mm cutter bar.

**Key words :** Development, Evaluation, Performance, Grass cutter

Agriculture is the most important sector in the Indian economy. In India there is a great scope of grass cutter machine. In our country as well as other countries has also, it is used in various fields for cutting the grass. The machine may consist of two, three or four blades depending upon the machine. The grass cutting machine is known as lawn mower. The grass cutting machine is available in the various types like reel (cylinder) mower, rotary and mulching mower, hover mower, riding mower, professional mower etc. but these are very costly and unaffordable also. Also, it requires a skilled person to operate it. Hence, it was found necessary to have a grass cutter which can be operated by electricity (motor) with minimum initial cost and can be operated by unskilled labour.

A vertical mounted electrical motor operated grass cutter was found to be an alternative to common rotor mower (Chancellor, 1958). The grass cutters do the better job of cutting grass or lawn grass. The vertical rotor shaft has many pairs of swinging knives that cut the grass at equal height. If the blade can not cut the grass by the first blade, then it can be cut by the other three remaining blades. The commercially available units for mowing or grass cutting are casting heavily. Hence, considering the needs for development of effective and economic grass management practice, the study was undertaken in the department of Farm Power and Machinery, Aditya College of Agril. Engg. and Tech., Beed (Maharashtra) in the year 2008.

### METHODOLOGY

#### *Working principle of grass cutter:*

The grass cutter works on the principle of slicing

action of the blades. The grass was cut above the ground surface without damaging the blades when it strikes on immovable object such as rock, stone. The grass cutting takes place due to impact and shearing action also.

#### *The basic units of grass cutter:*

Due attention was provided on the following design aspects while developing the grass cutter;

- Cutting unit
- Supporting frame
- Power unit
- Handle
- Transportation wheel

#### *Cutting unit:*

Cutting unit consisted of a cutter blades and a square plate.

The cutter blades were curved with externally sharpened edges fixed at an angle of  $120^{\circ}$  to the horizontal axis. The cutter blades were made of spring steel and the edges were hardened and tempered to the suitable hardness for longer service life. The blades were mounted over a square plate which was directly mounted on the motor shaft so that the blades get rotated at the same speed as the motor (*i.e.* 1520rpm).

The square plate has eight numbers of holes at its corners (of 10mm diameter) for the attachments of 4 blades and a central hole (of diameter 17mm) for the motor shaft.

Motor shaft connects the square plate on which the blades were attached. All the parts were fastened permanently and semi permanently by the self locking nut and bolts.