

SOLAR ENERGY GRASS CUTTER (SE)

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ABSTRACT

The Internal Combustion motor was used in older lawn shape models and thus as result of it natural effect contamination level ascents AC motor driven shape is all theorem exorbitant support of such traditional machine is more to stay away from these downsides arranging of building new sort of grass shapes which runs on sunlight based energy and this model is efficient contrasted with past one the point of our undertaking is to make the grass cutter which works on sunlight based energy henceforth save the power and decreases labor. This solar grass cutter uses sharp edges to cut a yard to an exact length. It is used to maintain yards in gardens, institutions, and even sports fields. The operations of a grass cutter are governed by this microprocessor. Two ultrasonic sensors, one for obstruction detection and the other one for blades damage management, are also included in the grass cutter, as well as a sensor that monitors the engine's temperature. These modifications have been made to the current machine in order to make it easier to use and least expensive Our primary point is to limit pollution while also making efficient use of solar energy. Based on the model's performance some calculation had been made, where total power consumption is 65w/hr and power required for working one day for four hours is 260w/hr. Therefore, to generate this required power the solar panel should be kept seven days for charging. Other than that,

based on the output of solar panel, temperature, voltage data various graphical were also being made which can be seen in upcoming pages. Nowadays grass cutter machines are becoming very popular today. Pollution is madman, which we can be see in our daily life. In old model of grass cutter IC engine was used and hence because of its environmental impact pollution level rises IC engine driven cutter is more costly. Maintenance of such conventional machine is more. The aim of our project is to make the grass cutter which operates on solar energy hence save the electricity and reduces manpower. In our project we use micro controller for controlling various operation of grass cutter. Also the grass cutter has obstacle sensor for obstacle detection. Grass cutter operates automatically hence it does not require skill person to operate. These modifications have been made to the current machine in order to make it easier to use and least expensive. Our primary point is to limit pollution while also making efficient use of solar energy. Based on the model's performance some calculation had been made, where total power consumption is 65w/hr and power required for working one day for four hours is 260w/hr. Therefore, to generate this required power the solar panel should be kept seven days for charging. Other than that, based on the output of solar panel, temperature, voltage data various graphical were also being made which can be seen in upcoming pages. The project work is prepared by the team of four members Gund Avinash, Kutal Abhishek, Chavan Dipak, Jadhav Omkar, and it is original. This work is referred from other works and it is mentioned in the references. All of the engineering drawings, computer programs, formulations, design work, development and testing reported in this document are also original and prepared by the same team of students.

1. INTRODUCTION

Problem Statement

Problem statement: Traditional methods of grass cutting in gardens, parks, and fields involve the use of gas or electric-powered mowers that consume non-renewable resources this problem is can be removed by using solar powered grass cutter.

Motivation

The grass cutter is totally operated on solar energy, so that the pollution and usage of fuel controlled. The grass cutter becomes semi-automated because of the controlling mechanism i.e. controller And the obstacles are also some amount of human efforts.

2. DESIGN OF SOLAR ENERGY GRASS CUTTER



Fig .1 Construction of model

SOLAR ENERGY GRASS CUTTER (SEGC) is an eco-friendly system. The SEGC works only on renewable energy without electricity. For making the given model we have choose Solar Energy Grass Cutter. This model consist of a Solar panel, DC Motor, Additional cover, free wheel, nut bolts, switches, charge controller etc. The model will work on the principal of solar power and it generate the electrical energy to run the motor. The model will work on the battery power and also solar. This model will be run in two stages firstit can run in solar energy and in second is operated it will run the motor the battery power. Provide the electrical energy to the our motor. Then the motor is to be run and also run the blade to cutting the unwanted grass.

3. ANALYTIC ANALYSIS

The cutting blade, the force required to cut the lawn as well as the force acting on the blade was considered. The force required by any sharp object to have impact on the grass is less than 10 Newton.

It is also dependent on the height, density and the area covered by the object. Therefore, in designing the blade of the solar powered lawn mower, the force required for effective mowing should be greater than 10 Newton. A stainless steel was used in the construction of the cutting blade because of its strength and weight which can transmit same speed as that of the DC motor or a little less cause of friction.

Hence, the torque produce by the blade is given by

$$T = Wr$$

Where,

Therefore,

W is the weight

$$T = Wr$$

r is the radius of blade

$$= 0.14 \times 225$$

$$r = 450/2$$

$$= 31.5 \text{ Nm}$$

$$= 225 \text{ mm}$$

Cost Analysis

Cost Analysis for Prototype

Sr. No	Part Name	Cost Per Unit (in Rs)	Quantity	Total (in Rs)
1	Solar Panel	2500	1	2500
2	Battery	1450	1	1450
3	Blade	150	1	150
4	Motor	450	1	450
5	Wheel	240	1	240
6	PVC Pipe	1600	-	1600
7	Charge Controller	480	1	480
8	Switch	70	2	140
9	Additional Fitments	1000	-	1000
TOTAL				7900/-

4. CONCLUSION

In the world today, all machines are designed with the aim of reducing or eliminating green house gas emissions which is the major causes of climate change. This solar powered grass cutter will meet the challenge of environmental production and low cost of operation since there is no cost for fueling. A solar powered lawn mower has been developed for the use of residences and establishments that have lawns where tractor driven mowers could not be used. The machine's capacity is adequate for its purpose. The machine has proved to be a possible replacement for the gasoline powered grass cutter. In the presented paper provides the fabricated information about the "Fabrication of Solar grass Cutting Machine" which was designed such that the solar plate generates solar energy and utilizing this energy for running the grass cutter motor.

5. REFERENCES

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