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A Review Paper on Design and Fabrication of Solar Operated Automatic Grass Cutter

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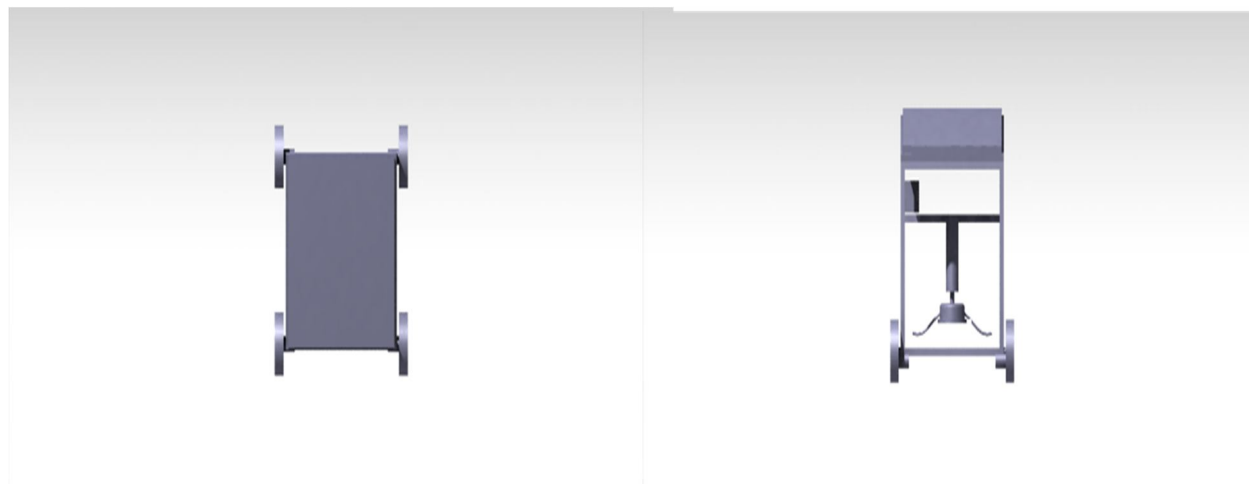
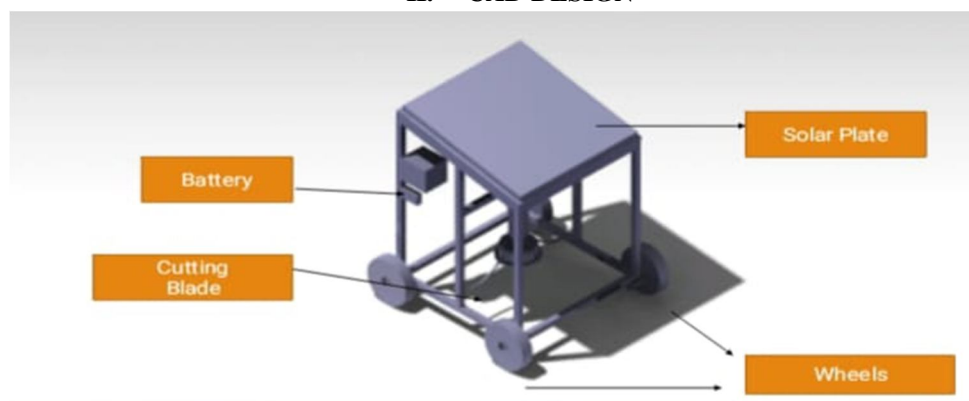
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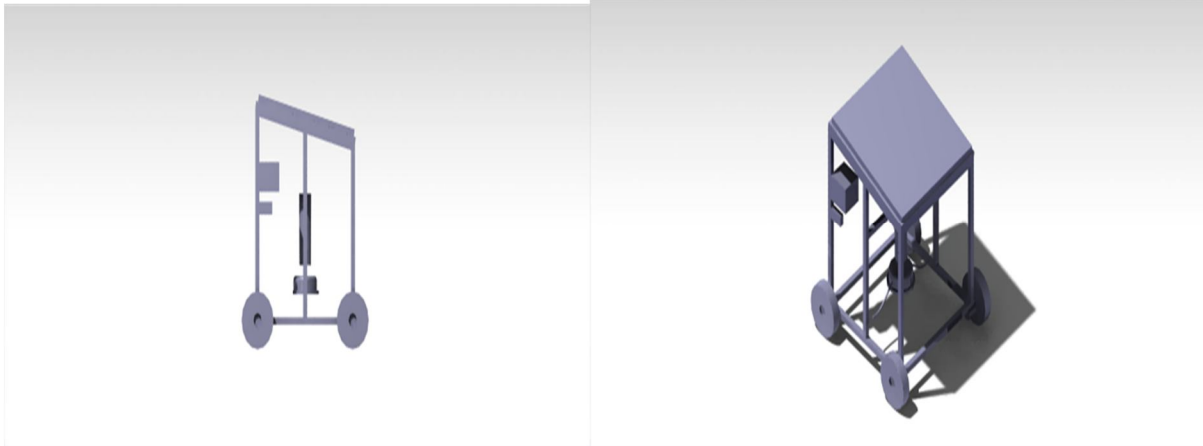
Abstract: A solar grass cutter could be a machine that uses rotating blades to cut a field. Power consumption becomes essential for future. Solar grass cutter could be a terribly helpful device that is incredibly simple in construction. We have made some changes within the existing machine to make its application easier at reduced price. Our main aim in pollution management is earned through this. The paper deals with solar grass cutter employed to chop the various grasses for the various application. Solar grass cutter could be a terribly helpful device that is incredibly simple construction. We have made some changes within the existing machine to make its application easier at reduced price. Our main aim in pollution management is earned through this. Unskilled person will operate simply and maintain the grass. The paper deals with solar grass cutter are employed to chop the various grasses for the various application.

I. INTRODUCTION

Moving the grass cutters with a customary motor gives inconvenience, and nobody takes pleasure in it. Cutting grass can't be simply accomplished by old, younger, grass cutter moving with engine produce sound pollution because of the loud engine, and gives pollution because of the combustion within the engine. Also, a motor supercharged engine needs periodic maintenance like dynamical the engine oil. Even if electrical solar grass is environmentally friendly, they can also be associate inconvenience.

II. CAD DESIGN





III. CALCULATIONS

1) Wheel Calculation

Motor= 60 rpm [Johnson Gear Motor]

Mass= 6.80 KG

Acceleration due to gravity= 0.9144 m/sec^2

Force= Mass \times Acceleration due to gravity

$$= 6.80 \times 0.9144$$

Force= 6.74 N

Force per wheel (having four wheels & motors)

$$= 6.74/4$$

Force= 1.686 N (Per wheel)

Torque= Force \times Distance \rightarrow (Wheel Radius)

$$= 1.686 \times 0.0508 \quad \text{diameter} = 2 \times 0.0508 \rightarrow \phi = 0.1016 \text{ m}$$

Torque= 0.0856 Nm

\rightarrow The required Torque on each wheel is 0.0856 Nm.

Total torque= 0.0856×4 wheel

$$= 0.3439 \text{ Nm}$$

0.0349 which is less than 0.7845 Nm.

\rightarrow Design is Safe.

2) Blade Dimensions

Radius of the Blade= 1.5 cm= 0.15 m

Length= 30cm= 0.3 m

Thickness= 3mm =0.03m

Breadth= 3mm

Motor Speed= 5000 RPM

Density of wire rope blade= 11.40 Kg/m^3

Acceleration due to gravity= 9.81 m/sec

3) Area of the Blade

A= Length \times Breadth

$$= 0.3 \times 0.03$$

$$A = 9 \times 10^{-3} \text{ m}^2$$

V= Area thickness

$$= 9 \times 10^{-3} \times 0.03$$

$$V = 2.7 \times 10^{-4} \text{ m}^3$$

4) *Mass of the Blade*

$$\text{Mass} = \text{Density} \times \text{Volume}$$

$$= 1140 \times 2.7 \times 10^{-4}$$

$$\text{Mass} = 0.3078 \text{ Kg}$$

$$\text{Weight} = \text{Mass} \times \text{Acceleration due to gravity}$$

$$= 0.3078 \times 9.81$$

$$\text{Weight} = 3.02 \text{ N}$$

$$\text{Torque} = \text{Radius of blade} \times \text{Weight of blade}$$

$$= 0.15 \times 3.02$$

$$\text{Torque} = 0.45 \text{ Nm}$$

To determine angular velocity

$$\mu = 2\pi N / 60$$

$$\mu = 2 \times 3.14 \times 5000$$

$$\mu = 523.5 \text{ rad/sec}^2$$

5) *To determine power generated by the blade*

$$\text{Power} = \text{Torque} \times \text{Angular Velocity}$$

$$= 0.45 \times 523.5$$

$$\text{Power} = 0.235 \text{ KW}$$

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