

TO DESIGN SOLAR OPERATED GARBAGE COLLECTOR

Gajanan. P. Solanke¹, Omkar. S. Shinde², Vaibhav. V. Jadhav³, Vijay. S. Jagadle⁴, Prof. S.R. Kulkarni⁵
^{1,2,3,4}UG student, ⁵Assistant professors,
Department of Mechanical Engineering, UCOER, Pune, Maharashtra, India.

ABSTRACT: *This article presents the garbage collection robot on the beach using wireless communications. The system is built on the caterpillar wheels, sizes 52x74x17 cm and the power is supplied from 12V 30Ah battery which is connected to 40W solar cells. We are making the garbage collection equipment that is working on solar. The main aim is to introduce the use of nonconventional energy source to run the mechanical machines crane is well known to all for its application & need. It is a material handling equipment basically used to wheel, move, rotate & place the material, from dust bin we know that except some rear cases any mechanical machines needs some power or drive through any type of energy.it can clearly indicate that the proposed system is superior to handle task conveniently, control capability, and environmentally friendly. Keywords-garbage collecting dust bin, solar energy, battery, wheel.*

I. INTRODUCTION

The main reason to giving focus on developing the renewable or nonconventional energy sources is to reduce the fossil fuel consumption. Like crude oil, natural gases etc. consumption of as fuel in India hence reducing the jungle and trees. Due to this the pollution is increased and rains falling also reduced. another fossil fuels are not fulfilling the needs of energy of India and the use is very vast in India due to the huge population. The cost of fuel like crude oil and natural gases are depends on the US currency hence the prices these fuels are always variable in the world markets we hear read and watch the prices of these fuels are increasing day by day .Our country is big and the use of fuel is also increasing day by day very large part of economy is spent on fuel in a year. Almost price of total economy of India is spent on fuel in India which is approximately near to the total price of total economy spent on the food per year. Hence as we develops the utilization of natural sources like wind energy, hydro energy, solar energy. The price spent on fuel is decreased and it can participate the economic development of India definitely.

II. CONSTRUCTION &WORKING

This project is a new approach to improve the effectiveness and flexibility of mechanical system as a whole low cost mechanization may be alternative solution for small scale industries to develop the new process. This is too much advantage in the industries having less running capital. This low cost mechanism may the less time to design manufacture and implement as compared to high cost mechanism. We are making the garbage collection equipment that is working on solar. The main aim is to introduce the use of nonconventional energy source to run the mechanical

machines crane is well known to all for its application & need. It is a material handling equipment basically used to wheel, move, rotate & place the material, from dust bin we know that except some rear cases any mechanical machines needs some power or drive through any type of energy.

The working is mainly divided into types.

- Supporting frame.
- Spur gear mechanism.
- Scrubber operation.
- Collection of dust.

1. Supporting frame.

As mentioned in the constructional parts, if it necessary to provide a better support to moving parts.

2. Spur gear mechanism.

This type is one of the most common effective device transmitting motion and power from one shaft to other by means of the insensible gear. The spur gear which have its own properly of transmission. There will be 100% positive transmission is possible without slip.

3. Scrubber operation.

Scrubber is the main heart of the machine. The various types of standard scrubber are available in market. Product design is now not confined to few creative artists, can be learned by systematic study. Fortier stress was laid on design as a synthesis of stress analysis, theory of mechanism and machines and other subject like machine design and dynamic of machinery. But current approach is to expose the student is uncovered to solve real problem with various optimization tools.

4. Collection of dust.

The neat dust collection is the main part of the machine & project. In the machine the dust is collected in dustbin which is placed or attached to the bottom frame. The dustbin is removoveable part of machine means when the dustbin is full of dust or particles we can remove it and again place it. The collection of dust is made by the scrubber, scrubber made force the dust or particles on the road to get it the dustbin.

III. SPECIFICATION

1. Dimensions

Total length: 760mm

Total Width: 450mm

Total Height: 950mm

2. Shaft :

Diameter of shaft : 15mm

Length of shaft : 560mm

3. Wheel :

Front wheel diameter : 100mm

Rear wheel diameter : 100mm

4. Solar frame :

Length : 360mm

Width : 290mm

Rod length : 470mm

5. Dustbin box :

Length 1 : 310mm

Width : 290mm

Length 2 : 360mm

6. Scrubber specification

Material : nylon

7. Height of garbage box from land : 20mm

8. MOTOR:-

Rated Power (P_{max}): 17W

Rated Voltage (V_{max}): 12 V D.C

No.ofRPM's : 30 RPM

9. SOLAR PANEL :-

Rated Power (P_{max}): 10 W

Rated Voltage (V_{max}): 17.00 V

Current at max. Power (Imp): 0.57 A

Open circuit voltage (V_{oc}): 21.00 V

Short circuit current (I_{sc}): 0.69 A

10. BATTERY:-

Valve regulated lead acid rechargeable battery

Constant voltage charge

Rated Power (P_{max}) : 10 W

Rated Voltage (V_{max}) : 17.00 V

Current at max. Power (Imp): 0.57 A

Boost/Equalizer : 14.4 V – 15.0V

Float : 13.5 V – 13.8 V

Max charging current : 2.28 A

IV. DESIGN

Many preliminary alternatives are eliminated during this phase Designer should have adequate knowledge physical properties of material, loads stresses, deformation, and failure. Theories and wear analysis. He should identify the external and internal force acting on the machine parts.

This force may be classified as;

- 1] Dead weigh forces
- 2] Friction forces
- 3] Inertia forces
- 4] Centrifugal forces
- 5] Forces generated during power transmission etc.

We are designing the following components

1. To develop the torque of 5kg to lift the load.
2. Hence design of gearbox to develop the torque.
3. Speed of the final output shaft.
4. Power required to operate the whole assembly & to lift the load.
- 5 .Selection of solar panel to run the motor.

V. SCOPE OF PROJECTS

1. Minimize human efforts and time required.
2. Save electricity usage.
3. Avoidance of Traffic during garbage collection due to small size of machine.
4. By using water tank we can wash the road.

VI. ADVANTAGES & DISADVANTAGES

1. Total body is simple in construction.
2. So it having long life and less maintenance.
3. The moving part are tempered properly to reduce wear and tear by friction .it has smooth operation and not required any human effort.
4. It has minimum economic input.
5. It is necessary to know any disturbance in the time of cleaning.

VII. APPLICATION

1. It is mainly used in city area.
2. In hospital areas it is very useful for cleaning.
3. On city road we can use to reduce man power working on road.

VIII. CONCLUSION

While concluding this part we feel quite contended in having completed the project assignment well on time. We had economics practical experience on the manufacturing schedule of the working project model we are therefore happy to state that the conclusion of mechanical proved to be very useful purpose.

REFERENCE

- [1] S. P. Sukhame, Solar Energy- Principles of Thermal Collection and Storage, Tata McGraw- Hill Education Private Limited, 2008, New Delhi, Third Edition, pp 37-310.
- [2] Rakesh Kumar, Marc A. Rosen, A critical review of photovoltaic–thermal solar collectors for air heating Applied Energy, pp 3604–362.
- [3] “Project Report on Design and fabrication of an electro-magnetic engine” edition 2007-2008. Page no. 49-52.
- [4] Design of machine Elements- Prof .V. B. Bhandari Tata McGraw Hill Publishing Co. New Delhi
- [5] Domkundwar, Course in Power Plant Engineering,& Co. (P) LTD, pp 31.1., Third Edition2007. Fundamentals of Photovoltaic Materials, National Solar Power Institute, Olivia.