

DESIGN AND FABRICATION OF MODERN ROAD CLEANING VEHICLE

¹V.Kalaiselvan, ²P.Jagadeeswaran, ³M.Gopi and ⁴B.Rahulraj

*^{1,2,3}Student , ⁴Assistant Professor , Department of Mechanical Engineering
Sengundhar Engineering College, Thiruchengode*

ABSTRACT

Indian road transport has come up as a fast growing and profit making organization. However it has been striving since many years to achieve complete cleanliness in roads. Lot of waste being deposited in the roads by the passengers every day. These wastes include plastics materials, eatables etc. It is very much mandatory to remove the wastes present in the roads in an effective way. The conventional cleaning techniques include manual methods which are not very much efficient. This triggers the need for an automated machine which can remove the wastes in an easier and efficient way.

Our project aims at developing a Modern road cleaning vehicle that can clean the waste particles lying in the roads effectively which provides clean roads. The vehicle is operated with the help of dual power i.e. solar power and battery. Thus Eco friendly environment can be obtained by the Modern cleaning vehicle because of the harmless energy sources.

I INTRODUCTION

Indian road transport has come up as a fast growing and profit making organization. Connectivity between towns, cities and different areas is an essential component in the development of a Nation. Dirty roads lead to uncomfortable for the passengers. India has a road network of over 5,472,144 kilometers (3,400,233 mi) as on 31 March 2015, the second largest road network in the world. However, qualitatively India's roads are a mix of modern highways and narrow, unpaved roads, and are being improved.

The pavement management system and the systematic approach contained in this are not adequately implemented for repairs and rehabilitation. Non compliance result into heavy losses, discomfort, Mechanical damages in vehicles and loss of man hours. In many cases the high speed corridor pavements have failed prematurely in the absence of adequate maintenance during the design life itself. This triggers the need for an automated machine which can remove the wastes in an easier and efficient way. Our project aims at developing a Modern road cleaning vehicle that can clean the waste particles lying in the roads effectively which provides clean roads. The vehicle is operated with the help of dual power i.e. solar power and battery. Thus Eco friendly environment can be obtained by the Modern cleaning vehicle because of the harmless energy sources.

II MATERIALS

Sprocket, Link Plates (C40, C50 alloy steel), Pin, Pushing and Rollers (C15, C20 Steels) , DC Motor, Battery(12V/7.5 Ah Rechargeable Battery), Rotary Brooms are used to clearing the dust by the motion of rotation.

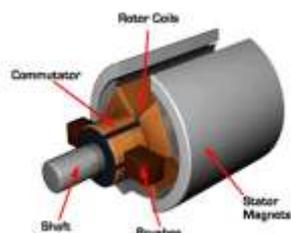


Fig1 DC Motor



Fig2 Sprocket Chain System



Fig3 Rotary Brooms

II WORKING PRINCIPLE

The frame is fixed with two pairs of wheels which are connected with the help of shafts. A motor (0.25 HP) is connected to the shaft which connects the rear wheels, through which power can be transmitted to the wheels and the systems can be moved. At the front end, a pair of rotary brooms is connected by means of a flat belt drive.

The belt is crossed across the grooves of the pulley, since both the brooms have to rotate in opposite directions. Next to it, a horizontal rotating brushes placed which is driven by a separate motor (0.25 HP) which dumps the wastes from the rotary brooms into waste collecting tank. At the rear end of the frame, a vacuum pump setup is placed.

The two suction mouths are operated by means of “Scotch yoke mechanism” with the help of the mechanism, the rotary motion can be easily converted into reciprocating motion. By using this mechanism, the waste particles present outside the track lane can also be effectively removed.

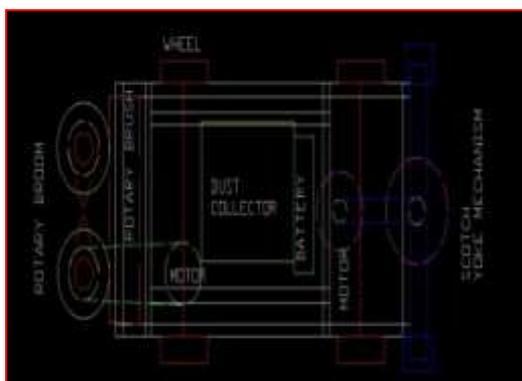


Fig4 2D Design

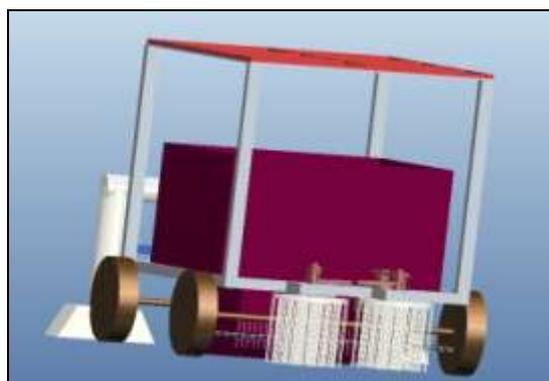


Fig5 3D Design

III PERFORMANCE ANALYSIS

Maximum weight of the vehicle which can be move=53 kg

Maximum load can carry = 17kg

Velocity of the vehicle (OFF LOAD)= 11 m/min

Velocity of the vehicle (ON LOAD)= 7 m/min

Off Load = 660 m/hr

On Load =420 m/hr

Maximum weight a conveyor can lift=2 kg

IV CONCLUSIONS

Thus, with the help of MODERN ROAD CLEANING VEHICLE we will be able to clean the wastes dumped in the Road tracks in a very easy and efficient way. The simple mechanisms employed in the system makes the vehicle easier for operation. This machine will overcome the human effort and saves time. Various modern Road cleaning machines are already being used in the foreign countries, but in India it is not possible to use those machines because of the economic background and lack of sophistications. So, we can use this machine for road cleaning, since it is cheaper than that of modern machines.

REFERENCES

- [1.] Dr. Manoj Hedao, Dr. Suchita Hirde, Ms. Arshi Khan (2011), 'Sanitation in Indian Road Premises: A Great Cause Of Concern', International Journal of Advanced Engineering Technology.
- [2.] Dhanajay G Dange, Dattaprakash G Vernekar, Sagar D Kurhade, Prashant D Agwane (2016), 'Methodology for Design and Fabrication of Human Waste Disposal System for Indian Road' in IJSTE - International Journal of Science Technology & Engineering, Volume 2, Issue 07.
- [3.] Dr. Manjunath.T.C (2016), 'Development of Discrete Output Feedback Sliding Mode Control for Controlling the Vibrations' International Journal of Emerging Research in Management & Technology ISSN: 2278-9359 (Volume-5, Issue-5).

First International Conference on *NexGen* Technologies

Sengunthar Engineering College Tiruchengode, Namakkal Dist. Tamilnadu (India)

05th - 06th January 2018, www.conferenceworld.in

ISBN: 978-93-86171-90-0

- [4.] Xavier Gibert, Vishal M Patel, and Rama Chellappa(2009), in their IEEE paper titled as 'Deep Multi-Task Learning for Road Inspection'
- [5.] S Mohamed Ashiq, K Karthikeyan, S Karthikeyan(2011), 'Fabrication of Semi Automated Pressurized Flushing System in Indian Road Toilet', International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-2, Issue-3.
- [6.] Muhammad Ali Mazdi, Janice Gillispie Mazdi, Rolin D. Mc Kinlay (2011), 'The 8051 Microcontroller and Embedded Systems' Pearson, Second edition. ``