

REVIEW ON DESIGN AND DEVELOPMENT OF FLOOR CLEANING MACHINE

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Abstract— Cleaning has become a basic need for all human beings and it is unavoidable in daily routine process. It is necessary to keep our environment clean because we get fresh air from our society and near around surrounding. In our project machine is designed in a such way that which will operate on mechanical energy and there no any use of electrical or any other energy sources. The motion is transmitted to scrubber from the wheels of the machine through the simple gear train. The dust or garbage is collected in compartment which is easy to remove from machine. It is the better alternative for conventional machine.

Keywords—Cleaning, Eco-friendly mechanism, manually Operated.

I. INTRODUCTION

It is necessary to keep our environment clean because we get fresh air from our society and near around surrounding. An unclean environment leads to a bad condition of a society, arrival of diseases and many more. People most of the times throw litter and dust on the footpaths and floor instead of throwing it in dustbins. This is how slowly the litter accumulates and transforms into huge garbage. If this garbage is not cleaned, further it smells stink and welcomes the diseases and then people are affected by it. There are so many ways to keep our society, roads etc. clean. This work can be done manually or it can be done by using machines. Manual work is not possible if the floor area will be larger & which will require more human effort. For that case the use of machine or equipment which will demand less human effort and will works more efficient can be useful.

Few machines are there which are operated on mechanical power and few demands electrical power. The conventional road cleaning machine is most widely used in railway stations, airports, hospitals, Bus stands, etc. also this machine needs electrical energy for its operation. It is not user friendly as well as eco-friendly. In summer time there is power crisis and most of the roads cleaning machines are not used effectively due to this problem particularly. In our project we are going to propose a model of floor cleaning machine which will operate on mechanical energy and there no any use of electrical or any other energy sources. It is the better alternative for conventional machine.

II. LITERATURE REVIEW

This part represents the survey of previous literature on floor or road cleaning machine. Many researchers have worked upon road cleaning and its related equipment.

A. M. Ranjith Kumar et al. [1] have designed manually Operated Floor Cleaning Machine and then he prepared the

3D model in modeling software and did analysis on that model by applying boundary conditions. From his research he concluded the stress level in the manually operated machine is within the safe limit.

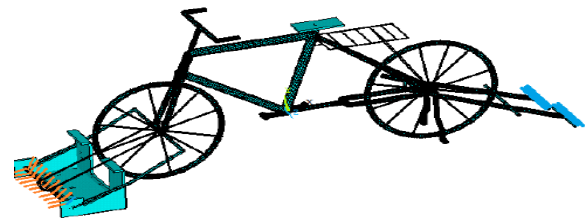


Fig.1

B. Sandeep. J. Meshram et al. [2] have developed a Tricycle Operated Street Cleaning Machine. He has developed the street cleaning machine by tricycle operated. In this research article he framed a model especially for rural area. He concluded that the cleaning is less effective where the street seems to be very rough and damaged.



Fig.2

C. Vardhaman Ladage et al. [3] have designed and manufactured the Semi- automatic floor cleaning machine using D.C Motor and wiper mechanism. Manufactured machine was flexible and effortlessly operated. Effective use of solar energy conserves electricity. The need of this project is satisfied and with the help of machine, cleaning of the floor can be done easily.

Semi-Automatic Floor Cleaning Machine



Fig.3

D. Vijaykumar L. S. et al. [4] have proposed a model for cleaning road. This cleaning machine is cost effective equipment. Since electric motor is used for cleaning no cost for fuel consumption. Design and safety has been given utmost importance keeping view of the comfort of the user and also the use of the motor is eco-friendly. Design shows that even the adjustability can be achieved without loss in features. From the above literature survey it has been concluded that for cleaning larger floor area cleaning machines are very important. The machines which are working on electrical power are more efficient than mechanical power but they are not ecofriendly and they are cost effective. Also this literature survey highlighted that very few work is done on mechanically operated ecofriendly road cleaning machine.



Fig.4

E. Prof. Dr. A. Muniaraj et al. [5] the manually operated eco-friendly road cleaner is successfully designed analyzed and fabricated. This project works implements the manually operated ecofriendly road cleaner for road cleaning that reducing the cost, human efforts as well as time. It is the best alternative for automated road cleaning machine during power crisis. It is found that the existing road cleaning machines uses petrol and diesel. The manually operated eco-friendly road cleaner can work very efficiently with respect to covering area, time and cost of road cleaning process compared with the existing machineries. Also it is economical. It was seen while testing of machine, that the cleaning is less effective where the road seems to be very rough and damaged. It can provide job to the uneducated person who is in need for such jobs as human energy is needed to drive the machine.

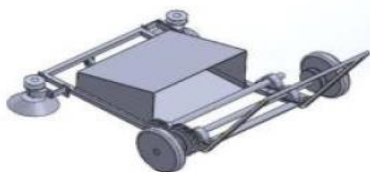


Fig.5

In analysis of manually operated eco-friendly road cleaner was carried out by using Solid Works software. Analysis was used to find the deflection and stress on frames, brushes and wheels. The maximum deflection & stresses

were checked and maintained with in the allowable limits for the materials of construction.

F. Dhiraj M. Bankar et al. [6] manually operated floor cleaning machine is an alternative for an automated floor cleaning machine during power crisis. The equipment purposely design for cleaning floors, but can only be use in outdoors with large ground like the hospitals, bus stands, railway stations etc. The equipment will result more beneficial when it is compared to other existing floor cleaning machines. Our project is based on very simple chain drive mechanisms which can be easily operated by any person. Any fault in machine can be easily identified and can be corrected on the spot.

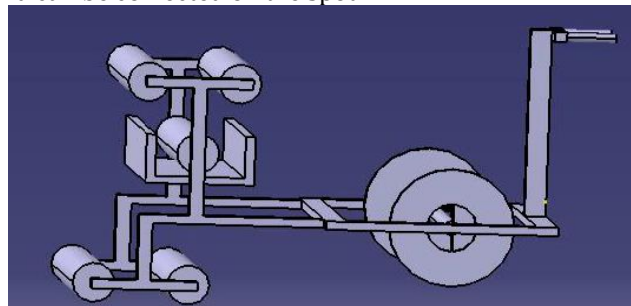


Fig.6

G. Shubham Khade [7] said Multi -use floor cleaning machine is designed and manufactured using A.C. induction Motor and speed reduction mechanism. Manufactured machine is flexible and effortlessly operated. Effective power of this project is satisfied and with the help of machine, cleaning of the floor can be done easily.



Fig.7

H. Aman khan et al. [8] the main motive of the project is to cover the aspects of cleanliness in the society. It focuses on cleanliness of roads, paths and other floors. By application of simple engineering technology we learned in our engineering life we have assembled such a vehicle which has multiple features being cost effective at the same time. The low budget project is very useful for the society and being cost effective and energy efficient can play a vital role in cleanliness of India.



Fig.8

III. METHODOLOGY

A. Design

In this phase we design our design of floor cleaning machine. While designing of floor cleaning machine we also calculate the all design parameters required for floor cleaning machine.

B. Material Procurement

In this phase we collect the all mechanical components which are required for our machine.

C. Manufacturing

In this phase we manufacture our required sub parts by using various machines and measuring instruments according to our design.

D. Assembly

In this phase we assemble all the components of our machine according to our design parameters.

IV. CONSTRUCTION

Our 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. Our machine consists of a structure in which gear mechanism is used. The machine consists of basically manually operated and also it can operate on motor. Quality and productivity along with job satisfaction can be increased by process management. To achieve the optimum level of productivity. Workforce is of almost importance. In structure of machine the gear mechanism is used to move scrubber and it used for cleaning purpose. The mechanical power produced by prime overview used to drive various machines in the workshop and factories. A transmission is the mechanism which deals with the transmission of the power and motion from prime mover to shaft or from one shaft to another. The whole machine consist of main part is SCRUBBER. It is the main hand of machine. In our project for giving the motion to scrubber. We use the gear mechanism. The gear operated forward and reverse direction. The mechanical power is transmitted to gear to scrubber. A transmission system is the mechanism which deals with transmission to operative element to provide a operative working motion when required motion is rotary the transmission is takes place through mechanism that transfer rotary motion to another. Our project require little investment to achieve efficiency improvement through modification of existing equipment and other operation. The operation as trouble free due to better construction material of the component and their metallurgical control. The project requires less space for installation the manufacturing and designing suitable machining for its operating. The Automatic Road Cleaner should be such that its operation should be simple it should be work with minimum work input. In our project, first we look frame as same as hand trolley which is utilized in construction of buildings as conveying purpose. On the frame we constructed a gear mechanism. When we

moving a frame the wheel shaft is rotating on wheel shaft we mount a spur gear. The wheel rotary motion is directly transmitted to another shaft on which scrubber is attached. This scrubber is clean the road. The dirty dust and small pollutants particles are collected in dustbin. This has led to new set of goal for this new kind of project course one of the important goals remain this development of usual facts but it is no longer the major one more importance i.e. on increased understand intelligent behaviors. A set of design principles as a theoretical frame work for understanding intelligence scheme desirable for number of reasons first at least at the movement there do not seen to any real alternatives. In our project transmission is more important part and it is necessary is to work noisy.

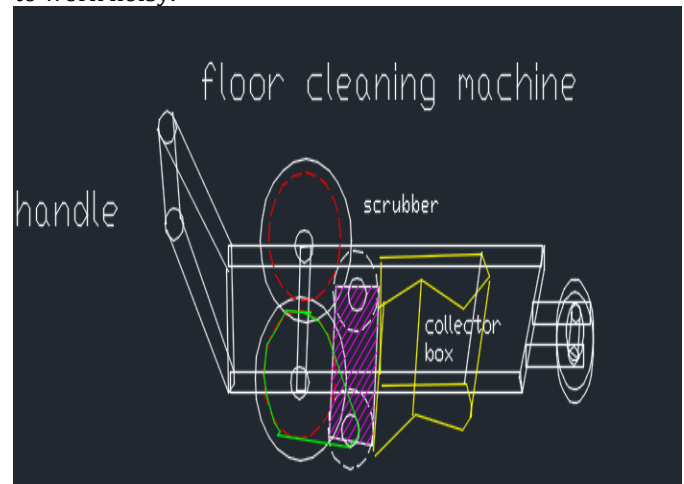


Fig.9

The basic principle that has to be taken into account for the attachment on machine is the conversion of rotary motion into intermitted motion. The gear transmission gives higher accuracy. In this two shaft as said above, attached laterally both parallel to each other. Because of this machine gives high efficient work and easy to handle.

V. WORKING

The Working Is Mainly Divided Into Types.

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

Supporting Frame

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

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.

Scrubber Operation

Scrubber is the main heart of the machine. The various types of standard scrubber are availabl 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.

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 removable 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.

VI. 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 aptitudes proved to be very useful purpose.

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