

Autonomous Vehicle for Organic Manure Mixing and Feeding

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Submitted: 01-03-2022

Revised: 13-03-2022

Accepted: 16-03-2022

ABSTRACT: Food is the basic need for every human being it is becoming poisonous nowadays because of chemical fertilizers and pesticides. So as to minimize the chemicals we have to replace them with manure. This project mainly focused on organic manure preparation as per proportions and to feed the plants with manure. The basic project idea is organic manure mixer and the modification we have made is integrating the feeder equipment. The feeder works when the vehicle is in forward motion. It consists of two feeding pipes on either side. This machine will help the farmers in supplying the manure very easily and reduce the toxicity in crops as we are feeding organic manure by using this machine.

KEYWORDS: Mixer, Screw feeder, Organic Manure, 13 v Motor, Single Cylinder Reciprocating Pump, Vehicle Controls, Batteries.

I. INTRODUCTION

In this paper i.e., autonomous vehicle for organic manure mixing and feeding which mixes and feed the organic manure to the crops at a required rate without aid of any human aid. Today one of the problems facing by the entire world is food toxicity. So we have to replace the chemical farming with the organic farming. Our main intension is to reduce toxicity of crops with the tremendous use of organic manure. This vehicle for Organic manure mixer and feeder is also designed with the same theme. As this organic manure mixer and feeder do the same automatically.

Although there are number of other models for the same purpose are present in the market, whose main work is to only mix the manure and bio waste. But in this vehicle for organic manure mixing and feeding we are going to

do little modifications and design a new model not only to mix the manure but also to feed according to proportions to the plants or crops. This Vehicle can mix the both semisolid manure/green waste and liquidious waste too. The solid waste can be feeded to the plants easily through feeding pipes through gravity. But supplying the liquidious manure to the plants is tough in this case because liquid manure cannot be fed but it must be sprinkled or sprayed. To achieve this we are also integrating the sprinkler to sprinkle over leafs and roots part.

The main components of this vehicle for organic manure mixing and feeding are wheels/rollers, motor, pump, seamless tube/seamless pipe, sprinkler setup, screw mixer and feeder, battery(s), electrical wiring, sensors for different purposes, the purposes are discussed further and a power shaft.

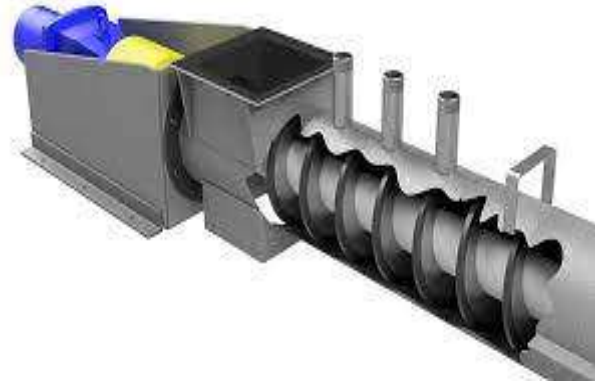
The modification made is including a feeder mechanism to the existing organic mixture machine.

A **battery** is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy. Historically the term "battery" specifically referred to a device

composed of multiple cells, however the usage has evolved to include devices composed of a single

cell

II. ADDITION OF FEEDER MECHANISM



Screw feeders are used across a broad range of industries and material applications. This article discusses ways to help mitigate some of the application issues that can occur when using a screw feeder.

Screw conveyors of all types are some of the most versatile bulk material handling equipment available. One specific type, the screw feeder, is used in a wide variety of applications for metering bulk materials. Screw feeders come in many sizes, lengths, configurations, and are constructed of a variety of materials.

Screw feeders are comprised of a screw mounted in an enclosed U- or tube-shaped trough or housing and typically are mounted to a hopper, bin,

or silo at the start of a process. The screw is connected to a rotating drive shaft on one end and an end shaft on the other, with the screw supported by bearings at both ends.

Because the inlet of a screw feeder is flood-fed, as opposed to being control-fed like a standard screw conveyor, the unit's rotational speed and special flight spacing are crucial design factors in determining how much material will be delivered to the discharge with every revolution of the screw. Controlling the feedrate to the next phase is critical in most processing environments, and screw feeders can be adapted accordingly. The following Q&A helps explain when a screw feeder can meet your specific



Pictures of hopper{ left } and a 13 v motor { right }

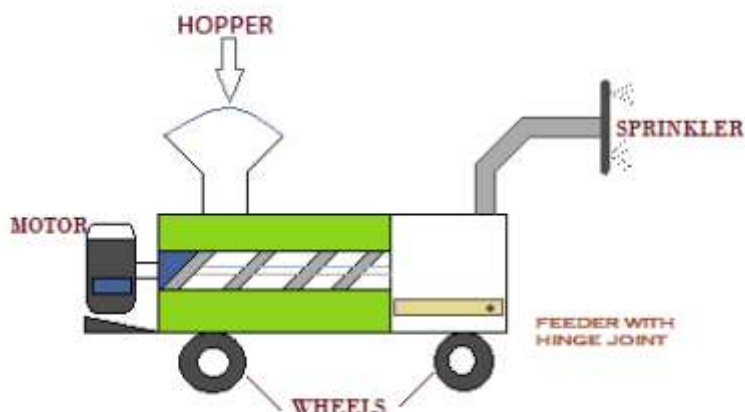
III. DESIGN AND ASSEMBLY

The design of Autonomous vehicle for organic manure mixing and feeding is very simple and easily operated. During its Design each and every component is made to be precise and convenient in its position. So that no play in its parts

and less wear and long durability can be achieved. So that no play in its parts and less wear and long durability can be achieved. To reduce and avoid the rusting of the metal components almost all the components are made of the stainless steel as stainless steel reacts less to the climatic conditions and rust free. Stainless steel contains 10-20 % of

chromium as the main alloying element. And 0.015% - 0.10% carbon. Sometimes alloyed steel can also be used as the material for the components mixing and feeding” is shown in table 1.01. The

assembly of the different components is done as follows, As shown in the line model diagram the machine almost looks like same.



MODEL LINE DIAGRAM OF ORGANIC MANURE MIXTURE AND FEEDING

BILL OF MATERIALS FOR AUTONOMOUS VEHICLE FOR ORGANIC MANURE MIXING AND FEEDING.

SL.NO	COMPONENTS NAME	CAPACITY	NO.S
1	SCREW FEEDER	0.2 TON	1
2	MOTOR	13 V	1
3	POWER SHAFT	100N-MT	1-3
4	BATTERIES	120 V	2-5
5	WHEELS	RUBBER 0.5 TON	3-6
6	PUMP		01
7	BOLTS & NUTS	FEASIBLE	AS REQUIRED

Sprinkle Frequency

At average speed i.e the valve opening or closing time is 40ms

For 1 min 25 openings and closings is possible

For 1 min for one valve $25 \times 60 = 1500$

With a force of 1.31N the inlet opens for 15 times and exhaust valve opens fo 15 times.

IV. CONCLUSION

Looking back on this project, the overall outcome of results to be observed. This can be evaluated by looking at how well our objectives were met. Our first objective is to control the Fertilizers to be used in the farming in India. By the vehicle autonomous vehicle for organic manure

mixing and feeding makes uses of organic manure so that we may give a fresh and healthy land to the future generations. The actual results and theoretical results are atmost same values.

This design is very realistic for the future of the AGRO INDUSTRY as well as our educational and research anddevelopment work.

SOME OF THE ADVANAGES FROM THE ABOVE RESULTS

- a) Eliminated Mechanical Linkages
- b) It can make clean, efficient and responsive farming
- c) ECU can control the sprinkler velocity acceleration and deceleration of pump
- d) Reduction in size and weight
- e) Fuel/Power economy Increases
- f) Power and Torque increase

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