Design and Development Solar Operated Automatic Animal Dung Cleaner

[1234]Atul Patil, Sourabh Patil, Pratik Patil, Prasad Shinde

[1234]Students, Mechanical Engineering Department,N.M.C.O.E., Peth, Sangli, Maharashtra, India.

[5]Mr. R.B. Fonde
[5]Asst. Professor, Mechanical Engineering Department,N.M.C.O.E., Peth, Sangli, Maharashtra, India.

Abstract : Health may be very vital whilst involved with paintings, so it's very vital to preserve the fitness in an amazing circumstance. While cleansing the animal waste a lot of human beings choose it up with the aid of using palms and a number of them with the aid of using pads. People can also additionally go through with sicknesses and a few can also additionally experience allergic to do it. So the employee need to be in accurate circumstance to make his/her paintings done. Animal waste purifier appropriate for scrapping animal waste in a passageway the waste that's in semisolid country and it'll be accumulated in green manner with out harming the animals and hold the hygienic conditions. This is a trouble confronted with the aid of using the various farmers who're present process the dairy practices they want to choose up with undergo palms. Since there may be no current or low-cost gadgets and due to this waste human beings get allergic and with a view to keep away from troubles implementation of tool is necessary

IndexTerms - Animal Cleaner, Solar, Motor, Power Transmission, Torque.

I. INTRODUCTION

The essential purpose as to why the idea has been selected is the fee of the exertions this is required to keep the hygiene and the cleanliness of the cow shed. Places that are deep in the rural belt additionally face the intense trouble of exertions scarcity. The sheds positioned withinside the village belt can also additionally face trouble of the energy scarcity however may be conquer with the assist of a sun electricity backup. Animal welfare refers to each the bodily and intellectual country of an animal, and the way it's miles dealing with its situation. An animal is taken into consideration in a very good country of welfare if it could explicit its innate behavior, comfortable, healthy, safe, properly nourished, and isn't always tormented by bad states which include distress, worry and pain. Good animal welfare calls for sickness prevention and veterinary treatment, suitable shelter, management, nutrition, humane handling, shipping and eventually, humane slaughter. Hence right and a smooth shed are a need to the cattle. Dairy merchandise synthetic below unsanitary or incorrect situations have an multiplied threat of containing bacteria. Proper sanitation practices assist to lessen the charge of bacterial contamination, and pasteurization significantly decreases the quantity of infected milk that reaches the consumer. Traditionally cow dung has been used as a fertilizer, aleven though nowadays dung is accumulated and used to supply bio gas. In nowadays`s state of affairs farmers are having tough time in retaining the cow shed. To smooth cow dung they've spend greater time. So we recommend this mechanism is used to sun powered computerized cow dung gathering cum cleansing gadget. In this gadget we've got used controller gadget to gather the cow dung. They are mechanical and electric additives are used on this mission which include restriction switches, DC motor, DC pump, solenoid valve, and drag.

II. OBJECRTIVE

1. Manual collection of cow dung
2. More effort required to collection, disposing and carrying
3. Time Consuming.
4. More manpower required.

III. LITERATURE REVIEW

Pramod B et. all in that paper we research that Cleaning became a each day recurring in each hotel, office, hospital, house, farms etc. as a result, every body anticipate smooth and short cleansing. Due to this motives humans are attracted toward electromechanical equipments as a result there has been a large call for for this machines withinside the market. Keeping those elements in mind, on this paintings "layout and improvement of animal shed cleansing device" a version became designed fabricated and overall performance assessment became been done. The device became manually moved, includes rotary brushes and one scrubbing brush. The rotary brushes are operated the use of unmarried motor which allows in cleansing the ground, scrubbing brush scrub the ground has the device moves. Two scrappers have been used one scrapper on the the front quit pushes the waste and every other scrapper on the bottom pushes the water left withinside the ground withinside the wake of cleansing. During cleansing, everyday water became provided on the the front quit, which moist the ground. It became trailed with the aid of using offering compound water saved in a tank of the device, which in addition moist the ground, and revolving brushes easy the ground. At closing everyday water is provided at excessive velocity via nozzles. Finally air blowing device may be applied if brisk dry became required.[1] Gurucharan M.et. all in that paper we research that paintings is ready the venture that we're offering to automate the method of cleansing the dairy farm with the click of a button. The essential purpose as to why the idea has been selected is the price of the hard work this is required to hold the hygiene and the cleanliness of the cow shed. Places that are deep in the rural belt additionally face the intense trouble of hard work shortage. The proposed version includes a couple of manual methods that is a number one load wearing member. The rack and pinion mechanism allows withinside the motion of device apparatuses alongside the period of the scaled down body. Here the electrical DC motor is set up with a equipment on pinnacle which drives the device alongside the rack. The motion alongside the period of the cow shed is taken into consideration as x axis. Similarly the peak of the equipment is taken into consideration as Y axis.

There are help manual methods set up to the lowest of the primary body device. The brush meeting is made to transport alongside the 2 manual methods with the assist of a screw rod and equipment power mechanism. The screw rod installation is coupled to a controllable DC motor, wherein the movement of the motor may be managed with the aid of using the output of the restriction switch. [2] Md. Manazir et. al in that paper we research that Health could be very critical while worried with paintings, so it's very critical to hold the fitness in an excellent situation. While cleansing the animal waste lots of humans select out it up with the aid of using arms and a number of them with the aid of using pads. People might also additionally go through with sicknesses and a few might also additionally sense allergic to do it. So the employee need to be in suitable situation to make his/her paintings done. Animal waste cleanser appropriate for scrapping animal waste in a passageway the waste that is in semisolid kingdom and it is going to be accrued in green manner with out harming the animals and hold the hygienic conditions. This is a trouble confronted with the aid of using some of the farmers who're present process the dairy practices they want to select out up with undergo arms. Since there may be no present or less expensive gadgets and due to this waste humans get allergic and with a purpose to keep away from troubles implementation of tool is essential. [3] Prakash Singh et. Al in that paper we research that during today`s state of affairs farmers are having tough time in retaining the cow shed to easy the cow dung they ought to spend greater time or they ought to rent employees for greater money. So on this paper we advise a mechanism that is used to accumulate the cow dung and extensively utilized to easy the area. We use cow dung cleansing device which runs beneathneath the electricity generated with the aid of using solar. By the use of this method routinely human electricity might be saved. [4] Dinesh R et. al in that paper we research that during today`s state of affairs farmers are having tough time in retaining the cow shed to easy the cow dung they ought to spend greater time or they ought to rent employees for greater money. So on this paper we advise a mechanism that is used to accumulate the cow dung and extensively utilized to easy the area. We use cow dung cleansing device which runs beneathneath the electricity generated with the aid of using solar. By the use of this method routinely human electricity might be saved. [5] Vijaykumar L S in that paper we research that the reason of the existing observe is to layout ground cleansing device. Designing the processing device of agricultural merchandise calls for records approximately their bodily and mechanical properties. Cleaning is a totally essential and unavoidable each day recurring. Cleaning machines have become very famous on this busy and growing old population. Nowadays even farmers need smooth operating and suitable crop in a brief time period for which purpose they may be attracted toward mechanical and electromechanical device and machinery. Keeping those elements in mind, on this venture "layout and modeling of farm animals shed cleansing device" it allows farmers for smooth cleansing and upkeep in their farm animals shed. This serves the fundamental wishes of cleansing huge and medium shed. In this venture the blade that is on the the front will convey and raise the cow dung to the wearing bath that is located lower back to the blade with the aid of using guide lifting mechanism. And the motor suited to brush via pulley through belt, which allows in cleansing the ground. The water deliver is organized such that it's going to assist in smooth cleansing. By this manner my paintings allows farmer for smooth and short cleansing in their farms. [6]

IV. LITERATURE SUMMERY

To assist farmers via way of means of lowering the hassle of cleansing waste on the shed we recommended the mechanism "sun powered computerized cow dung cleansing gadget for cowshed". These styles of task may be specifically imposing withinside the dairy farming for fast and fast cleansing of the environment of farm and it'll store water in addition to human labour or human power. Only it calls for operator for controlling for operation.

V. RESEARCH METHODOLOGY

- A overview of configuration and running additives of very quickly available cleansing machines.
- Identify the risks and decorate it for higher results.
- Based at the enhancements new layout became finished.
- Drawings had been made for fabricating making use of robust edge.;
- Fabrication and meeting of the cleansing gadget has been carried out through outline.
- Testing the running circumstance and if any adjustment became required, adjustments are made for purchasing genuine results.
- Results and end of the paintings has been recorded

VI. MATERIAL PARTS

The major components of solar powered automatic cow dung cleaning system for cowshed are written below:-

1. Battery
2. D.C motor
3. Frame
4. Microcontroller
5. Limit switches
6. Solar panel

VII. CALCULATION

Calculation of Motor

$P = 2\pi NT/60$ watts

Where,

P = power

N = Speed of motor

T = Torque

Then P=V*I

V=voltage

I=current

TORQUE AND POWER OF A MOTOR WITH NO LOAD CONDITIONS:

P=V*I
=12*25
=300W
N= 800 RPM
Then
P = 2πNT/60
300=2∗π∗800∗T/60
18000=2*π*800*T
T=3.58N-m

TORQUE AND POWER OF A MOTOR WITH LOAD CONDITIONS :

P=V*I
=12*29
=348W
N=600 RPM
Then
P = 2πNT/60
348=2∗π∗600∗T/60
20880=2*π*600*T
T=5.53 N-m

Chain Drive Power Transmission:

Design of Mower Shaft:
Determination of the Vertical Force acting on mower
The weight of the mowers = weight of the blade + weight of the discs.
Material density = 8000kg/ m3
Length of mower's blade (L) = 150 mm = 0.15 m
Thickness of the blade (t) = 2 mm = 2 x 10 -3m
Width of the blade (w) = 20 mm = 20 x 10 -3 m Number of blades = 4
Diameter of disc (d) = 70 mm = 0.7 m
Thickness of disc (t) = 10 mm = 0.01 m
Mass of the blade Mb = Density x Volume
Mb= 8000 x 0.15 x2 x10-3 x 20 x10-3 = 0.048 kg
Total mass of blade = 0.048 x 4 = 0.192 kg.
Tangential force on the gear acting upward Ft
Ft = Mt x g / rp = 110 .58 x 9.81 / 3.3 = 328.8 N
Force of the gear acting downward
Diameter of gear = 66mm = 0.066 m;
Face width b = 40 mm = 0.04 m
Mass of gear = Density x Volume = 8000 x π (0.066)2/4 x (0.04)
= 0.905 kg
Force of the gear acting downward = 0.905 x 9.81 = 8.88N.
Forces acting on the shaft both vertical and horizontal
The weight of the bearing
The area of the bearing =π (do – di)2 /4
Do = 80 mm; di = 75 mm; L = 152 mm
Volume of bearing = area x Length = π (80 – 75)2 /4 x (152) = 2984.5 mm3
Volume of bearing= 2.985 x 10-6 m3
Weight of the bearing,
Wb = 8000 x 2.985 x 10 -6 x 9.81= 0. 234 N
The vertical forces of gear on the shaft
Pitch diameter dp = 336 mm = 0.336 m;
Face width b = 40 mm = 0.04 m
Volume = π (dp)2 /4 x (b)
Mass of the gear = 8000x π (0.336)2 /4 x (0.04)
= 28.37 kg Weight of gear
= 28.37 x 9.81 = 278.35 N.
Design of the Chain on the Sprocket
Determination of the weight of chain Fch
The weight per meter length of the chain is 1.099 kgf
Length of the chain Lch = 1045.75 mm = 1.04575 m
Fch = 1.099 x 1.04575 x 9.81 = 11.182 N
Half of the weight of the chain will act on each of sprocket = 5.59 N
Determination of the weight of sprocket Fsp
Density of sprocket material = 8000 kg / m3
Depth of teeth dp = 0.07 m;
Thickness t = 0.015 m
Fsp = Density x Volume x Gravity = 8000 x 5.773 x 9.81 = 4.53 N
The sprocket tangential force Ft Given weight of sprocket as 141.29 kgf Ft = 141.29 x 9.81 = 1386.1 N

The tension in the chain driving sprocket is 1455.3 N included at angle 75.4° to the horizontal

Fych = F sin 75.4 = 1455.3 x 0.9977 = 1408.4 N Fxch = F cos 75.4 = 1455.3 x 0.25207 = 366.86 N

The total force acting at the point of sprocket F2

F2 = Fsp + ½ Fch + Fych – Ft = 4.53 + 5.59 + 1408.4 – 1386.1 = 32.45 N.

VIII. Conclusion

To assist farmers with the aid of using lowering the trouble of cleansing waste on the shed we advised the mechanism "sun powered computerized cow dung cleansing device for cowshed". This sorts of challenge may be specifically put in force withinside the dairy farming for fast and speedy cleansing of the environment of farm and it's going to shop water in addition to human labour or human power. Only it calls for skilful operator for controlling for operation.

IX. Future scope

- Motor may be constant for shifting reason for clean shifting.
- Fibre blade and fibre bath may be used as opposed to steel sheet to lessen the weight.
- Half or one HP cars may be used for growing pace and for excessive load taking capacity.
- Bearings may be used for guide lifting mechanism for reasonably-priced and clean lifting.

X. Actual Model

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