

# Fabrication of Portable Animal Shed Cleaning

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**Abstract**—The purpose of the present study is to design and fabricate a Portable Animal Shed Cleaning Machine. Cleaning is done daily in every household, industries, dairy farms, public places, etc., and for some cases it is even more important to clean the premises. In this age of modern technology every one are opting for electro mechanical means rather than manual working which helps farmers to reduce the work load, time taken and manpower. By considering these factors we have done designing and fabrication of Portable Animal Shed Cleaning Machine which helps in basic cleaning work of the animal shed. In this project the front is provided with a blade that pushes the waste in and the belt drive provided carries it to the detachable collecting tank. And at the back brushes are provided with motor and with water supply at the back for easy cleaning. This work helps farmers for easy and quick cleaning in the animaln shed.

## I. INTRODUCTION

In cattle fields cleaning is a unavoidable task as the cow dung is accumulated and there a necessity to clean it regularly. Manual cleaning is done with the use of tools like shovel, scraper, spade, wheel barrow and water etc. By using the tools the work may become easier but as everything in nowadays is automated there is a need in a cleaning machine particularly used for Animal shed. There are many cleaning machines available in the market but they are not capable of cleaning the floor and collecting the waste at same time. This project consists of both cleaning and lifting mechanisms. Hence it not only cleans but also collects the waste on the floor. At the front of the machine there is a blade that pushes the waste in and a conveyor belt is provided right next to it which sends the waste to the collecting tank which is detachable so the waste can be cleared easily. And for the cleaning mechanism, the brushes provided with motor at the back and a nozzle for water for easy cleaning. The movement of the machine is automated whereas the steering is done manually. Solar power can be used as villages have power shortages and by proper cleaning of the shed the bacterial content in the milk produced can be minimized.



Fig 1: manual cleaning

## II. Objectives:

- Design and fabrication of portable animal shed cleaning machine.
- To reduce time consumed and man power required for cleaning animal shed.
- To build a ecofriendly cleaning machine that can both clean the floor and collect the waste.

## III. Methodology:

- To study the current model of design of different cleaning machines.
- Make out the problems and define it for better solution.
- Final design concept which comply with regulation and guidelines.
- 3-Dand2-DdrawingsweremadeforfabricatingutilizingCatia v5.
- Prototype model testing and review of the design.
- Fabrication of the model and defining results and conclusion.

## IV. DESIGNING

- The design of cleaning machine for fabrication was done using Catia v5 and the designed model was shown in figure below

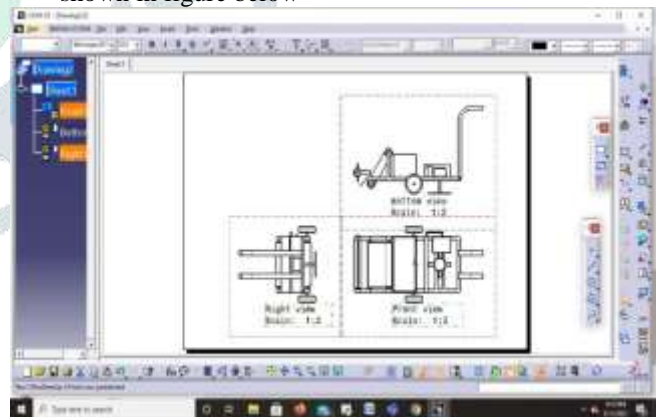


Fig.2:2D view of model

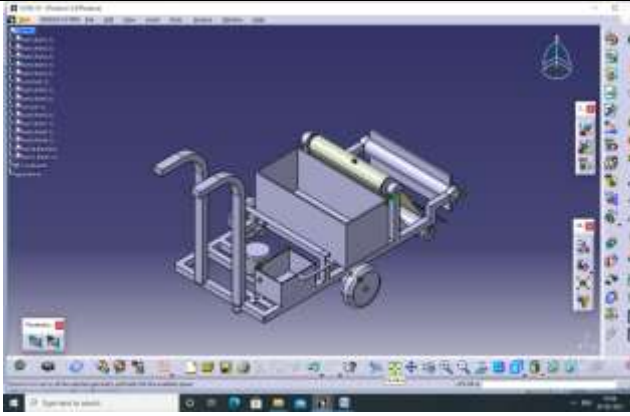


Fig.3: Isometric view of model

#### V. Working Principle:

The cleaning machine has been fabricated and the principle of working is listed below,

- First water tank is filled and the collecting tank is emptied from the waste.
- By switching on the machine automated movement of the machine starts and steering is done manually.
- At the front the scraper begin to work and the blade provided at the front pushes the waste in from the forward motion.
- And the pushes waste is sent to the collecting tank using a conveyor belt.
- Simultaneously while collecting the waste from front at the back the water is supplied at high speeds from nozzles to clean the waste collected area.
- At last the brushes pushes away the water sprayed on the floor and cleans the extra waste.
- Another scrapper at the back side pushes the water left in the floor in the wake of cleaning
- By simultaneous action of the water supply and brushes action the floor is cleaned effectively.

#### VI. FABRCATION DETAILS

- Body of this is completely made of MS square pipes of (1\*1) inch and build by MS steel of 1.6mm thickness (16 gauge).
- Conveyor belt mechanism is used to drive the waste using rubber pads into the tank. Pad & belt assembly is of 1500mm length and 400mm width.
- Collecting tank is of 36 liters capacity whose width and length is 300mm and height of 400mm which is made of MS steel.
- DC motor without load it can run 500rpm and with load it can run 150rpm. If we want to reduce speed we can use gears.
- Belt runs on two shafts of length 400mm and diameter of 16mm. Ball bearings are used to rotate the shaft 6020std ball bearings are used, totally four ball bearings are used.
- 12v 7Ah battery is used in this to operate 2motors.

Fabrication process

- Drilling
- Bending
- Welding

- Riveting
- Cutting

#### VII. MATERIALS USED

- MS square pipe 18 gauge.
- MS shaft 15mm diameter.
- Ball bearings inner diameter 15mm, outer 40mm.
- MS flat 1 inch width and 5mm thickness.
- Dc battery lead acid 12v 7.5 amps.
- Dc motor 12v 80 rpm
- Ms sheet metal 18 gauge
- Toggle switch, electric wires, bolt and nuts etc.,
- MS rollers
- Belt conveyor
- Water tank with sub pump
- Moping setup

#### VIII. ADVANTAGES

- Easy and quick cleaning can be achieved.
- Cleaning machine is eco-friendly.
- Nozzles were utilized for showering water at high speeds to expand the viability of cleaning.
- Skilled work is not required for working the machine.
- Overall cost of the machine is less since, mild steel was used for fabrication.
- Easy maintenance with less cost.

#### IX. CONCLUSION

- Cleaning machine was designed and fabricated with less cost, easy maintenance and ecofriendly, provides easy and effective cleaning of the floor.
- The design gives comfort and easy cleaning for the farmers of their cattle shed. As compared to the present day design this design has many more advantages as it helps in collecting the cow dung.
- It is a quick process consuming less time. And there is no consumption of fuel.
- This design is made by keeping view of cheaper cost for fabrication and maintenance and Environmental Friendly. Providing easy and quick cleaning for the farmers is an important criterion.
- 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.

#### X. FUTURE SCOPE

- Machine can be automated using IOT, but cost will be little high.
- Load carrying technology like hydraulics can be used to lift the collecting tank to easy disposal.
- Routing the electrical systems through PLC systems and Sensors can greatly improve the efficiency and quality of the electrical systems.
- Other materials can be used to reduce the weight.

- Germs detection sensors can be used, and sanitize the floor.

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