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Power Operated Knapsack Agricultural Duster

Naman Mehta¹, Shivangi Patidar², Arpit Bundela³, Aman Pandey⁴, Shivam Patel⁵, Naman Gandhi⁶

^{1,2,3,4,5} UG student, Department of Mechanical Engineering, IIST, Indore, India

⁶ Assistant Professor, Department of Mechanical Engineering, IIST, Indore, India

Abstract— The use of hands to spread the fertilizers on field cause adverse effect on soil as the parts of field not having any crop also gets the chemical treatment and also affects the health of the individual working with it. The aim of this work is to design and develop a hazards free pesticides blower that can be operated by an individual without coming in contact with the fertilizers. Separate channels are provided in order to spray out the fertilizer at different levels of the crops.

Index Terms— Pesticide, Insecticide, Fertilizer, Ergonomics, Agriculture.

1 INTRODUCTION

Chemical fertilizers are important for the cost-effective production of commercial crops, and have been since the 1930s. With a growing population and high cost of living, a bountiful harvest ensures enough food is available for everyone at affordable prices. However, using chemical fertilizers do have their hidden dangers about which most people may not know.

Much like humans, the soil needs a delicate balance of nutrients to remain healthy. While NPK can definitely help plants and crops grow, simply adding them to the soil without regard for keeping the balance can lead to unintended consequences or hidden dangers.

Due to improper safety measures the parts of body such as fingernails, lips and hands turns blue due to lack of oxygen.

At worst, chemical fertilizers may increase the risks of developing cancer in adults and children and adversely affecting fetal brain development. This is not news to scientists. A 1994 study by the University of Wisconsin suggest show that typical concentrations of nitrate (a common fertilizer) and a pesticide may compromise the nervous, endocrine, and immune system of young children and developing fetuses.

The use of hands to spread the fertilizers on field cause

adverse effect on soil as the parts of field not having any crop also gets the chemical treatment and also affect the health of one working with it.

Chemical fertilizers have their uses, but they also have hidden dangers. Whether used in a farm or lawn, applying more than the plants can use to help them grow results in damage to the environment and human health. Because the damage caused by chemical fertilizers is often long-term and cumulative, it may be wiser to consider alternative and sustainable methods of fertilizing the soil.

Hence this present project work provides a solution keeping in sense the difficulty faced by farmers during the spreading of pesticides and insecticides. The model consists of a tank, a flexible polymer pipe, connectors, a manually lever operatable extension and a power operated blower for covering wide range and spreading insecticide.

2 GEOMETRIES

The isometric view of geometry model of the pesticide blower is shown in fig. It consists of a tank, flexible pipe, reducer, manually operated extension,

power operated extension.

Fig 1

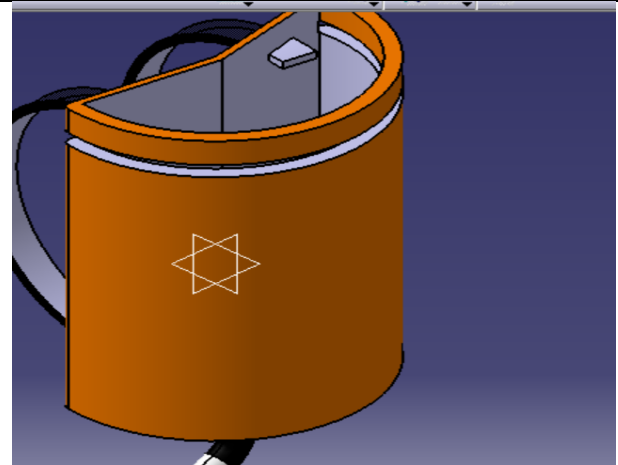
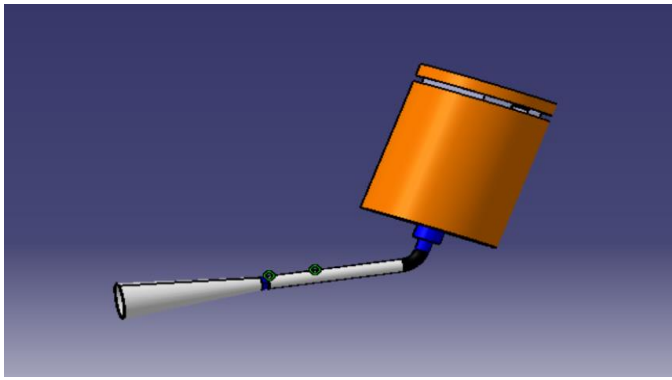


Fig 2

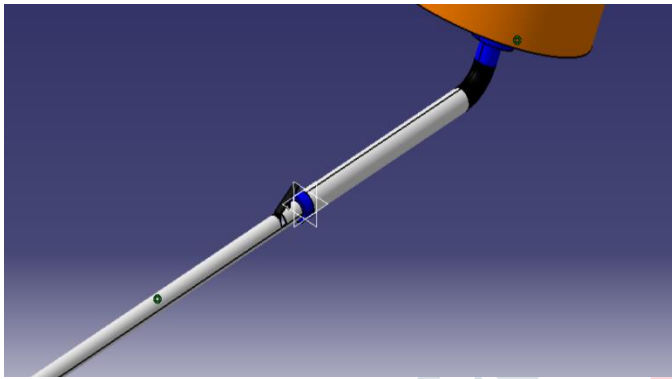


Fig 1.1

shown is Fig 1 and 1.1 The zoomed view for tank, flexible pipe, connectors, manually operated extension, power operated extension is shown in Fig 2, 3, 4, 5 and 6

2.1 Tank

A tank is a container for storing the solid fertilizers, pesticides and insecticides. It helps in easy carrying of fertilizers and also protects it from factors such as moisture. The blower and motor is fitted inside the tank for dusting of solid pesticide and insecticide.

The dimensions of tank are 25×30 cm. Having a capacity of 15 kilograms.

2.2 Reducer

Reducers are fixed to the tank and at the end of pipe for easy connectivity of the extension parts.

The dimensions of reducer are the broad part will be of 4.9 cm to 2.45 cm.

Reducer will help in developing pressure.

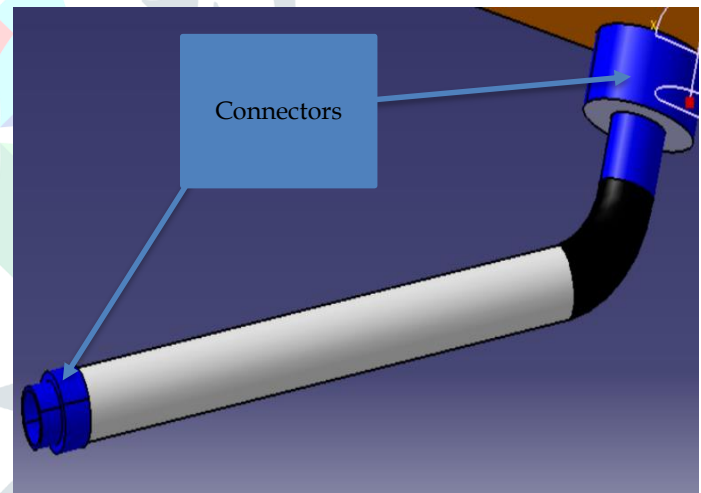


Fig 3

2.3 Hose Pipe

Flexible pipe helps the operator to easily rotate and release the material as per need.

The diameter of hose pipe is 2.45 cm and material will be rubber for providing it flexibility.

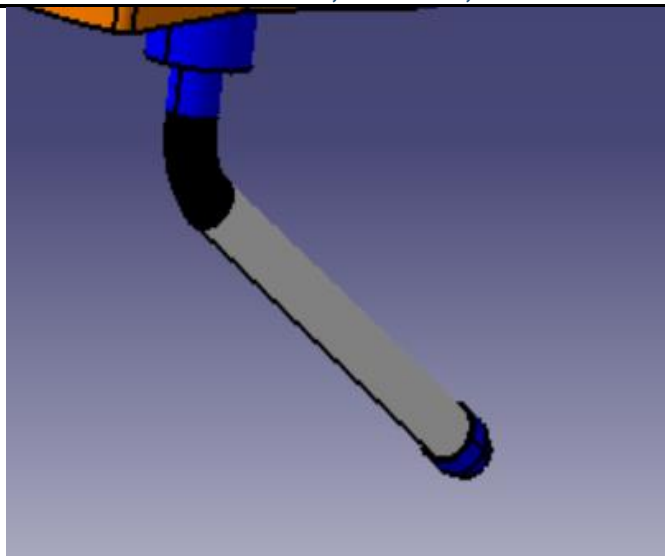


Fig 4

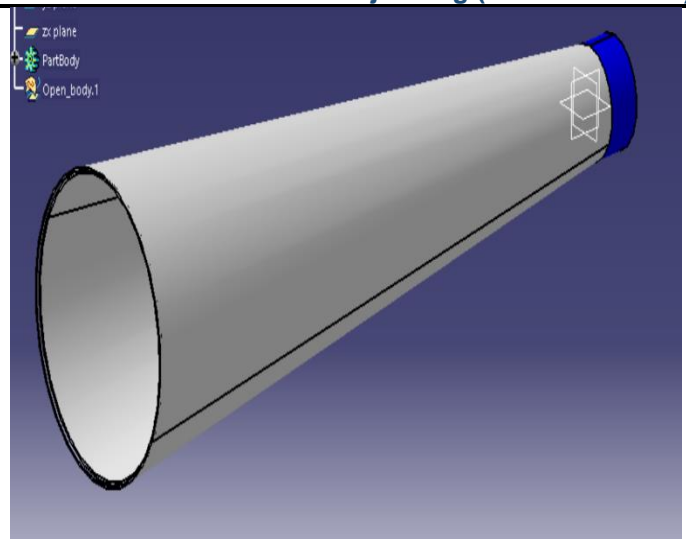


Fig 6

2.4 Lever operated extension (Manual Extension)

Manual extension helps for providing the fertilizer and insecticides directly to the root of plants. This is designed to minimize the bending done by operator for reaching pesticide to roots. And lever is also installed in easily accessible space. Requires no motor operation.

Hose Pipe

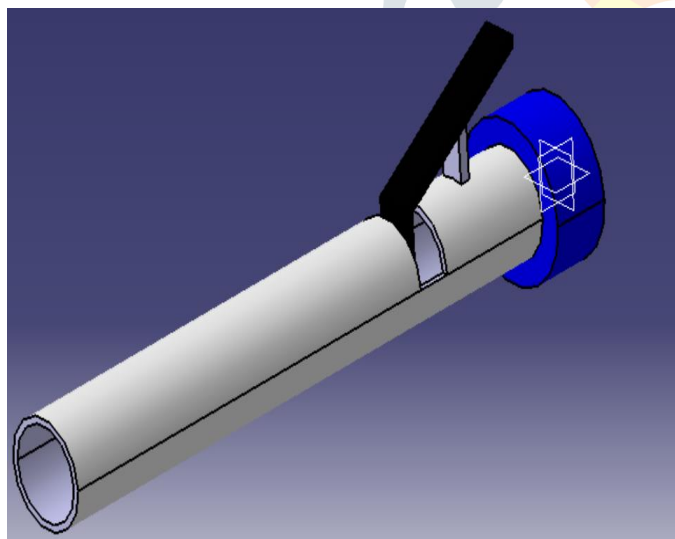


Fig 5

2.5 Motor operated extension (Blower extension)

For covering larger fields and spreading of powder over the crops from top this extension can be used. It will be a motor operated blower whose output range can be varied by varying the knob present on tank.

3 FABRICATION

Based on the design the model is fabricated and the details of components, cost and the materials based on research are in table

Fig No	Component	Material	Cost
1	Tank	Plastic	Rs 450
2	Reducer	PVC	Rs 200
4	Hose Pipe	PVC	Rs 70
4,5	PVC pipes	PVC	Rs 500
	Blower and battery		Rs 900
	Total		Rs 2120

The proposed model cost of Rs 2120 is accessible for small as well as medium scale farmers.

4 CONCLUSION

India is an agricultural country and it is the main source of livelihood for 80% of people living in rural areas of India. So in order to sustain, realize and to gain maximum output from agriculture it is necessary to develop skilled human resources.

As per the design of project it can be concluded that it is cost effective and affordable to small as well as medium scale farmers.

It reduces the direct exposure of human skin to the chemically active pesticides and insecticides.

The flexible design of model allows the user to cover large areas in a relatively small amount of time.

The ergonomic design of product allows the farmer to work efficiently without getting tired.

5 FUTURE SCOPE

This duster can be easily used for various types of crops and for various field patterns. We can add new features as per the need of the new farming techniques and crops.

There is flexibly and product is easy to understand and use.

The different components of product are completely reusable and reduces the environmental impacts arising from waste treatment and disposal.

Importance of technology in agriculture brings numerous major modifications in agricultural machines that introduced equipment that decreased the volume of labor needed.

With change in technology this product can be upgraded with different mods and attachments in future and will be highly beneficial as well as will provide higher productivity at an affordable cost for all.

6 ACKNOWLEDGMENT

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