

Design and Development of Mechanical Power Weeder

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***Abstract:** Agricultural area has been in the area of continuous research, and has made significant improvement in the recent period. Currently, standard cultivation removes weeds from the majority of the bed using sweeps, knives, coulters and blades. Typically a 4-inch wide band is left around the seed line. Weeds in the uncultivated band are typically removed by hand, and the density of weeds that occur there, determines how laborious and costly subsequent hand weeding will be. Mechanical weeding machine is a project used to remove unwanted plants/weeds, which grows around the crops. Technology will continue to develop and improve in the coming years. These technologies do not entirely replace the need for hand labor, but they can make subsequent hand weeding operations less costly and more efficient. So we are going to make a machine which removes these unwanted plants more efficiently and at a considerable less cost. We have made a machine which removes weed from in the line and around the plants. It uses rotary motor operated jaws which indeed removes weed. The design and other technical details are presented in the report.*

Keywords: Solar power, mechanical weed control, motorized, mechanism.

I. INTRODUCTION

India is a agricultural country. More than 70% of its population is dependent on agriculture for their living, still many of the farmers use conventional methods to remove weed. Thus there is a need to bring in new modern technologies to make farming easy and time saving. To achieve a high yielding vegetable production, good agricultural practices are required. One of the most important practices is to properly manage weeds. Weeds affect crop yield due to competition to acquire plant nutrients and resources Weeds have very fast growth rates compared to crops, and if not treated and managed, they may dominate the field. Some farmers adopt agronomic practices that improve crop competitiveness such as planting vigorous crop seeds at relatively shallow depths and planting right after a weed control operation. This method is used to prevent the weed seeds from germinating before the crop is planted and to ensure that crop plants emerge before the weed plants. This practice will not only ensure a maximized crop yield and reduce weed infestation, but also minimize any economic losses The above practice should be applied for controlling weeds if the canopy closes and does not allow much light onto the ground surface where weeds will germinate and grow. However, weed control is still required during the crop production cycle.

Diesel engines are playing a vital role in Road and sea transport, Agriculture, mining and many other industries. Considering the available fuel resources and the present technological development, Diesel fuel is evidently indispensable. In general, the consumption of fuel is an index for finding out the economic strength of any country. In spite, we cannot ignore the harmful effects of the large mass of the burnt gases, which erodes the purity of our environment every day. An aqua silencer is used to control the noise and emission in IC engines. The reason why we go for aqua silencer is, in today life the air pollution causes physical ill effects to the human beings and also the environment. The main contribution of the air pollution is automobiles releasing the gases like carbon dioxide, unburned hydrocarbons etc.

In order to avoid this type of gases we can use aqua silencer. It is fitted to the exhaust pipe of the engine; Sound produced under water is less hearable than it produced in atmosphere. This mainly because of small sprockets in water molecules, which lowers its amplitude thus, lowers the sound level. The emission can be controlled by using the

activated charcoal layer and Lime water. Activated charcoal layer is highly porous and posse's extra free valences so it has high absorption capacity along with this lime water chemically reacts with the exhaust gases from the engine and release much less pollution to the environment. The noise and smoke level is considerable less than the conventional silencer, no need of catalytic converter and easy to install. India is a agricultural country. More than 70% of its population is dependent on agriculture for their living, still many of the farmers use conventional methods to remove weed. Thus there is a need to bring in new modern technologies to make farming easy and time saving. To achieve a high yielding vegetable production, good agricultural practices are required. One of the most important practices is to properly manage weeds. Weeds affect crop yield due to competition to acquire plant nutrients and resources Weeds have very fast growth rates compared to crops, and if not treated and managed, they may dominate the field. Weeding is an important but equally labor intensive agricultural unit operation. There is an increasing interest in the use of mechanical intra-row weeder because of concern over environmental degradation and a growing demand for organically produced food. Today the agricultural sector requires non-chemical weed control that ensures food safety. Consumers demand high quality food products and pay special attention to food safety. Through the technical development of mechanisms for physical weed control, such as precise inter-and intra-row weeder, it might be possible to control weeds in a way that meets consumer and environmental demands. These mechanisms contribute significantly to safe food production.

II. OBJECTIVE

The following are the objectives behind making of solar power mechanical power weeder machine are given below,

- 1) To reduce the man power in agricultural sector.
- 2) To reduce the power consumption during weeding.
- 3) To maintain the accuracy during weeding.
- 5) This type of weeding machine provides work practically at low cost, low maintenance, low capital investment in less space.
- 6) To perform the most rigid operation with high-speed weeding & to reduce time in Weeding.

III. METHODOLOGY

We have proposed a methodology to solve the problems. Our methodology is divided in different parts, under different titles.

Sequence of proposed methodology is as follows –

- Proposed Methodology 1 – Problem Definitions
- Proposed Methodology 2 – Basic Information & literature survey
- Proposed Methodology 3 – Design of Components
- Proposed Methodology 4 – Selection of material & standard parts.
- Proposed Methodology 5 – Manufacturing process & testing.
- Proposed Methodology 6 – Cost Estimation & Report writing.

1. Proposed Methodology 1: Basic Information & Literature survey.

This project report discusses about how to use literature data & identify the problems from field. By studying the literature of previously available system that help in maximizing the output by minimizing the effort, cost, time & money in future develop new machine.

2. Proposed Methodology 2: Identify & Design of Machine Components Available in Market.

This project work will first introduce the background of the study. Presents the design constraints that influence on the use, efficiency & benefits their impacts on machine. After that machine parts design all different existing machine assembly units will done to make a probable machine model.

3. Proposed Methodology 3: Selection of Components for Machine as per design specifications.

We will discuss the construction & working of system components. Various resources and factors were considered for getting the information on the project: First, the requirement of the field is to identify. The specification of the material is thought according to the need. Then, the allocation of budget is taken into consideration. Different research papers were read, we visited many markets & fields. Guidance was taken from college staff regarding the initial research of project. The Resources/Consumable required are: The main components of machine are to be purchase.

4. Proposed Methodology 4: CAD modeling & Fabrication of Machine parts.

This project work will start to manufacture after purchasing of required specification material & making sample simulations which will be easy for visualization. After that manufacturing procedure of machine will be done, after this cost estimation of machine will calculate.

5. Proposed Methodology 5: Assembly & Testing of Machine.

Finally, after complete manufacturing procedure, will test the working model which will satisfy probable objectives or not. After that complete working & satisfied testing will discuss advantages & applications of the machine while performing satisfied operation with complete report writing.

The below flow chart shows the sequential operation/steps that will be performed during the project process.

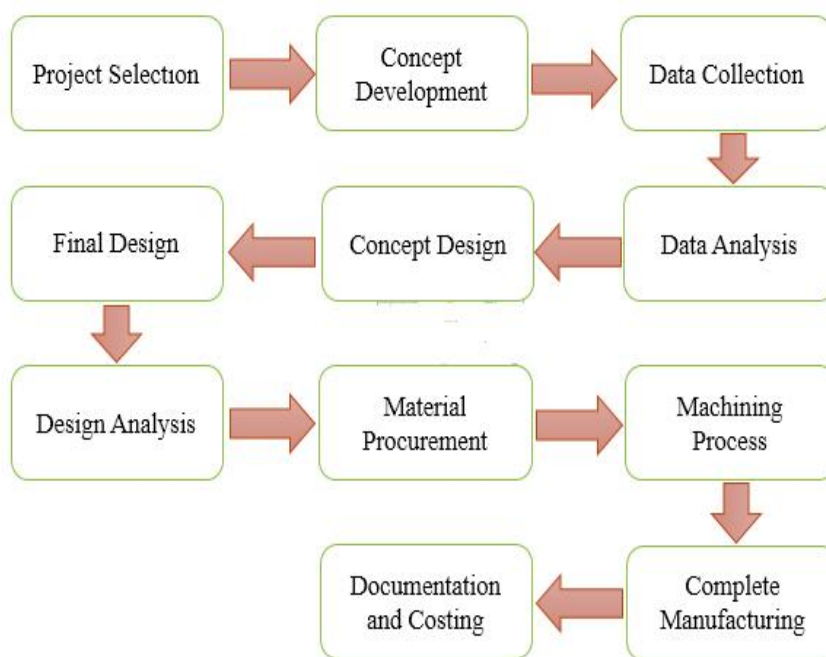


Fig.1. Process Flow Chart.

IV. PROBLEM STATEMENT

In traditional farming, weed removal operation is done manually. To achieve a high yielding vegetable production, good agricultural practices are required. One of the most important practices is to properly manage weeds. Weeds affect crop yield due to competition to acquire plant nutrients and resources. Weeds have very fast growth rates compared to crops, and if not treated and managed, they may dominate the agro field. To reduce the time, efforts & cost saving we will make a solar power mechanical power weeder machine.

V. CONSTRUCTION & WORKING

Components are used for manufacturing the weeding machine are:

Table.1. Material Requirement

SR. NO.	COMPONENTS	QUANTITY
1.	Geared motor 12 VDC	1
2.	Chain Drive	2
3.	Bearing	4
4.	Shaft	2
5.	Battery 12 VDC	1
6.	Weeder Wheel	1
7.	ON/OFF switch	1
8.	Frame Structure	1
9.	Solar Panel	1
10.	Nylon Wheel	2
11.	Nut and Bolt	-

WORKING OF PROJECT

This project consists of weeder wheel which is mounted on center of M.S. frame. The rotary weeder wheel is mounted at the front side of the frame. When we required operating the weeder wheel, we can push & inclined the weeder trolley in forward direction. When there is push ON button it supplies current from battery to electric motor. When electric motor is ON and rotates the weeder wheel by using chain power for weed removal of the unwanted crops around the main trees. To stop the motion of blade drum the motor will stop by using switch. This weeder is operated by using electric geared motor & electrical supply with the application of 12 Volt batteries & solar power in addition..

VI. CONCLUSION

As we know that due to increase in demand for vegetable crop production, farmers have started using mechanical techniques to control weed. Only difference is that instead of using conventional methods i.e. in weeding operation the farmers have started using automated mechanical machines to achieve the goal. Our project is now Solar operated mechanical weeder, but in future we can make it more practical after some modifications. The machine develop by us is primary actual model but after some expertise research & some modifications it will definitely use in actual field. While concluding this report, we feel quite fulfill in having completed the project assignment well on time, we had enormous practical experience on fulfillment of the manufacturing schedules of the working project model. We are therefore, happy to state that the in calculation of mechanical aptitude proved to be a very useful purpose. Although the design criterions imposed challenging problems which, however were overcome by us due to availability of good reference books. The selection of choice raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem. Needless to emphasis here that we had lift no stone unturned in our potential efforts during machining, fabrication and assembly work of the project model to our entire satisfaction to solve the problem in agricultural field for social welfare.

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