Advanced Mulching Paper and Drip laying Machine

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Abstract: In order to improve growing condition of crops there are various methods that improves productivity, reduces water required to grow up the crops. But mulching paper which is also known as agriculture film is one of the best method to cover the soil and maintain required atmosphere around the crop. This mulching paper is available in different types but plastic mulching is famous requires less efforts so we have decided to work on automatic mulching paper laying machine which also have attachment for the drip laying.

Keywords: growing of crops, plastic mulching, automatic mulching laying.

Introduction

Mulching (Agriculture Film) is the practice of covering the soil around plants to improve the growing conditions for the crop. Historically natural mulches such as straw, compost, hay and wood chippings have been used but over the last 40 years paper and plastics have been tried. Because of its poor wet strength and price, paper has been found less effective and more costly than plastic. The result is that plastic mulch film is the primary choice for agricultural application. Plastic mulch film is widely used on high value crops, such as Tomatoes, Melons, Cucumbers, Squash, Peppers and Strawberries increasingly on lower value crops such as Corn and Ginger. For arable soils, the most effective conservation practices for reducing water loss through surface evaporation are those that provide some degree of surface cover for the soil. A cover can be best provided by mulches or by tillage practices that leave plant residues on the soil surface.

Objectives

1. To develop a machine which reduce cycle time of laying mulch film.
2. To reduce human effort.
3. To increase the production rate.
4. To minimize miss-operation.
5. To reduce no of worker.
6. To minimize the production time.

Methodology

1. Literature study.
2. Project identification
3. Project literature study
4. Field work
5. Design stage
6. System drawing
7. Material procurement
8. Manufacturing stage
9. Fabrication of assembly
10. Trials and troubleshooting.
11. Testing
12. Conclusion
13. Report and project presentation

**Working Principle**

It consists of a main frame which supports the other components. Other components mounted on the main frame which are drip roller, drip line director roller, mulch paper roller, paper pressing roller, and joining arrangements to the tractor. When the machine is pulled forward, the drip line and mulch paper start to unwind as they are anchored at one end. The drip line is guided below the paper by the drip line director roller, and at the same time, the mulch paper is placed over the bed by the paper pressing rollers.

**Design Of Main Frame**

**Design Of Mulch paper Roller**

**Drilling attachment calculation**

Consider distance between two hole = 300 mm
If we attached one drilling punch on drum then, for achieving single hole, the radius of drum can be calculated.

Distance between two hole = 2πR

R = radius of drum

From above formula, radius of drum = 47.7 mm

= 50 mm

Approx 100 mm dia. roller will not be safe to bear all the forces.

We have to increase the diameter of roller but constraint is that the distance between two holes is 300 mm.

We can arrange a number of drilling punches on the drum. Consider 4 drilling punches are arranged on the drum.

Then, Distance between holes = 2πR/4

= 2 * π * 50 / 4

= 314.16 = 316 mm

Diameter of drilling drum = 400 mm

**Conclusion**

Plasticulture is crucial to Indian agriculture in view of the changing technological scenario for boosting crop yields and productivity. Introduction of linear low-density polyethylene (LLDPE) as a mulch film has brought a revolution in agricultural water management. It is actually a boon to dryland farmers. This is one of the fastest growing plasticultural applications in the world. The cost of LLDPE film is also lesser than one-third of LDPE mulch film. Moreover, for mulch activity, lower thickness (15 to 20 microns) are highly suitable. However, due to the ever-increasing cost of raw materials, the films are costlier now. Hence, the Government should take all possible measures to produce the film in a mass scale and make it available to the farmers at a reasonable price. Subsidy may also be given through banks to encourage the farmer to adoption soil mulching. Low-cost machines may be developed for spreading and...
rolling down the film in the field. PFDC’s may be geared up for large scale demonstration in farmer’s field to give a wide publicity.

References