# A REVIEW PAPER ON PNEUMATIC SUGARCANE BUD CUTTING MACHINE

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## ABSTRACT

*The main objective of our project is to perform job holding and cutting operations effectively with less human effort by incorporating a machine with the pneumatic power. This also takes less time due to its quick action. This pneumatic sugarcane bud cutting machine aims to provide a better and faster bud cutting operations with less human effort thereby promoting agricultural activities of sugarcane cultivation. Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate.[2] To achieve mass production, the automation of the predefined tasks is necessary and is made mandatory in the current operating conditions of the industries Conventional method of planting sugarcane causes to chip the complete sugarcane into several fragments with buds present at its nodes. This damages the sugarcane completely and leads to causing loss in the farmer's hands since they are unable to sell their cultivated sugarcanes to the industries such as sugar factories and other industries that use sugarcane as their source of raw material. Tons of sugarcanes are chipped into fragments to utilize the necessary cane buds and the chipped ones rather than used for planting are then sold to the markets at very cheaper rates.[3]*

**Keyword**:- *Pneumatic, SPM, etc.*

## 1. INTRODUCTION

Tons of sugarcanes are chipped into fragments to utilize the necessary cane buds and the chipped ones rather than used for planting are then sold to the markets at very cheaper rates.[4]

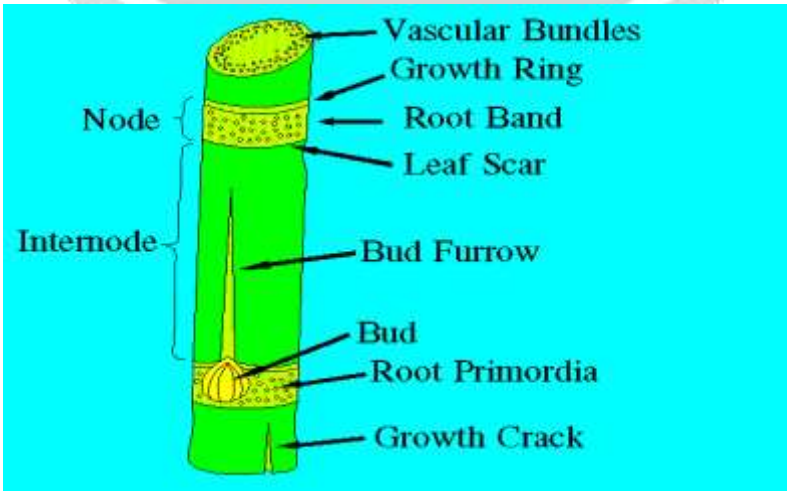


Fig 1. Representation of bud in sugarcane

One alternative to reduce the mass and improve the quality of seed cane would be to plant excised axillary buds of cane stalk, popularly known as bud chips. These bud chips are less bulky, easily transportable and more economical seed material. The bud chip technology holds great promise in rapid multiplication of new cane varieties. [1]The sowing of buds of grown sugarcane ensures the growth of new sugarcane thereby increasing the production rate and decreasing the damaging rate of the sugarcanes. The left-over cane can be well utilized for preparing juice or sugar or jiggery.[3]

### 1.1 ADVANTAGES OF BUDCHIPS

1. Bud chip technology could be one of the most viable and economical alternatives in reducing the cost of sugarcane production, provided necessary precautions are taken in handling and storage of bud chip seed material and their subsequent multiplication in the field.
2. Plant mortality rate could be reduced using bud chip raised settlings. Cane yield could be enhanced using bud chip raised settlings.

Fig. 2 Chipped buds of Sugarcane[5]

## 2. SUGAR CANE BUD REMOVING METHODS

Following are the general methods to remove the sugar cane bud.

### 2.1 To remove sugarcane bud:-

They are keep the sugarcane on the Supporting Plate. The linear motion of cutter helps to cut the bud of sugarcane and the same size of bud is collected. The Collection of sugarcane is done in the box.

### 2.2 Spaced Transplanting Technique:-

A spaced transplanting technique has been developed for synchronization of tillering and quick seed multiplication of sugarcane. It increases seed multiplication ratio from 1:10 to 1:40. It has contributed in fast spreading of newly evolved varieties at several places.

**2.3 Methods of Raising Bud Chip Settlings:**

Fig 3 Buds Are Put In Plastic in Cups or Trays

Fig 4: Buds Covered With Soil

Fig 5 Sugarcane Crop Growth

Fig 6 After 4 weeks Sugarcane Crop Ready to Plantation

Select fresh harvested sugarcane stalk free from disease sugarcane must be 8-10 months age. Cut out buds from stalk by using sugarcane bud cutting machine. Put this buds in plastic cups or trays filled with soil, organic material like death leafs of plants in ratio1:1 fig no-(3.2.2) & (3.2.3). After 4 weeks later sugarcane crop ready to plant in field fig no- (3.2.4).in nursery sugarcane crop get full sun, energy and its free from any disease. Also buds is directly plantation in field

## 3. PROJECT METHODOLOGY

This chapter will cover the details explanation of methodology that is being used to make this project complete and working well. Many methodology or findings from this field mainly generated into journal for others to take advantages and improve as upcoming studies. The method is use to achieve the objective of the project that will accomplish a perfect result. In order to evaluate this project, the methodology based on System Development Life Cycle (SDLC), generally three major step, which is planning, implementing and analysis**.[6]**

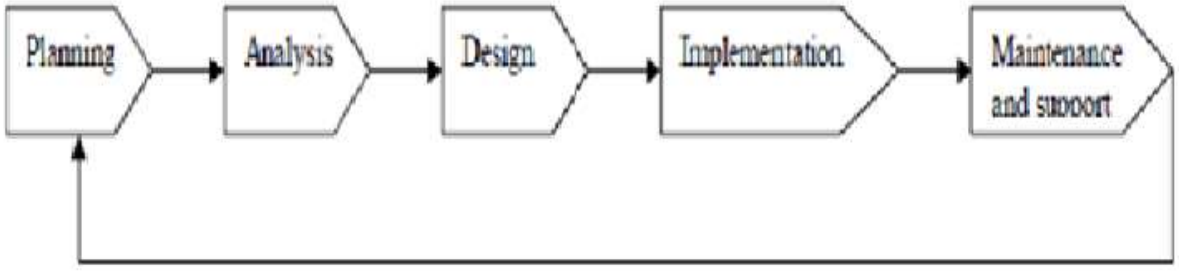


Fig 7 SDLC Phase [6]

This final year project used three major steps to implement project starting from planning, implementing and testing. All the methods used for finding and analyzing data regarding the project related.

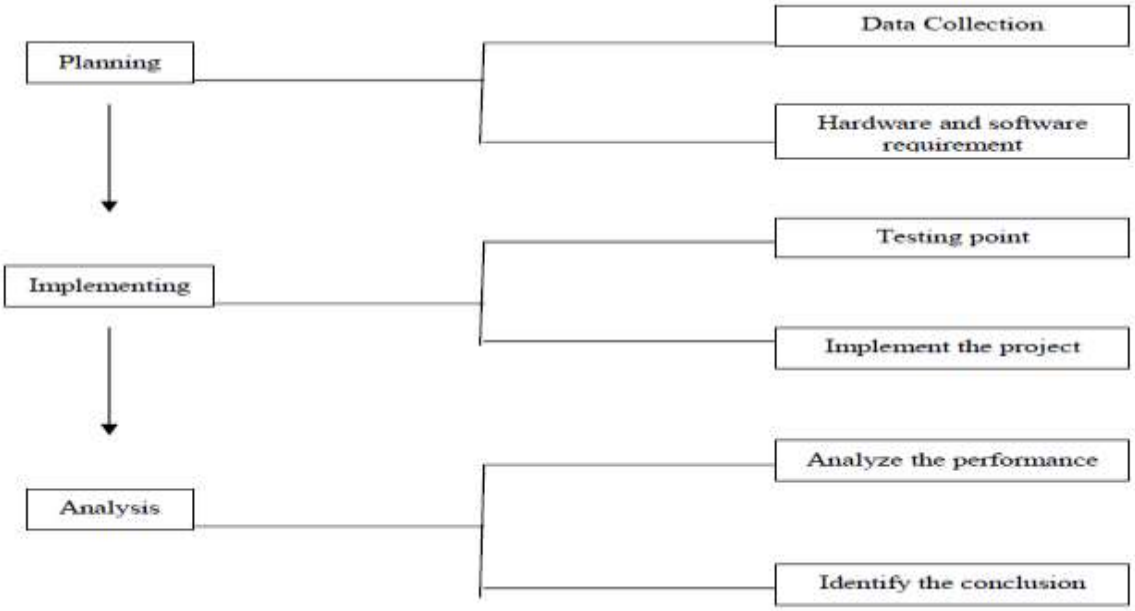


Fig 8 Steps of Methodology [6]

**3.1 Method of Sugarcane Bud Cutting**

One of the most common practice of sugarcane bud cutting is the use of cutting machine pneumatic operated with 5/2 solenoid valve. It requires pneumatic power for the cutting operations and is takes much longer time to chip several pieces of sugarcane buds. Hence this method is unsuitable for large scale production of chipped sugarcane buds for the need of agriculture. Few other sugarcane bud cutting machines are made using manually operated. But it requires more manual force for its working. When compare to the pneumatic operated cutting method.

Fig 9 Hand operated conventional cutting machine [4]

**3.2 Proposed work in Project Stage II:-**

In stage II we will used Pneumatic System to perform this task instead of manual work. Pneumatic systems use pressurized gases to transmit and control power. Pneumatic systems typically use air as the fluid medium because air is safe, low cost and readily available. Pneumatic systems operate on a supply of compressed air, which must be made available in sufficient quantity and at a pressure level to suit the capacity of the system. When pneumatic system is being adopted for the first time, however it will indeed the necessary to deal with the question of compressed air supply since air is the source of pneumatic operations. A compressor is a machine that takes in air, gas at a certain pressure and deliver the air at a high pressure. Compressor capacity is the actual quantity of air compressed and delivered and the volume expressed is that of the air at intake conditions namely at atmosphere pressure and normal ambient temperature. Clean condition of the suction air is one of the factors, which decides the life of a compressor. Warm and moist suction air will result increased precipitation of condense from the compressed air.

**3.2.1 Advantages of Pneumatic System**

Air used in pneumatic systems can be directly exhausted back into the surrounding environment and hence the need of special reservoirs and no-leak system designs are eliminated.

1. Pneumatic systems are simple and economical.
2. Control of pneumatic systems is easier.
3. Pneumatic systems are highly reliable since generally they have long operating lives and require little maintenance. Because gas is compressible, equipment is less subject to shock damage.
4. There is a very low chance of fire compared to hydraulic oil.

**3.2.2 Drawback of Pneumatic System**

1. Pneumatic systems exhibit spongy characteristics due to compressibility of air.
2. Pneumatic pressures are quite low due to compressor design limitations (less than 250 psi).

**3.2.3 Working Principal of Propose working Machine**

The compressed air from the compressor is used as the force medium for this operation. The machine uses a pneumatic double acting cylinder, foot valves. The arm from the compressor enters to the flow control valve. The controlled air from the flow control valve enters to the foot valve. The function of foot valves controls the extension

and retraction of air from cylinder at correct time interval. The 5/2 foot valve is used. In one position air enters to the cylinder and pushes the piston so that the cutting stroke is obtained. The next position air enters to the other side of cylinder and pushes the piston return back, so that the releasing stroke is obtained. The speed of the cutting and releasing stroke is varied by the human foot position.

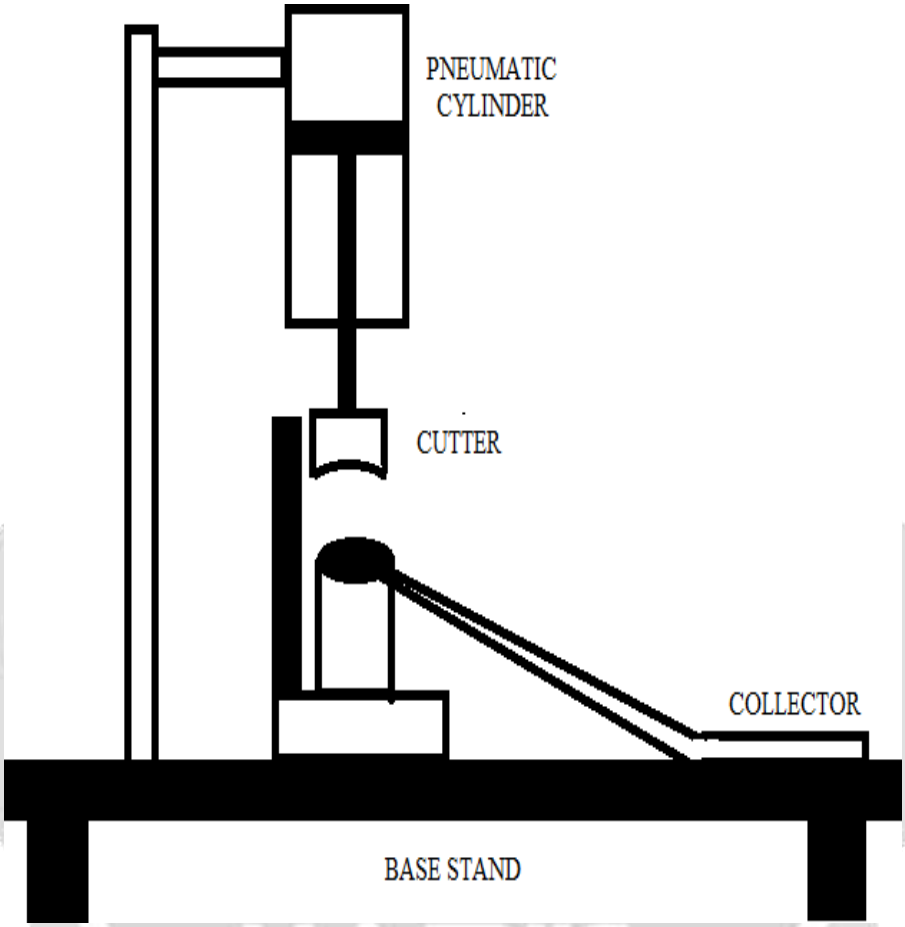


Fig 10 Design of Pneumatic sugarcane bud cutting machine [2]

**Work to be done in Stage II:-**Following path is followed for the proceeding project work for project stage II

**Table 1 Proposed Project stage II planning**

| Sr. No. | Month | Task to be done |
|---|---|---|
| 1 | November 2019 | Review research paper proceeding and paper publication on project stage I |
| 2 | December 2019 | Design calculation and data collection. |
| 3 | January 2020 | Manufacturing of machine and experimentation in agricultural Field. |
| 4 | February 2020 | Final research paper proceeding and paper publication on project stage II |
| 5 | March 2019 | Report writing under guidance of project guide |

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| 6 | April 2020 | Report writing with guidance from project guide and final presentation preparation. |

## 4. REFERENCES


1) A.S. Aditya Polapragada & K. Sri Varsha (2012), "Pneumatic Auto Feed Punching , cutting and Riveting Machine" , International Journal of Engineering Research & Technology (IJERT) Vol. 1 Issue 7, ISSN: 2278-0181.
2) A Textbook of Fluid Mechanics and Hydraulic machines– Dr. R.K.Bansal.
3) Design data book - P.S.G.Tech.
4) Fluid power with applications- Anthony Esposito
5) Manufacturing Technology- Haslehurst.M
6) Mr. Rohit J.Masute, Dr. Sharad S.Chaudhari and Prof .S. S. Khedkar (March 2015),"Design and fabrication of small scale sugarcane harvester", International Journal on Research and development Organization (IJRD),issue3, vol.2, ISSN-3855-0154.
7) Ningappa H Kuri and Prof.Reddy Naik.J (Dec 2015), "Design and development of sugarcane bud chipping machine", International Journal of Research in Aeronautical and Mechanical Engineering, issue 12, pp. 97-110.
8) P.M.Pradhan (2013), "Experimental Investigation and Fabrication of Pneumatic Cutting tool", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 2, Issue 6.
9) www.freefullpdf.com