

# DESIGN AND FABRICATION OF AN AUTOMATED ROTO –PLOUGHER CUM FERTILIZER WITH COMPACT SINGLE CYLINDER PETROL ENGINE

V.Prabakaran <sup>1</sup>, G.Prabu <sup>2</sup>, M.Naveen kumar<sup>3</sup>,V.Manikandan <sup>4</sup>, V.Prasanth <sup>5</sup>, B.Sanjay Gandhi<sup>6</sup>,S.Gopalakrishnan<sup>7</sup>

<sup>1,7</sup> Assistant professor, Department of Mechanical Engineering, Gnanamani College of Technology, Namakkal, Tamil Nadu, India

<sup>2,3,4,5</sup> UG Students, Department of Mechanical Engineering, Gnanamani College of Technology, Namakkal, Tamil Nadu, India

<sup>6</sup> Principal, Gnanamani College of Technology, Namakkal, Tamil Nadu, India

## ABSTRACT

*In present scenario, people start migrating for work towards industries, corporate companies, etc. So, the farmers are affected because insufficient labors. In this project, we reduce the need of more labors by using our project. This project is to minimize the size of the existing ploughed and cultivator. This is project human friendly.*

**Keywords-** Single cylinder petrol engine, belt, fuel tank, chain, hopper, roto-plunger

## 1. INTRODUCTION

In present days we using a manual power to align the base of plants. But in our project concern to reduce the manual power by using plougher with renovator. The possibility of our project may be reduce the man power from 5 to 20%. The additional purpose of this project automatic fertilize distribution. In this machine are using small scale area. To introduce new equipment's for agriculture field. To reducing some difficulties in exiting system. While using this to reduce mankind and time consumption. In present days we using a manual power to align the base of plants. But in our project concern to reduce the manual power by using plougher with renovator. The possibility of our project may be reduce the man power. The additional purpose of this project automatic fertilize distribution. In this project, we have worked to reduce the need of more labours by an automated system comprised with Roto-plougher and a single cylinder compact petrol engine. This project is to minimize the size of the existing plougher and cultivator. We comprise single cylinder petrol engine, Roto-plougher angular blades, V-Belt and hopper. The purpose of this project is to bury furrows and drop fertiliser. It also reduces man power existing size cost complicated design. And al so human friendly project.

## 2.MATERIALS

### 2.1 SINGLE CYLINDER PETROL ENGINE

The single cylinder petrol engine is usually applied to reciprocating internal combustion engines like the ones founding every day automobiles. There are basically two types of ignition engines, those which need a spark plug, and those that rely on compression of a uid. Spark ignition engines take a mixture of fuel and air, compress it, and ignite it using a spark plug. Piston and some of its basic components. The name 'reciprocating' is given because of the motion that the crank mechanism goes through. The piston-cylinder engine is basically a crank-slider mechanism, where the slider is the in this case. The piston is moved up and down by the rotary motion of the two arms or links. The crankshaft rotates which makes the two links rotate. The piston is encapsulated within a combustion chamber. Engines while

trailers and some big trucks use compression ignition engines. The main difference between the two is the way in which the air to fuel mixture is ignited, and the design of the chamber which leads to certain power and cadency characteristics. Spark ignition engines use an air to fuel mixture that is compressed at high pressures. The most commonly used source of power for motor vehicles was introduced by the German engineers Gottlieb Daimler and Karl Benz in The petrol engine is a complex piece of machinery made up of about moving parts. It is a reciprocating piston engine, in which a number of pistons move up and down in cylinders. A mixture of petrol and air is introduced into the space above the pistons and ignited. The gases produced force the pistons down, generating power. The engine-operating cycle is repeated every four strokes (upward or downward movement) of the piston, this being known as the four-stroke cycle. The motion of the pistons rotates a crankshaft, at the end of which is a heavy flywheel. From the flywheel the power is transferred to the car's driving wheels via the transmission system of clutch, gearbox, and final drive.

## 2.2.Fuel tank

Important consideration in designing a fuel tank are determining placement choosing the shape and determining the required volume. The fuel system of automobile chassis body system. At first the theoretical study of bracket is done. The overall purpose of fuel tank bracket is to support the fuel tank and sustain the vibrations caused by fuel tank as well as chassis from tires due to uneven road surfaces. The key areas for modification are identified. The main task in this study is to tune the natural frequency of bracket by optimizing it for various design modification. The Dimensional model of fuel tank bracket is prepared. The computer aided design of base model fuel tank mount bracket and the meshed model for the bracket. This bracket has been assigned to various design modification by adding stiffeners to base design. Let us consider an example of high speed vehicle boat, at high speeds the sloshing that occur in the tank can drastically affect center of gravity of the vehicle, depending on the size of the fuel tank severity of the sloshing can negatively affect a control system. The forces that act on the wall of the tank can also reduce the integrity of the tank. By considering these guidelines we are going to examine the overall geometry of a fuel tank and designing the most effective fuel tank for a given vehicle. This paper mainly focuses on finite element analysis of fuel tank bracket for optimizing natural frequency by use of different bracket stiffeners.

## 2.3 .Belt-Drive

The timing belt drives with trapezoidal teeth profile of the belts and the belt pulleys are the most frequently used in exploitation. The largest application of these belts is found in automobile industry. Transfer of power and motion via timing belt is conducted by shape and by friction. During the power transfer, the belt's teeth enter the coupling.

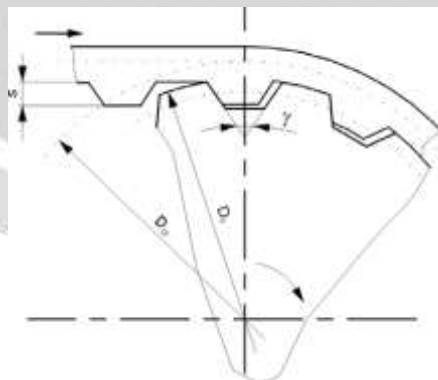


Fig-1

The side surface of the belt's teeth makes contact with the side surface of the belt pulley's teeth, after entering the coupling. The belt's tooth enters the coupling with the drive belt pulley, maximally strained due to previous tension. During the motion of the belt along then vella leangle of the belt pulley, bending and tension of the Belt occur. The influence of the axial force reflects in Pressuring the belt towards the flange. Praxis has shown that the timing belts have the inclination to run into the flange or to slide off the belt pulley if there is no control.

## 2.4. Chain Drive

The radius of the small intermediate sprocket is smaller than that of the driving sprocket, while the radius of the large intermediate sprocket is greater than that of the driven sprocket. A power drive unit for driving a utilization mechanism such as, for example, a road wheel of a light vehicle such as a bicycle, tricycle, The utilization mechanism is driven from the output shaft of a prime mover mounted through a controllable clutch and chain drive train. Turning is the machining process in which a cutting tool, typically a non-rotary tool bit, describes a helical tool path by moving more or less linearly while the work piece rotates. In this operation reduce the diameter of the shaft. This is often done by melting the work pieces and adding a filler material to form a pool of molten material. The drive mechanism includes a power take of means that has: a first power transmission mechanism mounted on said frame; a second power transmission mechanism mounted on the bicycle frame in positive drive. Meshing of a roller chain with a sprocket causes noise and vibration, and by modeling the chain as, a moving, heavy, uniform string we present two approaches to how the dynamical effects of meshing can be analyzed.

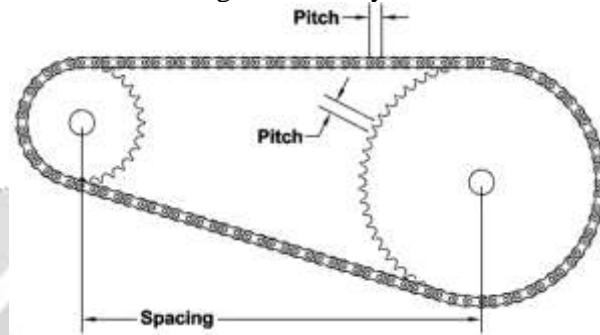


Fig -2

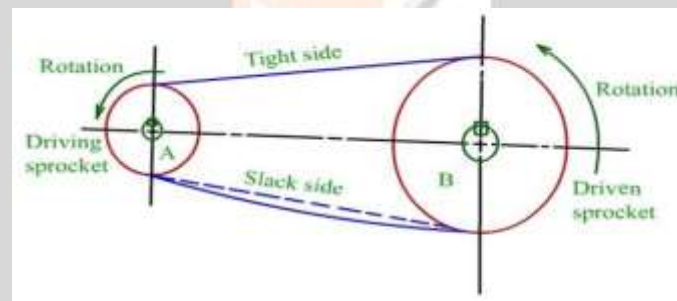


Fig-3

Chain Drive is Power Transmitting Device from Long Time. The mechanism provides a vertically oval pedal path which provides an improvement in the thruster parted to the driving wheel. The chain wheel is mechanically coupled to the input shaft of the transmission unit in a manner wherein rotation of the chain drive.

## 2.5. Roto-Ploguers

Weakening soil structural resistance by introducing a number of slots that alter the slip-line field in favor of power reduction, lubricating the blade sides and front to reduce frictional forces, improving the flow characteristics of soil around the blade and facilitating penetration by moisturizing the soil. The tip of a sub-soiler to loosen the soil structure in front of the tool and also lubricate the tool-soil interface. After taking into account of the power required for injecting the fluid, a total saving. Reported similar conclusions, whereas the draft force of tillage tools increases significantly when the depth of operation is increased. The draft requirements of a tillage tool is also a function of operating speed and an important criterion for evaluating the performance of a tillage tool either in field and laboratory conditions. Mentioned that poor injection can still result in manure exposure on the soil surface, which causes odor emissions and nutrient losses by volatilization.

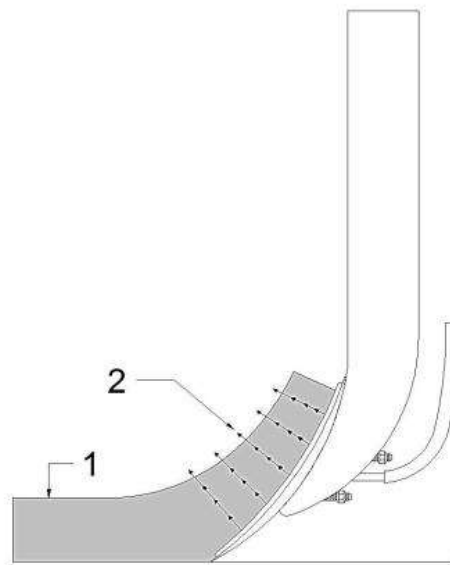


Fig-4

### 3.WORKING

In this engine to start manual by pedaling like as a TVS- Extracted EG 50 starting method. The difference of the starting in this project to using the hand power. After that, the main shaft transmit the power to plougher. With chain drive. Then the plougher will start its work by getting the power from the belt drive. The fertilizer hopper was placed in lower on middle of the machine. Because the plants are getting some growth for few months. So the fertilizer distribution doesn't affected. By using the valve to supply to the rate distribution. We need some man power to guide the machine. Because of we don't give the engine power to the wheels. For this reason if we stop plougher suddenly, the wheels could not be stop. So the plants are may be damaged. It required one man power. The renovator is used for arranging the sand by using plougher. Finally in this project to reduce the man power and save the time duration for using minimum area.

### 4.ADVANTAGES

- A. It reduce the man power.
- B. To save the time.
- C. Low investment.
- D. Good finishing.
- E. Average fertilize distribution.
- F. It's merging the two machines for ploughing and fertilizing.

### 5.CONCLUSION

In recent day, the most of the peoples moved to study oriented jobs (white collar jobs) .So, the farmers are lagging to labors. The possibility of our project may be reduce the man power from 5 to 20% .At the time, our project used farmers friendly.

### 6.REFERENCE

- [1] Abrate, S. (1992). Vibrations of belts and belt-drives. *Mechanism and Machine Theory*, vol. 27, p. 645-659.
- [2] Leamy, M.J., Wasfy, T.M. (2002). Transient and steady-state dynamic finite element modeling of belt-drives. *Journal of Dynamic Systems, Measurement, and Control*, vol. 124,p. 575-581.
- [3] Čepon, G., Manin, L., Boltežar, M. (2010). Experimental identification of the contact parameters between a V-ribbed belt and pulley. *Mechanism and Machine Theory*, vol.45, p. 1424-1433.
- [4] Berzeri, M., Shabana, A.A. (2000). Development of simple models for the elastic forces in the absolute nodal coordinate formulation. *Journal of Sound and Vibration*, vol. 235, p. 539-565
- [5] B. Stojanovic, S. Tanasijevic, N. Miloradovic: *Tribomechanical systems in timing belt drives*, Journal of the Balkan Tribological Association, Vol.15, No.4, pp. 465-473, 2009.
- [6] Y. R. Case: *Timing belt drive*, McGraw Hill

Book Company, INC, New York, 1954.

[6] S. Tanasijević: *Characteristics of Existence and Development of Machine Element Tribology*, Tribology in industry, Vol. 20, No 4, pp. 142-148, 1998

[7] Mahalingam, S. (1957). Transverse vibrations of power transmission chains. *British Journal of Applied Physics*, 8(4):145–148.

[8] chen, C. K. and Freudenstein, F. (1988) Toward a more exact kinematics of roller chain drives. *Journal of Mechanisms Transmissions and Automation in Design-Transactions of the ASME*, 110(3):269–275.

[9] Wickert, J. A. and Mote, C. D. (1990). Classical vibration analysis of axially moving continua. *Journal of Applied Mechanics-Transactions of the ASME*, 57(3):738–744

[10] Patrick E. Turner; Lawrence K. O'Dell. "Bicycle with selectable engage able single or dual wheel drive". United States Patent. Turner et al. Patent Number: 5,332,244 Date of Patent: Jul. 26, 1994

