DESIGN AND FABRICATION UTILIZATION OF SOIL DRILLING MACHINE BY USING NX 12 AND CATIA V 5 R19

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ABSTRACT
No machines were employed in ancient times to excavate the soil for plantations. Using a hand auger, humans manually excavate the soil for plantations, which takes more time and involves a lot of human labor. This kind of traditional method is quite difficult and demands a lot of human work. Owing to these factors, soil digging machines are now employed in agricultural fields to reduce labor-intensive human labor and complete tasks effectively. The use of soil drilling equipment in agricultural fields is widespread. Several capacities of these devices are offered on the market. When a machine's capacity grows, its cost likewise does so automatically. At present in market soil drilling machines is available with diesel engines which are high in cost and heavier in weight. The aim of our project is to reduce the cost of the machine and make it as portable for easy carrying. So due to these reasons we are using petrol engine instead of diesel engine and we attach a iron frame to it for making it portable. This project involves design and fabrication of soil drilling machine. The design of soil drilling machine is done by NX 12 and CATIA V 5 R19 and the fabrication is completed by means of various fabrication techniques
Keywords: Soil drilling machines, Hand auger, Fabrication techniques

INTRODUCTION
Due to reasons like global warming, an increase in average world temperature, and other variables, more individuals are becoming interested in planting saplings, which has caused many non-governmental organizations to accelerate their planting efforts. The use of levers and hand link devices makes the task more complicated and time-consuming when planting trees in large quantities. The main goal of this study is to use a soil drilling machine in place of traditional methods to significantly save the time needed for planting saplings. is generally employed on building sites as piling foundations. [1] When using the auger drill bit to dig up dirt using the help of petrol engine. A petrol engine can be fitted to the end of the auger shaft and which can be used both in clockwise and anti-clockwise directions thus enabling the shaft to go deep inside the soil as well a comeback after the required size is being achieved.[2] The machine can be transported easily since there are wheels which are provided at the bottom of the frame. The machine is made of stainless steel material since it should withstand a higher impact loading.[3] The petrolengine power is brought down to the shaft using down link mechanism using pulleys. The frame is also attached to this machine with wheels and the frame is made up of high carbon steel which is very harder and less weight. So by this we can carry it for our required places. The greater advantage in this machine is that it digs only the required area and also does the same in very minimal time. As so many companies are came forward for implementing this machine and with small challenges in it this machine becomes a revolutionary project for agricultural fields. In future it is also operated by remotes and uses solar energy for digging the soil.[4]

LITERATURE RIVEW
Agriculture is the backbone of Indian economy and soil digging is one of the majoractivities in agriculture. Soil digging is the one of the most important problem that will reduce the farmer interest to continue plantation. The farmer acute labou shortage, decreasing income per acre of cultivation, and economic frustration are some of the key factors hurting a farmer's confidence in continuing farming. Hence soil drilling machine is necessary to reduce the labor force. Environmental degradation and pollution caused by chemical is reduced by the use of soil drilling machine. We have developed soil drilling machine which

take its energy source from the petrol engine. The design and fabrication process of mechanical soil drilling machine is explained in this paper. [1] In this work our team make soil drilling machine which is useful for farmers, and others also who wants to do plantation of smaller saplings. This equipment is known as soil digging machine. In India most of people are farmer. For doing field work maximum human power is used, but some present year's needs of workers are necessary but availability of workers are less for field work. So due to these reasons we designed soil drilling machine.[2] . Generally Indian farmer use traditional way for doing field work that is digging of soil is done by group of people with hand auger digging bit. This method is useful but it is very demanding of labour. To overcome this problem we introducing an alternative solution that is "soil drilling machine". These soil drilling machine will reduce the time and efforts of workers. This machine is portable so that a single person is enough for moving the machine from one place to another place. We use chain and spocket mechanism for the moment of the auger drill bit. With the help of this machine we are trying to reduce human efforts with less maintenance.. Main benefit is reducing labour cost by reducing the number of labours with less time consumption. [3] Most operation of soil digging is done manually with the help of hand auger drill bit because of insufficient machinery and high fabrication cost. In this work fabrication of a low cost and portable machine is done. The parts used in this machines are mainly petrole engine, auger drill bit, Iron frame, wheels and bearings. The design and drafting of all components of soil drilling machine is done by Auto CAD software. So due to this it becomes easy for workers for operating this machine.[4]

DESIGN OF TRANSVERBLE SOIL DRILLING MACHINE

The design of the transferable Mechanized Concrete blending machine is completed by using CATIA V5 R19 software. By using these software's we design several parts of this machine and finally assembled these parts.

FIG1: Design of Transverable Soil Drilling Machine Using CATIA Software

FABRICATION OF SOIL DRILLING MACHINE

The fabrication of Transferable Mechanized Concrete Blending Machine is fabricated by using different fabrication techniques i.e, cutting process, welding, grinding and drilling etc. This concrete machine consists of several parts are as follows

1. PETROL ENGINE
2. AUGER DRILL BIT
3. IRON FRAME
4. CHAIN
5. SPROCKET
6. BEARING
7. WHEELS

PETROL ENGINE: The petrol engine used in this machine for giving rotational moment to the auger drill bit, which digs the soil from the earth. A 52CC petrol engine is used in the manufacturing of the soil drilling machine, and it can be varied based upon our requirements. There are many reasons for using of petrole engine instead of diesel enginebecause it has high capacity than petrol engine,it is portable, and its cost is less than diesel engine. The engine speed ranges between 3500-4000 RPM. We are using 2-stroke petrol engine, because it is affordable and portable also.

Figure2: Petrol engine

AUGER DRILL BIT

The auger drill bit is used for digging the soilfrom the earth. It usually includes a rotatinghelical screw blade called a 'fighting' to act asa screw conveyer to remove the drilled outmaterial. The auger drill bit is connected to theengine with the help of shaft, and it is rotatedwith the help of engine. It can be rotated in both clock& anti-clock wise directions. machine are 50cm diameter.

Figure3: Auger drill bit

Depth is another factor in selecting earth auger. To dig deeper, more powerful engine
and a larger bit is required. Typically the depth of the auger bit is 40cm height and 15cm width. It is important to determine the drill bit size on the auger you purchase as this willdetermine the diameter of poles you can place into the hole that you make.

IRON FRAME

A frame is often a structural system that supports other components of a physical construction The iron frame is used as supporting frame of soil drilling machine. The soil drilling machine is attached to the ironvframe, by this attachment the machine moves upwards and downwards with the help of the pulleys.

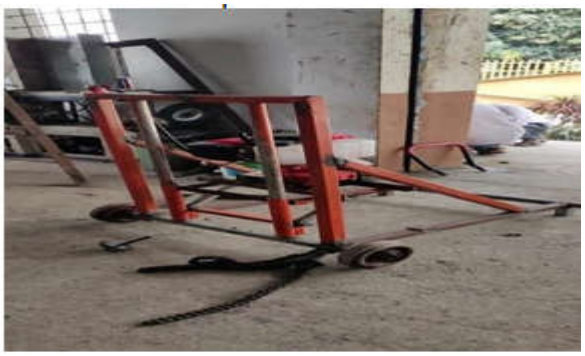

Figure4: Iron frame

HAIN

Chain is the important functional partof the project, which helps to transfer therotary motion of the hand wheel to the linearmoment of the auger drill bit by using plainbevel mechanism. The two ends of the chain isconnected to the iron frame. The energytransfers between the engine and auger drillbit. Generally pulleys are used for transferring the motion between the engine and auger drillbit, but we are using chain instead of pulleysbecause it has no slippage.

Figure5: Chain

SPROCKET

Sprocket is used with chain for transmission of power from one component to another component. Specifically they transfer speedand torque through the use of a linked chainand sprocket . Normally these are in circularshape .

Figure5: Sprocket

BEARINGS

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. We are using ball bearings for the fabrication of soil drilling machine because it can sustain radial, axial, or composite loads. And it has longer service life, also maintenance free. Which transmits exact velocity ratios.

Figure7: Bearings

WHEELS

In its primitive form, a wheel is a circular block of a hard and durable material atwhose center has been bored a circular holethrough which is placed an axial bearing about

which the wheels rotates when the moment is applied by gravity or torque to the wheels about its axis, thereby making together one of the six simple machines. The main object of the wheels is to transfer the whole machine from one place to another place easily.

Figure 8: wheels

We can select the wheels based upon our requirement and it should be in that way for carry the machine which we designed

WORKINGOF TRANSFERABLESOILDRILLING MACHINE

The soil drilling machine consists of Petrol Engine, Auger Drill bit, Wheels, Chain, Bearings and Iron frame. First of all start the engine with the help of the rope. After starting the engine the shaft gets rotated in clockwise direction as well as anti-clockwise direction. The engine speed is controlled by accelerator. The drill bit speed (RPM) is based upon the engine speed. When the shaft gets rotated which is connected to the engine due to its motion the auger drill bit also rotated. With the help of the hand wheel the auger drill bit moves upward and downwards directions, by using bevel gear mechanism. Then the auger drill bit goes into the earth and digs the soil for making the hole to planting the smaller saplings. It is portable also.

Figure 9**: Po**rtable Soil Drilling Machine

PROS

a. Improvement in pile foundation.
b. Minimize the time required by usingsimple mechanical mechanism.
c. It reduces the repetitive talk**..** Developmachine which will require less labourand which can be operate with unskilled operator.
d. Time consumptions is less as compare to previous machines.

priority is given for strength and rigidity at the time or initial design. after installation and establishing successful working of the machine, it is proposed to concentrate on value is given only to design modification in bevel gear mechanism for the benefit of the small farmers, at present soil drilling machine is usedin different types of purposes with different types of mechanisms. Thus we can increase the value of the machine in future.

e. It is portable so we can carry this machine easily, high machinability.
f. It requires less human efforts, highstrength.

g. The progress is too much faster thanwith previously used machines.
h. Minor disturbance to the soils and limited occupational exposer.
i. **S**uitable for most ground conditions.
j. CONS

The fuel tank capacity is less so, the workingtime of the machine should be low

CONCLUSION

It is more efficient than the present existing machines of this category and range. This machine used in any type of soil In this machine we can vary depth of soil based upon our requirements. It is portable so we can easily transport it from on place to anotherplace. The mode of operation is very simple even to the payment is of low costcomparatively. It requires less human efforts It has high efficiency than the previously existed machines. After comparing the soil drilling.

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