IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Review Paper on Earth Auger Machine

Dr.B.Vijaya Kumar, K Shivaji, Md Wajeed Ali, N Srinivasulu, P Pavan

Department of Mechanical Engineering

Gurunanak Institute of Technology, JNTUH, Hyderabad, India

Abstract-This research discusses about the design and development of an Earth Auger machine for plantation of Horticulture crop. Now the approach of this project is to develop the battery powered Soil digging machine which is to minimize the working cost and the time for the digging as well as operate on clean energy. Helical blade arrangements are presented with the potential for removing soil from earth to scale back plantation time. Design and Ansys of the machine is done and as per the results fabrication is done using Lithium Ion battery.

Keyword- Post hole digger, Earth auger

I .INTRODUCTION

Production of agriculture is one of the mostly discussed problems as a significant part of our population. Agriculture plays a pivotal role in Indian economy. We have inequalities of poverty and unemployment in health, education and agricultural sectors. Small scale farming which is the subject of this paper is important for increasing the growth in agriculture and food security. It may be noted that Indian agriculture is home to small and marginal farmers[80 percent] , Agriculture census shows that in India there are about 121 million farmers, about 99 million are small farmers. Here the main purpose of this project is to reduce farmer's work and time consumption.

The soil digging machine which is used for the plantation of small plants or crops. This machine uses the principle of Auger drilling machine which is employed in pile foundation during construction. The machine is formed automatic by employing a D.C motor which is an influence source for digging the soil. The motor can be rotated both in clockwise and anticlockwise directions. This makes the auger to drill hole in the soil return back to its original position. This machine is meant for a preliminary aim of avoiding the utilization of shovels & levers in plantation of saplings thereby enhancing the plantation process by making it facile.

Auger Drilling

Auger drilling can be a form of drilling using an outsized helical shaped screw to remove material from the ground. The auger drilling bit screws into the soil and material is automatically moved up. Today many types of augers are available in the market. Typically large powered augers are used in the farming, building, and utility industries.such auger drilling machines are widely used to drill holes under highways for fence posts, utility poles and large drainage pipes. Some of these augers are large and cumbersome to operate.

II .LITERATURE SURVEY

Amle Kishore E.,Lohote Shiram T., Ghule Vaibhav M.,Bahirat Sagar S. ,Jahind Polytechnic, India, Tractor Operated Auger, IJSRD – In this paper Journal it describes about the methodology used for the manufacturing of Auger machine and material and used for the manufacture. It also describes about the design of auger which includes the calculations like power, torque required, determination of shaft diameter based on strength, resistance to twisting method, transimission of torque approach. In this regard, the project's main objective is to meet the needs of small scale farmers, reduce operating time and manufacturing costs.

Vaibhav Shinde, Akshata Goankar, Mayuri Gavankar, Siddhnath Shetkar, Prof. M.T.Sawant., S.S.P.M college of engineering, Kankavli, Solar Powered Soil Digging Machine, IJTRE- this journal describes about the problems faced by the farmers using agriculture tools. It tells that before the auger machine was used with the help of petrol powered engine which burdens the farmers with the increasing price of the petrol. So the main objective is, therefore, to replace the petrol engine with the rechargeable electric battery and also to reduce the cost of the machine used to dig planting holes.

Zong Wangyuan, Wang Jingliang, Huang Xiaomao, Yu Dong, Zhao Yingbiao, Sean Graham, Iowa State University, USA, Development of a mobile operated hole digger for cultivation using a slider-wrench feed mechanism, J-Agric-&-Bio Eng-

This journal describes about the Design of the powered hole diggers using slider crank feed mechanism in which it shows the calculation of the overall length and overall structure of the powered hole digger and power consumption test and data analysis. This journal describes about the problem faced by the farmers to handle it throughout the operation and it is solved by making an application through which it is operated through mobile.

Suyog Thakare ,P. R. Pote (Patil) College of engineering, Amravati, India, Research on design and manufacture of a machine to drill holes for tree planting, IJAITE- This journal deals about the different hole drilling methods and tree planters and machine design and its components and applications of the earth drilling machine.

Journal of Material Science Springer- The Journal of Materials Science issues articles which report original research results on study techniques, the relation between structure, processing, and material behavior. Topics include metals, electrical and electronic materials, composite materials, ceramics, fibers, polymers, nano-structured materials, for applications within the bioscience. Papers are chosen for highest quality and wide interest of the materials community. The Journal of Material science is now strongly established since scientists studying the structure and properties of all materials are leading source of basic communication. After going through this article the material we are going to use is mild steel and high carbon steel which has material properties as follows Carbon steels that can undergo heat-treatment have a carbon content within the range of 0.30-1.70 percent by weight. Trace impurities of other diverse components can have a great impact on resulting steel quality. In particular, trace amounts of sulfur makes the steel red-hot, that is, brittle at working temperatures, and crumbly. Low alloy steels, such as grade A36, contains about 0.05 percent sulfur and melts about 1,426–1,538 °C. Manganese is typically added to make low-carbon steels more hardenable. Such additions render the fabric into a low-alloy steel by certain standards, but the concept of steel by AISI requires up to 1.65 percent manganese by mass. And Steel consists of carbon and iron, with iron far more than carbon. In addition, steel can have around 2.1 percent carbon. Mild steel is one among the generally used building materials. Mild steel is extremely strong because of the low carbon content in it. For strength is a complicated term in material science. Mild steel has high break resistance. As opposed to high carbon steels, mild steel is kind of malleable, even when cold.this mean it is having high tensile strength and resistance to impact.

Zhai Haizhou, Lithium ion battery system to charging/ Discharging characteristics supported circuit model, International Journal on Online and Biomedical Engineering., This paper describes the theory and features of lithium-ion charging or discharging. It is because the study objects picked Lithium-ion batteries with LiyMn2O4 and LixC6 positive and negative materials. A mathematical model is formed to simulate Lithium-ion battery electrochemical behavior. It is known that the electro-chemical cell model is stated, and therefore the one help of the RC cell model. The case of voltage, current, temperature, SOC and thus the charging/discharging characteristics were investigated. The model is complex and it throws back the battery output's transient state. This is a part of a experimental setup employed to test power grid of an electrical or hybrid vehicle simulating the storage of electrochemical energy. This gives the results as follows The circuit model of lithium ion battery was established by using the second - order RC circuit model, and the battery was simulated dynamically. Through the parameter setting, this model can carry on the simulation research in the complex situation. The current, open circuit voltage, SOC state and battery temperature change of the battery under different charge and discharge are studied. This simulation model is helpful for the optimization and design of lithium ion batteries. It is because the research objects that Lithium-ion batteries with positive and negative materials of LiyMn2O4 and LixC6 were selected.

Adithya Nigam, Sandeep Jain, department of Mechanical Engineering, Samrat Ashok Engineering College, India, Modelling and Structural Analysis of Planetary Geared Winch – IJSR., In this journal design and Finite Element Analysis Planetary geared Winch is done and is described in a detailed manner. After going through this journal we decided to adopt Planetary gear motor for Earth Auger Machine. Because a planetary gearbox refers to a gear system that rotates around a central 'sun' gear in one or more 'earth' gear. In general, the input torque powers a planet carrier, which rotates the planets around a hard outer ring. It drives the gear which then provides a torque for the output. There are examples of the opposite variations, however, such as the gear being set, and therefore the ring supplying torque for output. The actual benefit of planetary gearbox is its efficiencies in high power transmission. This will typically only be around 3 percent per stage. However, given the compact design, the high efficiency is delivered which gives a large torque to size to weight ratio. Some of this is often because of the load sharing that happens across the multiple planar net gears

R.K Agarwal, Yogendra Pandey, Dr. Sandeep Jain, Yadaorao Tasgaonkar College of Engineering, Mumbai, Dapoli, India, Modeling and Finite Element Analysis of Post Hole Digger, IJSRD- this journal deals about the Finite Element Analysis done on the Post Hole digger. The earth auger is analyzed for static load, fatigue load and tensile load analysis. Based on the results of the FEA the manufacture of the earth auger is done.

Solidworks 2018 review: Something for Everyone- Digital engineering 24/7, this article gives the review of Solidworks 2018 which helped us to choose a software. Solidworks is a 3D modeling Software operates primarily on Microsoft Systems. Published by Dassault Systems.

Fig: Generally used Petrol powered Earth Auger Machine

III .DISCUSSION

Based on the literature reviews above the problems encountered are the machine's cost and its maintenance because e the machine is very costly and it runs on petrol engine which increases its running cost and its maintenance cost. And the operating of the machine is difficult which increases the labour expenses. One of the problem encountered is its transportation because of its weight its handling is very difficult and it also produce lot of dust which may cause health issues to the workers. Going through all the problems the solution for the problems is discovered in our project by replacing the petrol engine with the rechargeable battery which reduces the weight and machine's cost and also it is easily operated which saves the farmers hard earned money in labour expenses. Our main focus is to reduce the machine's cost to make it affordable to the small scale farmers. Keeping these points as a note manufacture of the earth auger is done.

We also know that petrol is non renewable energy and is decreasing day by day and the Indian government also proposed a plan which states that by the year 2030 Indian roads will be having a large amount of electric vehicles to reduce environment pollution. So we are feeling very honored by coming up with a project working on electric motors which has no environment pollution.

REFERENCES

1. www.Wikipedia.com
2. Chang-Hyun Choi. 2013, "Effects of gear selection of an agricultural tractor during rotary tillage on transmission and PTO load"
3. Jaren.C 2006, "design calculations on Roll-over protective strictures for agricultural tractors"
4. Robert D. Cook; "Concepts and application of Finite element analysis"
5. R.L.Norton; "machine design an integrated approach"
6. Joseph Sighley.: Theory of Machine and Mechanism"
7. Anonymous, (2018b). "Guven Machine Auger Boring Machine"
8. Ebrahimia, R., Mirdamadib, H. R., Ziaei-Radb, S. (2018). "Operational modal study and calculation of the life span of a chisel plow arm under spontaneous excitations caused by soil"
9. Erdogan, D. (2012). "Agricultural Machinery. Ankara University"
10. Gautam, A. K., Shrivastava, A., Samaiya, R. K., Jha, A. (2018). "Design and development of tractor drawn seed cum pressurized aqueous fertilizer drill"
11. Journals of Material Science, Springer
12. http://www.igidr.ac.in/pdf/publication/WP-2012-014.pdf
13. Modelling and Structural Analysis of Planetary Geared Winch, International Journal of Science and Research (IJSR)
14. K. Shionuma, M. Yokokawa, T. Nagaura, "Characteristics of lithium ion rechargeable battery", *Proc. Abstracts 32nd Battery Symp.*, vol. 1B3, pp. 33-34, Sep. 1991
15. Lithium ion battery system to charging/ Discharging characteristics supported circuit model, International Journal on Online and Biomedical Engineering.
16. Digital Engineering 24/7, Solidworks 2018 Review
17. Cannon H N, Stoker C R, Dunagan S E, et al. MARTE: Technology development and lessons learnt from a simulation of the Mars drilling mission [J]. Journal of Field Robotics, 2007