DESIGN, DEVELOPMENT AND SIMULATION OF ABRASIVE SIEVING MACHINE

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ABSTRACT: The existing sieving machine in the market is based on single layer filtration.The idea to develop of sieve machine is come from the supervisor that gives a task and a title for this project. This project focuses in design, fabrication of the mechanical part of machine and the system of the sieve machine. To achieve the objective of project we made the new innovation of the sieving machine which is totally different than all existing machine . In our project the machine will be able to Sieve the material in three different layer with the same efforts of the energy and less time required .

The machine is generally works on the vibration produced by the rotation of cranks and connecting link. We made the machine in such way that it is able to generate three different types and size of sieve . In the machine fitting the larger size of sieve will be at the top position , medium at the middle and smallest will be at the bottom position . By using this system we can separate all types of sieve at inclined postilion .

Key Word: Sieves , Vibration , Crank , Links

1. INTRODUCTION : The prime focus of the study of Sieving Machine integrates various skills and knowledge attainment and gives orientation towards application in practical life. It helps in intensifying the thinking and alternatives for potential applications. [3] Sieving is a uncomplicated practice for sorting out the particles of different sizes. A sieve or a riddle is mechanical vibrating element used for extrication the needed elements from unwanted material further it is used for characteristic the element to the required size by the allocation of a sample. [1] Using a pane such as a mesh or net. Sifter is used to separate and to break up clumps in the dry ingredient particles like sand and flour.

A very fine small holes used in this sieve for sift flour core.[7] The fine Coarse particle are separated or broken up by grind against one-another and screen openings. Different types of sieves are used for the separation of industrial wastage like bolts, nuts washers and nails of various particle sizes of the holes. Similar types of sieves are used for agricultural equipment.[2] Vibration table is plays on important role in today's mechanical field. Companies where mass manufacture of nuts is done different sixes of nuts can be separated without difficulty. The project can be comprehensive to continue separation of different sizes of nuts by involving series of mesh.[5] Materials used in the preparation of the foundry molding compounds (sands, clays, betonies, mixtures reused) are presented in the form of masses of granules of various shapes and sizes, which cannot be used as in the preparation of such mixtures. [8] The par tickle size of materials used in various types of training or mixture score is important, so is necessary to achieve a sieve (mechanical sorting) to a known particle size.[9] There are dependencies between functional and constructive parame ters of sieves performances and a program using Matlab software, which clearly shows the dependence between them.[10] It is developed a program based on experimental data subject to problems bolting regression analysis in which the yield is represented as a function of two dependent random variables (speed and angle tilt rotor shaft / rotor speed and power flow rotor / rotor tilt angle and flow supply)

2. HISTORY OF SIEVE MACHINE: From years sand has been the most important thing in human community. Most sediment, including sand, are made up of the fragments that result when rock is broken down by wind and rain (weathering). Generally, they start as larger fragments (gravel), which are broken down as rivers carry them down stream; the finer the particle, the further it has traveled. In other words, large bits of gravel are plentiful on the banks close to the head of a river. As you travel down stream, gravel becomes finer into cobble, pebble, granule, and eventually turning into sand, and finally flowing into the ocean, where these sediments deposit.

3. COMPONENTS AND MATERIAL USED :

(1) **Crank:** The primary electric motor is connected to the crank wheel externally and as a result, when the motor rotates on its axis, correspondingly the crank also rotates. The rotary motion of the crank wheel is converted into a translating motion of the sieve net by a means of a connecting rod.
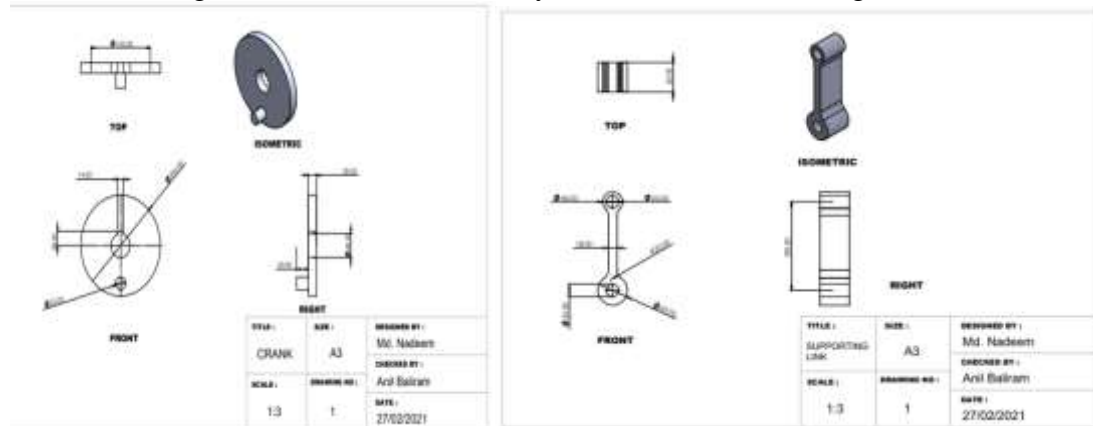

Figure 01 Details components Crank and links

(2) **Supporting link 01:** Sieving separates dust from the powder. Powder which could have compacted during recovery or transport is once again distributed into distinct fine particles.
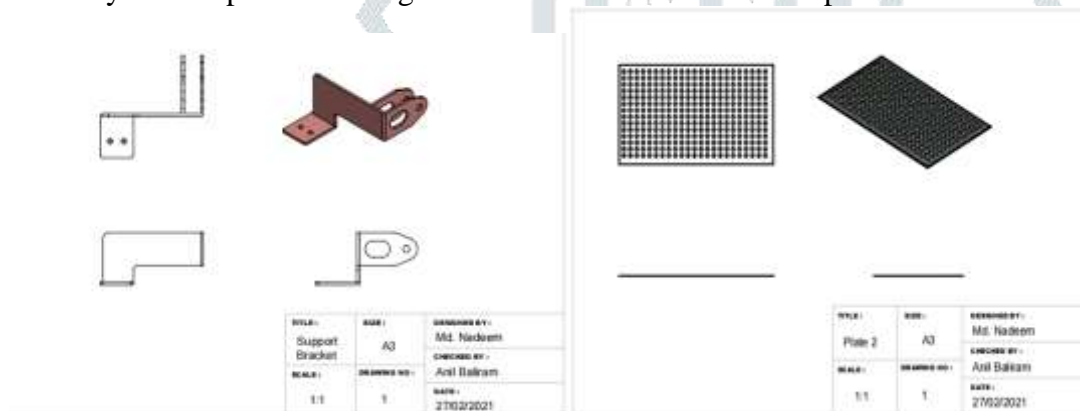

Figure 02 details of assembly device

(3) SUPPORT BRACKETS
(4) BASE FRAME NUT
(5) Frame
(6) BOLTS 18 mm.

(4) METHDOLOGY:

The following steps is to be followed
a) The mass of an empty container (mc) was measured and recorded.
b) The container was filled with garri and the mass (mcg), was recorded. Thus the mass of garri m, in the container is the difference between mcg and mc.
c) Garri of mass m was poured into the sieve housing for sieving.
d) The sieving process is allowed for a particular time and the amount of garri sieved is measured and recorded.
e) The average sieving rate in kg/min was determined and recorded.
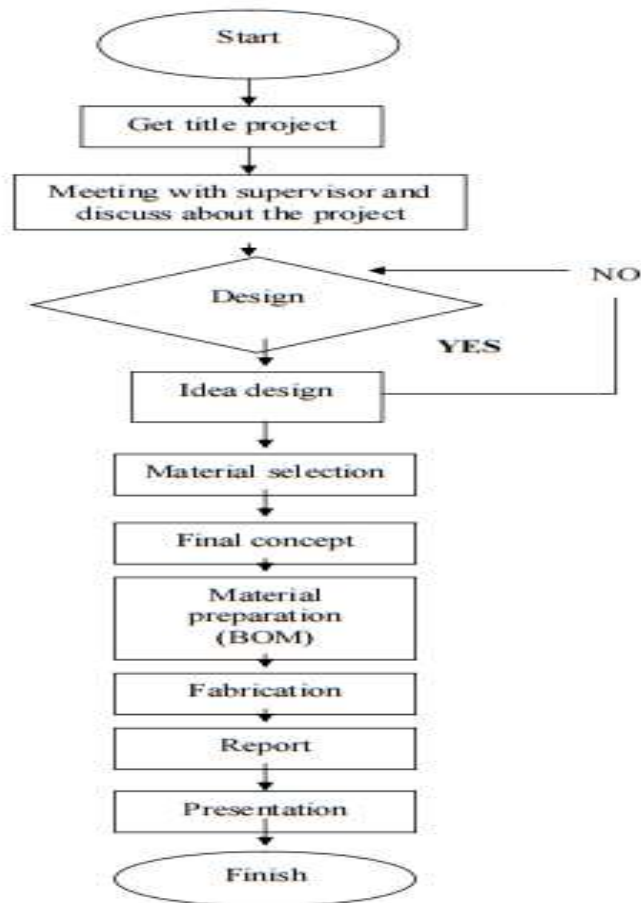f) The average sieving efficiency in % was determined and recorded.

Figure 03 Flow chart of methodology

(5) RESULT AND DISCUSSION:

The design consideration must be done carefully so that the design can be fabricate easily and the system functioning. Then the material used in each design influence the selection thing because absolutely we need a lightweight material suitable with product size. The design is separated into three phases, firstly choose as many proposed design can be produce then choose 4 designs and try to improve it functionality and the last one is a new design with detail thing including dimension by using Solid Work software.
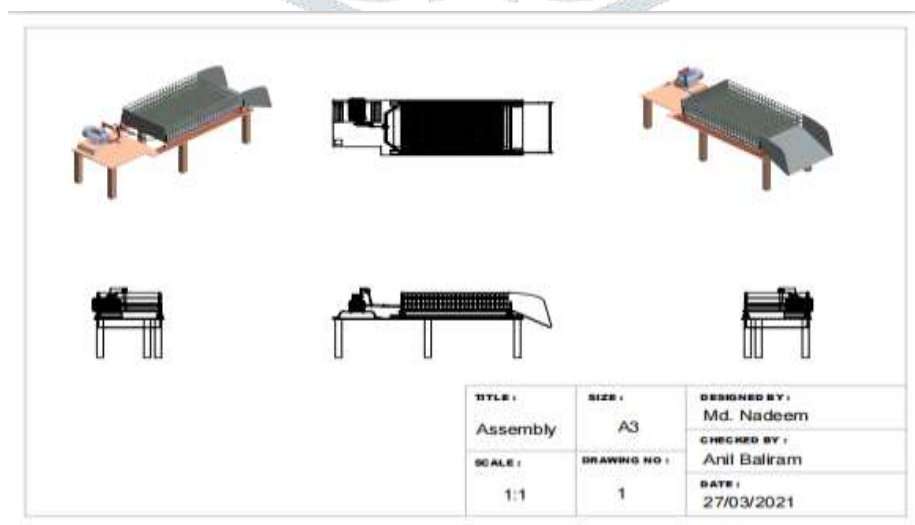

Figure 04 Final layout and cross section of Machine

(6) CONCLUSION:

The project can be comprehensive to continue separation of different sizes of nuts by involving series of mesh. Through this project one can get rid of manual separation which is time consuming. The project can be implemented all other types of separation of combination with the involvement of different types of mesh. After careful review of literature it was found that no specific solution to separate different sizes of grains are not available. The main conclusions are Improves the quality of grains, reduce human effort, save the time and money, It can be better used for small industry.

(7) REFERENCES:

[1] Hillocks, R., 2002. „Cassava in Africa in R. Hillocks, J.Tresh, and A.C. Belloti eds., Cassava Biology, Production and Utilization CABI Publishing.

[2] Odigboh, E.U. and Ahmed S.F., 1984. „A machine for Pulverizing and Sifting Garri Mash" NIJOTECH Vol. 8 No. 1 Pp 19 – 23.

[3] Ogunleye, O.O., 2003. „Design and Fabrication of Garri Sieving Machine". An Unpublished B.Eng. Thesis Submitted to the

Department of Mechanical Engineering, University of Ado – Ekiti, Ekiti State, Nigeria.

[4] Fayose, F.T., 2008. „The Development of a Multipurpose Wet Food Sieving Machine. Agricultural Engineering International: The CIGR Ejournal, ManuscriptFP 08 006. Pp 1- 9.

[5] Abdukadir B.H., 2012 ;Design and Fabrication of Cassava peeling machine". IOSR Journal of Engineering, ISSN: 2250 – 3021 Vol. 2. Pp 1 – 8.

[6] Adetunji, O.R., Dairo, O.U., Aina, T., and Osunlana, A.S., 2013. „Development of an Improved Garri Sifting Machine". The Pacific Journal of Science and Technology Vol. 14, No. 2. Pp 54 – 61.

[7] Olawale J.O., Abdukadir, B.H., Abubakar, M., Alhaji A.A.and Dele, S.J., 2014. „The Design of a Pedal Driven Pulverizing and Sieving Machine for Dewatered Grated Cassava". International Journal of Scientific and Research Publications, Vol. 4, Issue 4 ISSN 2250 – 3153. Pp 1 – 5.

[8] Sharma, P.C. and Aggarwal, D.K. 2007."Machine Design S.I. Units, S.K. Kataria & Sons, Delhi, India. Pp 667 – 669.

[9] Gupta, J.K. and Khurmi, R.S., 2005, A Textbook of Machine Design, 14th Edition, S. Chand Co. ltd., New Delhi. Pp 726 – 758.

[10] Ramjet Sharma, Ankit Singh, Saurabh Singh, SharvanShukla,Sharique Hayat "Fabrication of Sand Sieving Machine" International Journal of Scientific Research and Review (Volume 07, Issue 03, March 2019)