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DESIGN AND FABRICATION OF RAW MATERIAL PURIFYING SYSTEM FOR MANUFACTURING OF PVC PIPES

Prof. R. S. Yadav,[1] Arjun Mane[2], Rohit Vadgave[3], Shubham Mane[4], Makarand Patil[5], Gagan Patil[6]

[1]*Assistant Professor Mechanical Engg. Dept.,*
Nanasaheb Mahadik College of Engineering,Peth,(India)
[2,3,4,5,6]*Students Mechanical Engineering,*
Nanasaheb Mahadik College of Engineering,Peth.,(India)

ABSTRACT

For manufacturing of PVC pipes crushed scrap pvc pipes were used as raw material. These crushed pipe pieces contains different types of impurities like soil particles, metal screws, iron particles etc. Which causes the defects in manufacturing of pipes, so to to remove impurities this purifying system is designed . By purifying the raw material of PVC pipes all the impurities are removed and pure raw material is supply to the furnaces for making the PVC pipes. Impure raw material causes blockage of the strainer which supply the molten material to the extrusion dies to manufacture a pipe also due to impurities some defects are occurred in the manufactured pipe such as porous holes and cracks again once blockage of a strainer occurs it takes much time to replace the strainer and to obtained the pipe in proper quality. To prevent the blockage of the strainer chamber from impurities and to get the continuous pipe without any hole or fracture it is necessary to construct a device which can separate the impurities present in raw materials initially before it is supplied to the furnace also such device can save lot of efforts of worker, money, and also production time. So the project work is to design and manufacture the sieve mechanism which can separate course particles, big lumps or unwanted materials or impurities from raw material before it is to be supplied to furnace. The siever mechanism is designed & manufactured consist of three sieves of different gauges which removes all the impurities from raw material. The mechanism is electric motor driven increases the purification rate with large amount.

Keywords : PVC Raw Material, Extrusion, Impurities in raw material , Defects in pipe, Sieve mechanism, etc.

I.INTRODUCTION

The PVC pipe is manufactured by tubular extrusion. Extrusion is a manufacturing process in which a molten material is enclosed in container is forced to flow through the opening of dies. For PVC pipes manufacturing the raw material used is crushed scraped PVC pipe pieces which is first melted and then extruded. This raw

material contains impurities such as sand & dust particles, metal pieces etc. If these particles are remains there with raw material then during the extrusion process the pipes manufactured are facing the defects like improper sizes, forming holes, porous holes, cracks etc. Such problem is experienced by one of the PVC pipe manufacturing industry in Islampur MIDC area.

To solve the above problem we have designed a system which can remove the impurities from the raw material before supplying it to the furnace which reduces the defects in pipe extrusion. Also existing purification method is manual purification which consists of a single sieve and lot of human efforts are required to clean the raw material. Again the quality of cleaned raw material is also low. The mechanism which we have designed is consist of three different sieves so that all the impurities can be removed also the provision of magnetic inspection removes all the metal particles if remains any. Also the amount of raw material purified is very large as compare to manual purification within much less time.

Fig. 1 available raw material.

II. DESIGN CONCEPT

The design of multistage sieving system is done carefully so that sieving mechanism can be fabricated easily and the system can be functioning properly. The different sizes of raw material servers are available in market. If multistage vibrator is used, there is more vibration in the system. Due to these reason the system becomes noisy. Proper balancing of shaft, pulleys, bearings are required. The material used for each components is to be light weight and suitable with product size. Besides these the cost of design and fabrication must reasonable and should not exceed the budget and try to reduce waste. The criteria that must be considered while designing the system contains durability and cost etc

III. PROPOSED MODEL

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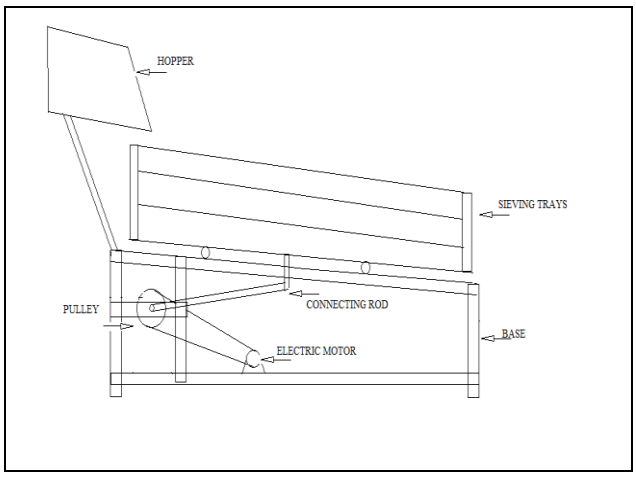

Fig. 2 proposed model

IV. REQUIRED COMPONENTS

1. Sieving trays: Four sieving trays are manufactured with different mesh sizes as shown in fig.2
2. Base: Base is fabricated using 2"L channels
3. Shaft: 37" two shafts are used having diameter 1.25" and 1 shaft of diameter 1".
4. Bearings: Four 6206 no.SKF bearings, two TNTN P205 no. bearings.
5. Pulley: 8" diameter .
6. Motor: 3 phase,1 HP.
7. Hopper

V. FABRICATION OF SYSTEM

First step of fabrication of system is to form a rigid base, further forming a sieving trays then making assembly of trays, fitting axle and bearings and then creating a drive mechanism, fitting the hopper. All joining process is done by arc welding.

Fig. 3 assembly of four trays, bearings, axles, outlet sections.

Fig. 4 sieve mechanism

VI. WORKING OF THE SYSTEM

The multistage sieving system is very easy to operate .The electric motor transmit power to pulley, the pulley is connected to shaft containing crank which is connected to sieving trays with the help of connecting rod. When motor is started the plastic raw material is poured into hopper it gets down into first level of sieving tray and get sorted into different sizes as it get travels into different levels.

VII. CONCLUSION

In this study the impurities present in raw material of PVC pipes are completely removed .The prime objective of improving production of PVC pipes mfg company without impurities is satisfied. By using this system we can separate different sizes of raw material in less time and at cheaper cost. Thus production rate is improved. It is important that design satisfies all functional requirements…

REFERENCES

[1].A.K.Nachimutu, S.Ragunath, SMohanavelan , P. PNabhan, S.Mariraj. Design and Fabrication of Horizental Sieving Machine, *International Research Journal of Multidisciplinary Science and Technology. 01(02) 2016, 17-20.*

[2].Salunkhe Prashant, Saurabh Naik, Sagar Sonawane,Vedanti Deore, Dinesh Bhadane.Study and Design of Multilevel Vibration Screening Machine. *International Conference on Emerging Trends in Engineering and Management Research. 07(05)* 2016, 618-623.

[3] Abhinav Gautam, K.Priyaajit. Static stress analysis of connecting rod using finite element approach. *Isro journal of mechanical and civil engineering, 01,2013,47-51.*

[4] Jillavenkatesa, A; dakpunas, Particle size characterization, . *NIST, 960-1,2001,*

[5] Ujam, A. j. and Enebe, K. O., Experimental analysis of particle size distribution using electromagnetic sieve, *American journal of Engineering research, 02(10) ,2013, 77-85.*