



A REVIEW ON DESIGN & FABRICATION OF CAM & FOLLOWER OPERATED MULTI-LEVEL VIBRATING SCREENING MACHINE

¹Kale Sanket A., ²Kale Rushikesh., ³Kambre Vishal S, ⁴Deshmukh Karan K.,
⁵Baravkar P.S.

¹UG Scholar, Mechanical Engg. Dept. S.N.D. C.O.E.& R.C. Yeola- Nashik Maharashtra

²UG Scholar, Mechanical Engg. Dept. S.N.D. C.O.E.& R.C. Yeola- Nashik Maharashtra

³UG Scholar, Mechanical Engg. Dept. S.N.D. C.O.E.& R.C. Yeola- Nashik Maharashtra

⁴UG Scholar, Mechanical Engg. Dept. S.N.D. C.O.E.& R.C. Yeola- Nashik Maharashtra

⁵Asst. Prof., Mechanical Engg. Dept. S.N.D. C.O.E.& R.C. Yeola- Nashik Maharashtra

paithankarnitin211@gmail.com

ABSTRACT:-This paper includes use of operated on cam as well as follower multi-level vibrating screening machine. Cam and supporter is utilized to give responding movement for screens. For the most part in vibrating machine just one screen is utilized, however in this wonder multiple screens are utilized for working on the presentation. it comprise of main player that initiates vibrations ,with the assistance of cam and adherent by utilizing the screen media particle is isolated vibratory screens This framework generally valuable for mining, food ,horticulture ventures to partition of different size of material. The unique type of product having large verities and hence required different grades of powder. This system basically designed for mechanical strength, and powder specimen. This system is also used for coal industries for dewatering of coal and sorting purpose.

Key words:- screen, powder, vibrations, material, cam, grades.

I. INTRODUCTION

Different type of material in powder form or in solid form is separated by using multiple vibrating screening machine. In mining industry chemical companies food industries and construction firm is the screens to help independent and clean the thing or metallurgical parts. Crafted by couple of individuals should be possible in an extremely less time by utilizing screening machine Screening machine is comprised of strong material like gentle steel having high strength. It has two opening sides for checking the progressively improving of the screen.

Some vibrating screening machine having staggered with at least two levels of screen placed. to separate different size of components. The screens are made up of the wire mesh and come in various grit sizes vibrating screening machine. The component which is greater in size they stay on top layer of vibrating screen. The little of components fall on second screen and lesser size of components falls on third screen. Thus the different sizes of components are separated with the help of screens. There is of course a wide range of purpose for the multi-screening. the main purpose in mining industries there are different types of vibrating screens, but in this type inclined The various size of coal, coffee powder, sand are separated by using cam and follower operated multi-level are used.

A. 1.1 Vibrating Screens And There Type

- 1 Circular Vibrating Screen
- 2 Drum Type Screen
- 3 Rotary Vibrating Screen

1.1.1 Circular Vibrating Screen: Circular Vibrating Screen is a kind of screening equipment mostly used in the industries like mining, construction, building materials, water conservancy and hydropower, road, railway, chemical industry, and so on. Improve your product purity and avoided oversized material from your powders and liquids. Eliminate dust and fumes Enclosed screening means total containment. It's having lowers noise levels. A solid rubber suspension gives the machine a quiet operation.

1.1.2 Drum Type Screen: The drum screen is made up mainly by the motor, reducer, roller device, and rack, closures, expected out of the mouth. The drum unit is mounted on a rack aslope. Motor and the drum means is connected through a gear unit and via a coupling, drive roller means is rotated about its axis. When the material into the drum assembly, since the inclination and rotation of the drum assembly, so that the flip and scroll of the screen surface material. Selected materials discharged by the discharge port of the rear of the drum at the bottom, substandard materials are discharged through the discharge opening of the drum tail. As the material within the drum of the flip, scroll, so that the block material can be ejected, to prevent the screen closed.

1.1.3 Rotary Vibrating Screen: Rotary vibrating screen is a kind of high efficiency sieving machine for screening any powder or particle material in many industries.

II. LITERATURE SURVEY

M. Majumder & P Ghosh 2015[1] described that finite element analysis of vibration screening techniques using EPS geo foam. The application of continuous geo foam filled barriers as vibration screening material. The numerical analysis is performed by using two-dimensional finite element method under dynamic condition considering vertically oscillated strip footing as a dynamic source. The present analysis considers the foundation bed as linearly elastic, isotropic, homogeneous and non homogeneous soil deposit. The vertical displacement amplitudes of



ground vibrations are measured at different pick-up points along the ground surface to determine the amplitude reduction factor, which is considered as a measure of the screening efficiency. The present finite element analysis explores the usefulness of vibration screening technique using continuous geo foam. The effect of different parameters such as strength, width, depth, inclination, location, frequency of excitation and soil stiffness on the amplitude reduction factor (ARF) is analyzed critically.

Dr. Bhavesh Patel 2013[2] carried out a research on Design of Vibratory Screen used in Coal Mining Industry to Prevent Failure has done experiments on the design of the vibratory screen used in coal mining industry. As per the design of the existing vibratory screen, the life of the vibratory screen is more than eight month but it can be failed within half of its designed life two. In the first proposed design, to reduce the bending stresses within the limiting value the height is changed. Whereas in second proposed design, design is made safer by changing the support height.

Zhao Yue-min 2009 [3] et al carried out a research on Dynamic design theory and application of large vibrating screen. Dynamic characteristic of the vibrating screen was researched and dynamic simulation method of large screening machines was explored. They used finite element method (FEM) to analyze dynamic characteristic of large vibrating screen with hyper static net-beam structure. Multi natural frequency, natural modes of vibration and dynamic response of the vibrating screen were calculated. The finite element method is an important method and necessary process in the dynamic design process of vibrating screen. Using FEM to analyze structural characteristic can help the designers realize dynamic characteristic of vibrating screen and make dynamic modification of the structure.

III. DESIGN & CALCULATION

1) SELECTION OF MOTOR

Single phase ac motor power = 0.5hp=375 watt speed= 01440 rpm (variable)

Motor torque

$$P = 2 \pi N T / 60$$

$$T = (60 \times 375) / (2 \pi \times 1440) \quad T = 2.4867 \text{ N-m}$$

Calculations are based on the top speed of the motor.

Diameter of motor pulley = 60 mm



Diameter of output shaft pulley = 120 mm

Reduction ratio = 2

Speed of Input shaft pulley = $1440/2 = 720$ rpm

3) SHAFT DESIGN. (ASME CODE)

Since in connected machinery forces on most of the shafts are not constant, it is necessary to make proper allowance for reduce the baneful effects of load fluctuations. According to ASME code allowable values of shear stress may be calculated from various relations. For commercial steel shaft,

Actual shear stress $\tau_{act} = 41$ N/mm²

$$\tau_{act} = \frac{16 \times T}{\pi \times d^3}$$
$$41 = \frac{16 \times 36449.1}{\pi \times d^3}$$

$d = 12.948$ mm $d = 13$ mm Assume $d = 20$ mm. Ref: - PSG Design data book

BALL BEARING DESIGN.

While considering of mounting of ball bearing. As shaft diameter is 20 mm to it & selected a pedestal ball bearing having shaft outer dia-20mm ball bearing to support the shaft of 20mm.

DESIGN OF RADIAL CAM WITH FOLLOWER

Least radius of cam 20 mm

Ascent lift 20 mm

$N_1 =$ speed of motor shaft = 1440 rpm

$N_2 =$ speed of shaft pulley = 720 rpm

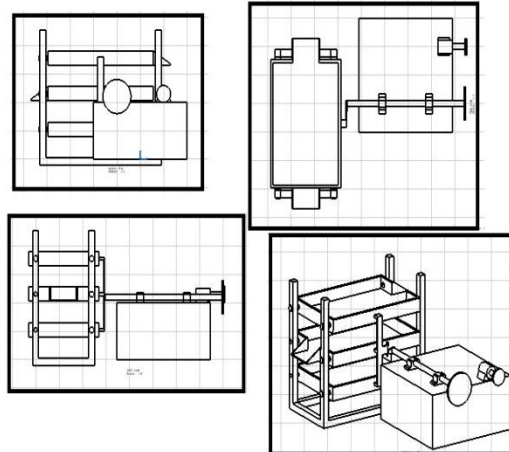
$D_1 =$ diameter of motor pulley = 60 mm

$D_2 =$ diameter of shaft pulley = 120 mm

$$\frac{N1}{N2} = \frac{d2}{d1} \qquad \frac{1440}{N2} = \frac{120}{60}$$

N2= 720

Speed of cam 720 rpm



IV. CONCLUSION

By utilizing this machine we can isolate the corn meal of various kinds just as size in less time and cost Machine utilizes a solitary vibrator is changed will be changed for all sizes of powders delivered which saves the machine cost.

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