

STUDY OF DESIGN OF MULTILEVEL VIBRATION SCREENING MACHINE

**Salunkhe Prashant¹, Saurabh Naik², Sagar Sonawane³,
Vedanti Deore⁴, Dinesh Bhadane⁵**

^{1,2,3,4} *B.E. Mechanical Scholar BVCOE & RI Nashik, Pune University*

⁵ *Assistant Professor Mechanical Dept. BVCOE & RI Nashik(India)*

ABSTRACT

Powder metallurgy is a new field with increasing popularity and productivity in the production of gears, sintered bushes and many other components. This is because of fact that this process need a low production cost and has a faster rate of production and so also it is easy to maintain the stringent quality requirements. The component product by this method has good strength to weight ratio and are also effective in cost. Powder metallurgy involves the use of metal powder which is fixed with suitable binders like cobalt and wax. This mixture is then compacted in the dies on power presses to give the desired shape of the components. This components are later sintered I the sintering furnace to give them necessary strength. The component product of large verity and hence required different grades of power. The components are basically designed for mechanical strength on the basis of the grit of powder i.e. the powder size. This powder size is always different for different application for which the component is to be put to use.

Keywords : Powder Metallurgy, Productivity, Metal Powder, Cobalt, Mechanical Strength

I. INTRODUCTION

In the present age of demanding productivity the conventional methods of production like machining are replaced by other non-conventional methods like production of components by powder metallurgy. Power metallurgy involves the use of metal power which is mixed with suitable binders like cobalt and wax. This mixture is then compacted in the dies on power presses to give the desired shape of the component. These components are later sintered in the sintering furnaces to give them the necessary strength. The components produced of a large variety and hence require different grades of powder. The components are basically designed for mechanical strength on basis of the grit of powder i.e., the powder size. This powder size is always different for different applications for which the component is to be to use. Our project is based on principle of working of cam. Radial cam is a type of cam in which follower oscillates perpendicular to the cam axis. When motor is started input shaft rotates; which rotates Cam shaft about the axis by the application of belt power transmission; thus the Cam which is connected to the shaft push the stopper at same time it is constrained by sliding pairs at the other end which are connected to the slider pin mounted on the central screen. This end which is connected to the slider causes the slider pin to reciprocate on the slide. The slider pin carries the strokes from bar mounted on the on one end. As the slider pin slides on the slider the Screens are oscillates by the Cam motion thereby imparting vibrations to the grit connected at the other end. The amplitude and frequency of

vibrations to the grit can vary by changing the speed of cam rotation speeds. Provision can be made to operate one or more grits simultaneously. Working principle of vibrating screen are Vibrating screen use motor vibration as excitation source, to throw the materials on the screen, While forward by linear motion, the material from the feeder uniform enter feed mouth of screen. Through multi-storey screen to produce different size product on the sieving or under the sieve, then discharge from their output opening. Normally use in production line after crushing.

1.1 Problem Statement

Following are the main important problems occurred during machining

- Frequency of vibration.
- Level of vibrators.
- Speed of motor.
- Size of screens.
- Selection of bearing and spring.

1.2 Objectives

Objectives of Project are:

- Single vibrator for all sizes of powders.
- Level of vibrator i.e. the grade to which vibrations are employed can be changed.
- Amplitude of strokes can be varied according to size of powder.
- Frequency of vibration i.e. the number of strokes per minute can also be varied.

1.3 Need of Development

- Perfect balancing and alignments is required for transmission system.
- High speed system creates more vibrating effects so heavy foundation is required to reduce excessive vibration.
- The process of separating different sizes of powder can also be varied.
- The number of strokes of vibration per minute can be varied which helps to apply desired vibration to the given grid this improves the quality of powder produced as well as the rate of production.

II. LITERATURE SURVEY

Working principle of vibrating screen are Vibrating screen use motor vibration as excitation source, to throw the materials on the screen, While forward by linear motion, the material from the feeder uniform enter feed mouth of screen. Through multi-storey screen to produce different size product on the sieving or under the sieve, then discharge from their output opening. Normally use in production line after crushing.

Types of Vibrating Screen:

- Circular Vibrating screen.
- Drum type Screen.
- Rotary Vibrating Screen.

Circular Vibrating Screen is a kind of screening equipment widely used in the industries such as mining, construction, building materials, water conservancy and hydropower, road, railway, chemical industry. The drum sieve 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 a slope. 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. Qualified materials (sieve products) 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 sieve clogged. Rotary vibrating screen is a kind of high efficiency sieving machine for screening any powder or particle material in many industries.

2.1 Common Problems and Remedies

As single vibrator is used for all three screens there is more vibration in the system. Due to these reason the system becomes noisy. For this purpose vibration isolators can be used to reduce the vibration .Proper balancing of shaft and bearing is required.

III. VISUAL DESIGN

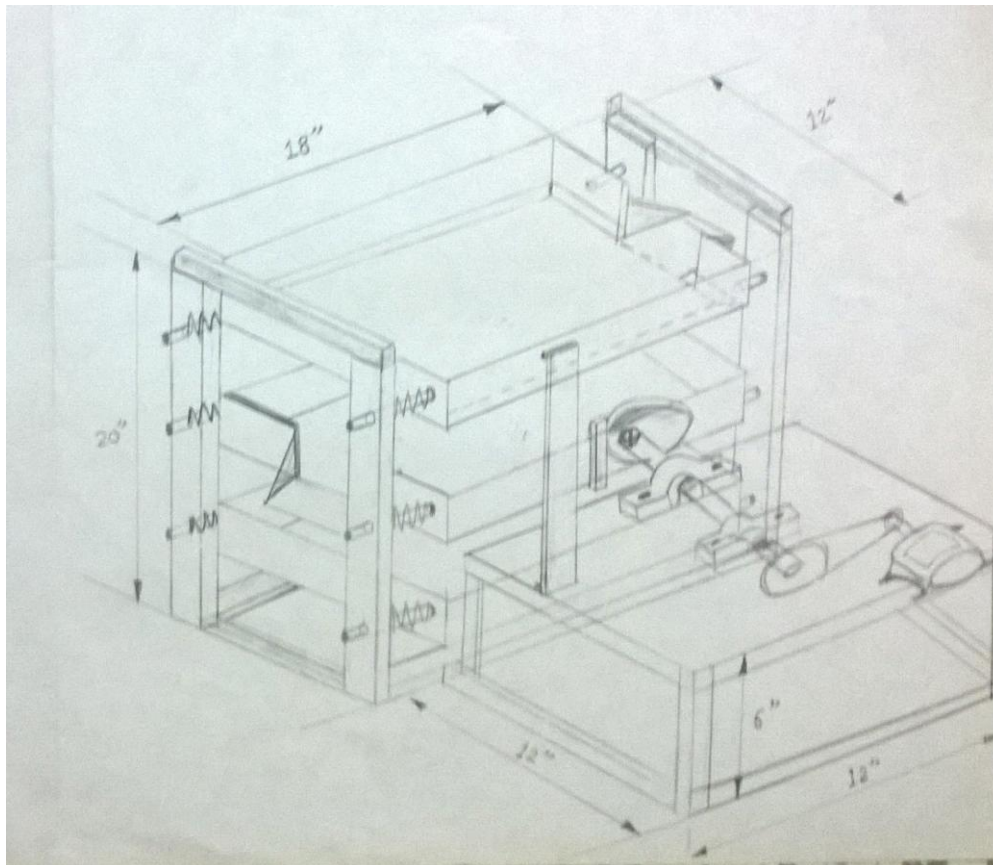


Fig 3.1 Visual Design of Multilevel Screening Machine

IV. METHODOLOGY

To achieve the objectives screening machine methodology is selected. when motor is started input shaft rotates; which rotates Cam shaft about the axis by the application of belt power transmission; thus the Cam which is connected to the shaft push the stopper at same time it is constrained by sliding pairs at the other end which are

connected to the slider pin mounted on the central screen. This end which is connected to the slider causes the slider pin to reciprocate on the slide. The slider pin carries the strokes from bar mounted on the on one end. As the slider pin slides on the slider the Screens are oscillates by the Cam motion thereby imparting vibrations to the grit connected at the other end. The amplitude and frequency of vibrations to the grit can vary by changing the speed of cam rotation speeds. Provision can be made to operate one or more grits simultaneously. Working principle of vibrating screen are Vibrating screen use motor vibration as excitation source, to throw the materials on the screen, While forward by linear motion, the material from the feeder uniform enter feed mouth of screen. Through multi-storey screen to produce different size product on the sieving or under the sieve, then discharge from their output opening. Normally use in production line after crushing.

V. EXISTING WORK

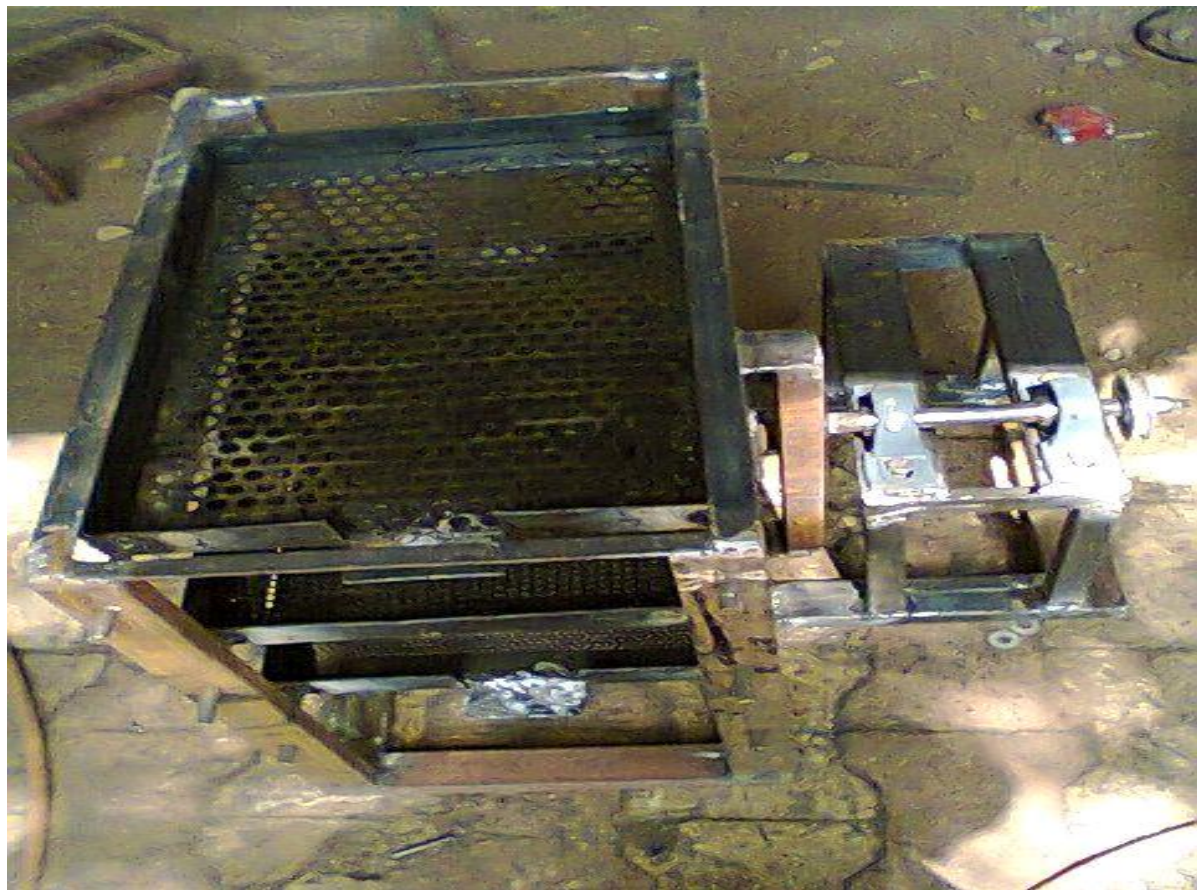


Fig. 5.1 Multilevel Screening Machine



Fig. 5.2 Screen 1



Fig. 5.3 Screen 2



Fig. 5.4 Screen 3



Fig. 5.5 Machine Set up

VI. CONCLUSION

Conclusion is drawn on the basis of the information collected on each aspect of our project . It leads to a belief that if applied will create an even better machine than we have designed. By using this machine we can separate the grits of different types as well as size in less time & at cheaper cost. Machine uses a single vibrator is changed for all sizes of powders produced; which saves the machine cost considerably. The level of vibrations is changed in the machine which enables to vibrate the grits placed at different level one by one or at the same time. The amplitude of vibration or the frequency i.e. the number of stroke of vibration per minute can be varied which helps to apply desired vibration to the given grit; this improves the quality of powder produced as well as

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the rate of production. Machine is compact hence occupies less space as compare to the conventional machines. By also knowing the material selection a cost benefit analysis could be conducted to determine how cost effective is. It is important that the design satisfies all of the functional requirements and design parameters which were outlined at the start of the project.

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