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Vibro Finishing Machine

Krupal Bharadwa[1]

[1]Department of Mechanical Engineering
[1]Lukhdhirji Engineering College, Morbi, India

Abstract: ***Vibrotary Finishing, Also Known As Mass Finishing, Is A Mechanical/Chemical Process For The Deburring, Radiusing, Smoothing, Polishing And Degreasing Of Individual, Mass Produced Oarts. Mass Finishing is the process of parts being submerged in media and compounded (specially treated water) within a vibratory finishing machine. The machine vibrates causing the contents to move in a circular motion and the media to grind against the part to get the desired finish.***

Keywords: Vibro Finishing Machine, Mass Finishing, polishing Machine

1. Introduction

Mechanical surface finishing also known as mass finishing or vibratory finishing is a surface technology has been widely used for more than six decades for surface finishing of material, because of the capability of finishing consistency with considerably lower manufacturing cost.

Vibratory Mass finishing involves the use of the use of a cyclic action to create grinding contact between work pieces and medium surfaces. Mass finishing can be performed dry or wet; however it is common to wet the media with water-based lubricant. Cycle times can be as short as 10 minutes for nonferrous work pieces or as long as 2 hours for hardened steel.

Vibratory mass finishing is a versatile process that can be used for deburring, edge preparation, surface smoothing, polishing, degreasing or cleaning. Besides being a low-cost method, an important advantage of this process is the high surface quality and hardness. The selection of the process parameters is important for product quality and based on the operator's experience or trial and error. These parameters include the frequency and amplitude of the vibration, the amount of water or lubricant, and the size, shape and properties of the media.

The mass finishing is considered a "low-tech" technology that is noisy, dirty, contaminant and uncontrollable. And many manufacturers do not pay enough attention to decrease these unfavourable effects of vibratory mass finishing optimizing their Finishing operation or automating the operation.

There is very little scientific literature published on the vibratory finishing process and the most of them are based on process parameters effect on the product quality. A very small part of them are based on improvement in production efficiency and system improvement.

The objective of the present project is to improve the vibratory mass finishing system, increase sustainability with process efficiency and make the process automatic for continuous production The principal changes will be made on product loading and transport with new conveyor system, automation addition, finishing number of different components at time and then automatic separation of these components after the process completes.

2. Types of Vibro Finishing Machine

There Are Many Types Of Machine Available In Market:

1) Disc Finishing Machines
2) Drag Finishing Machines
3) Stream Finishing Machines
4) Tub Vibrators

A] Disc Type Finishing Machine

In these types of machine the processing is carried out in an open drum (the process container) with a base plate in the form of turntable or disc. The workpieces, together with a suitable polishing or grinding granulate, are set in motion by the rotation of the disc to create a toroidal stream inside the stationary drum. The contact between the workpieces and the medium generates a very intense finishing effect which is up to 20 times more efficient than can be achieved with systems such as conventional vibrators. This makes these types especially suitable for the deburring, edge rounding and polishing of delicate and intricate workpieces.

B] Drag Type Finishing Machine

In the drag finishing process, the workpieces are clamped in specially designed holders. These holders are dragged in a circular motion through a process drum containing grinding or polishing granulates. This high-speed motion generates high contact pressure between the workpiece and the media, which in a very short time produces perfect results in the form of high- precision edge rounding, smoothing or a mirror finish in a quality equivalent to that obtained by manual polishing.

C] Steam Type Finishing Machine

SF technology, also known as stream finishing, gives rise to an innovative new generation of mass finishing machines. The differences to other technologies lie in the tremendous processing forces harnessed by the machine. This enables material to be removed more selectively and faster than with any other surface finishing system. The machine is suitable for a wide range of applications from deburring and mirror-finish polishing, to smoothing and polishing, as well as the edge rounding of cutting tools.

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D] Tub Vibration

It is in rectangular in shape, and recommended for long length parts or heavy parts also to be used for royal metals. The parts to parts hitting can be avoiding in this type of machines. With the vibratory force the media and parts are rotated inside the u-shape tub and get scrubbed with each other, resulting the components gets the desire finish .Poly urethane or rubber lining provided inside the tub.

Component for Model Making

1] Upper Body

Function of upper body is to store the abrasive particles and the finishing components. It is made of mild steel material and the dimensions of the components are 6'X48' in INCHES.

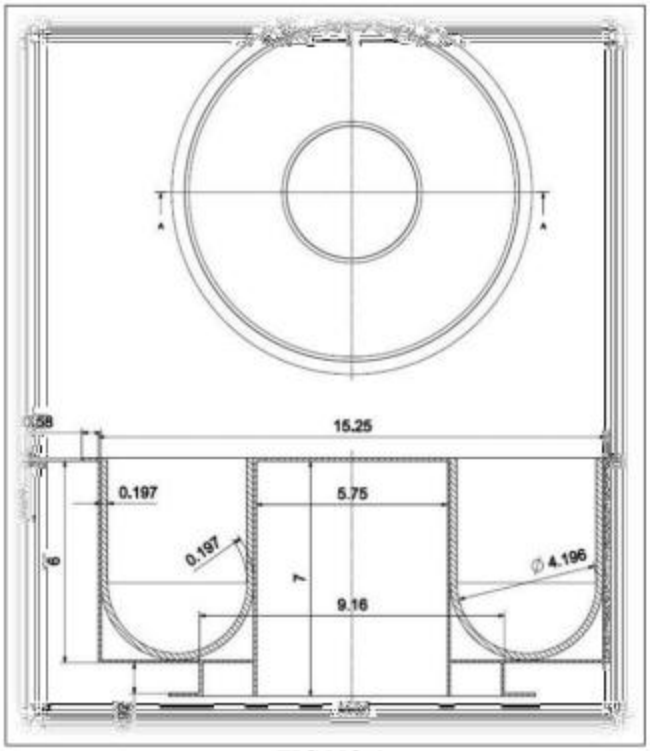
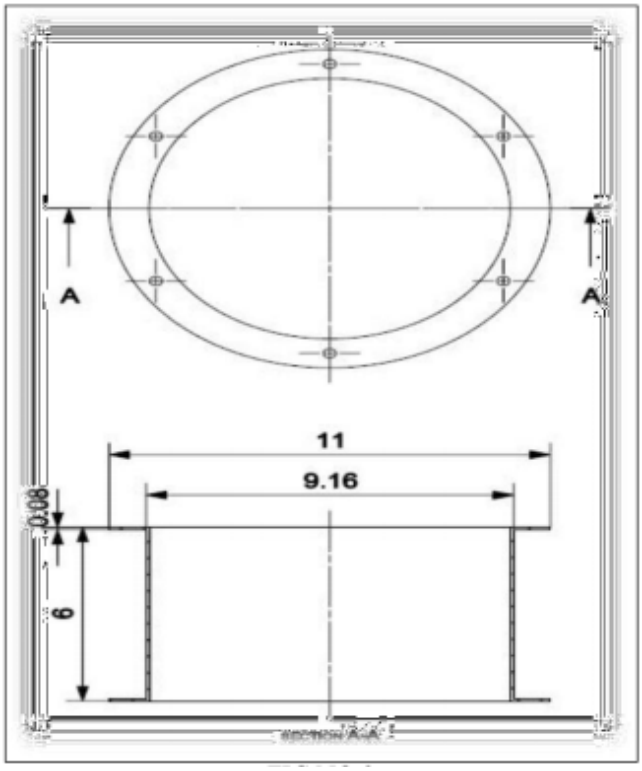


Figure No 1

2] Lower Body

The Lower Body Is Also Made of Mild Steel Material and the Dimension Are6'x28.30'



3] Motor Specification

1	SUPPLY	A.C
2	R.P.M	1440
3	Shaft Diameter	8mm
4	Outshaft	CENTER
5	Voltage	230V
6	Current	0.5A
7	Motor Weight	100g.m

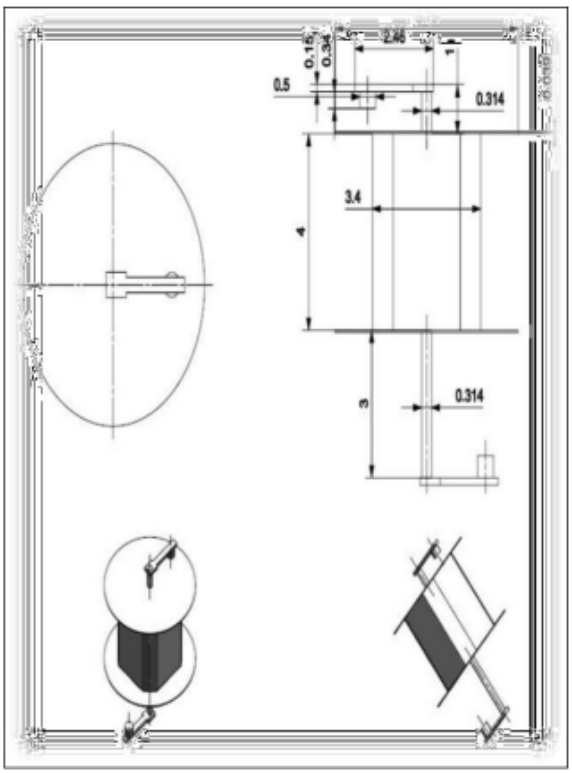


Figure No 3

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3] Spring

The Spring Is Made Of M.S Material with Dimension 1'x3'

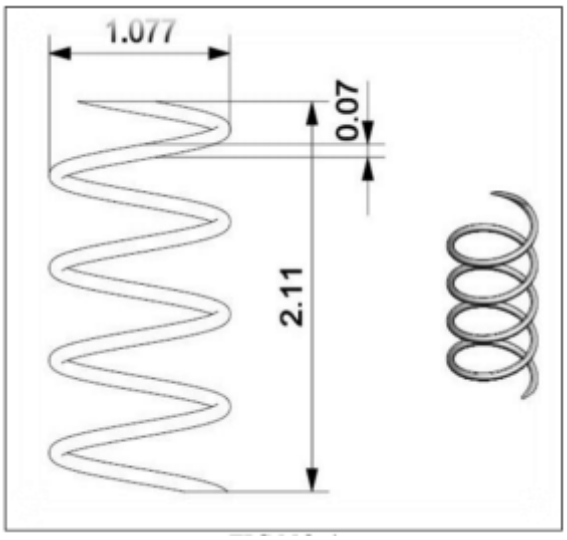

Figure No 4

All the dimension of the figure is in 'inche 3D model and cross-section

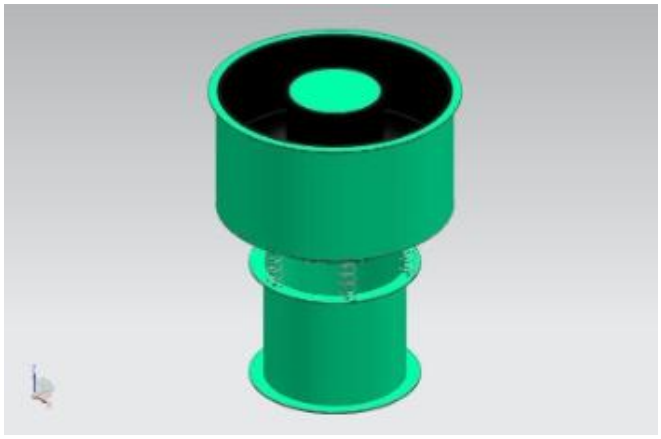

Figure No 5: Cross-section of Model

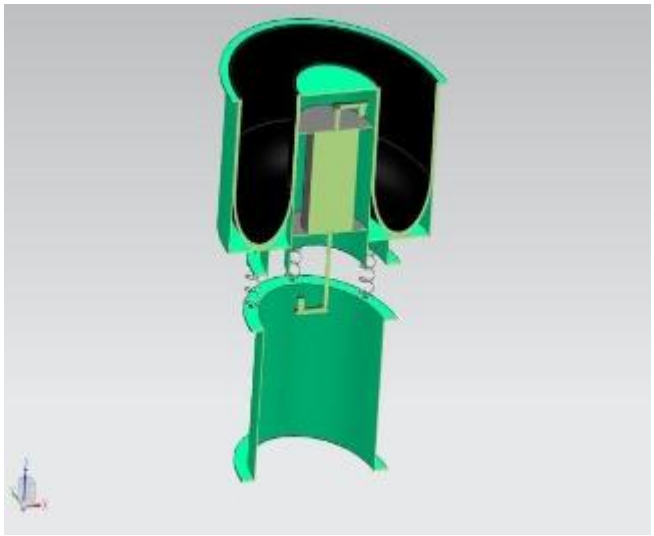

Figure No 6

3. Working Principle

The machine has a steel bowl lined with rubber or polyurethane which is filled up with required media (either ceramic, plastic, maize etc. depending upon the finish required) and components.

Eccentric weights are mounted on an extended shaft attached to a heavy-duty motor to cause vibrations and create a spiral of the media and the components. Variations in vibration, achieved by varying weights and angles, and suitable combination of media enable machine to be used for different components.

4. Calculation and Result of the Process

The Finishing is Parameter of types of materials used Workpiece Size and Components. Types of Abrasive is Used for the Operation and Time for the Machining the Components.

The calculations of the sample are as below Types of abrasive: ceramic abrasive the operation time: 1:30 hours

Name of the components: Nut and Bolts

SR	Finishing before Operation	Finishing after Operation	Accuracy	
			microns	IN%
1	0.91 microns	0.38 microns	0.53	53%
2	0.85microns	0.29	0.56	56%
3	0.95	0.43	0.52	52%

5. Conclusion

The Goal of this Project Has Achieved Successfully. A Vibro Finishing Machine was designed and constructed without kit. The Scope of Project Involved the Designing and Building of the Vibrating Mechanisms, Motor Linkage, and Required Control Features Automatically and Manually. Although the Original Requirements were Met some Design Flaws were Uncovered during testing. Time Constraints Prevented the Rectification of these Deficiencies.

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