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Portable Sandblasting Machine

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Abstract: ***At the point when a surface is covered in oil, paint or another undesired facade, a sandblaster can totally eliminate the build-up and re-establish the thing to its unique condition. When machining leaves sharp burrs on an article, sandblasters can smooth it until it is protected to deal with. Shot-peening is another helpful application where a metal is exposed to a blast of little however amazing effects consider what a ball-peen hammer does to make it more mouldable. This gives the outside of the metal a compressive, plastic quality that is more averse to create minuscule miniature breaks. Sand impacting is a technique used to perfect, clean or reinforce metal. Sand impacting is utilized in pretty much every industry that utilizations metal, including aviation, auto, development, foundry, shipbuilding, rail, and numerous others. Sand impacting machines can appear as an impact bureau, the impact media is pneumatically sped up by compacted air and projected by spouts onto the segment to roughen a smooth surface, shape a surface or eliminate surface pollutants. For the use of nearby sand shooting measure on a little segments, as we can't complete shooting measure in open environmental, so often we need to move occupations to restricted room. Because of this work dealing with cost increments. To keep away from this, there is need of plan of compact kind shot impacting machine.***

Keywords: Sand impacting measure, Components, Work taking care of framework

I. INTRODUCTION

Sand Blasting is a surface treatment measure utilizing high speed steel grating. Sand impacting is technique through which it is feasible to acquire superb cleaning and surface groundwork for optional completing activities.

A. The cleaning of iron, steel, non-cast parts, forgings, and so forth
B. Mechanical cleaning of sheets, bars, curls, wire, and so forth
C. Shot peening to adjust mechanical properties (expanding protection from weakness for springs, gears, and so forth)
D. Planning surfaces to be painted, covered, and so on.

Sandblasting is otherwise called grating impacting. Fundamentally, it is the activity of persuasively pushing a flood of grating material against a surface. The sandblasting activity is done under the gun to smooth an unpleasant surface, roughen a smooth/Shape the surface to eliminate its pollutants.

There are a few variations of sandblasting measure like dab impacting, Soda impacting and shot impacting. Sandblasting is an incredibly helpful technique in an expansive cluster of utilizations and ventures. Regardless of whether a material should be cleaned, deburred, prepared for powder-covering, de-rusted, shot-peened or in any case have its paint eliminated, sandblasting is the cycle for the work.

These gadgets are helpful in the automobile business, in boat and rail yards and in a scope of mechanical applications. Specific levels of ability and security preparing are needed to adequately work a sandblaster, contingent upon your expected application. As we as a whole realize that the sand impacting machine which were utilized in the business are fixed and extremely large in size. The fundamental point of our task is that to make a compactable by diminishing the size of the tank and make it mobile. These machine is utilized to decrease the weight and lessen the time by physically eliminating the rust from the body.

To decrease the expense of the machine and these machine can likewise be utilized in the little business and it doesn't consume more space.

II. PROBLEM STATEMENT

Eliminate the oil and scale present on a superficial level, the projection of the abrasives eliminates consumption from the surface also, giving a particularly surface condition which has simple bond to the paint. We realize that around 80% of the surface disappointments happen when the pre-treatment of the surfaces isn't finished appropriately. Consequently, this progression of sandblasting the surface, earlier to painting, galvanization or such a covering should not be neglected as it is considered as the most basic stage for a great pre-treatment of surface. It is one of the most straightforward and the quickest approach to eliminate old paint and rust from the metal surface.

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Yet, for the utilization of nearby sand shooting measure on a little parts, As we can't do shooting measure in open air, so every time we need to do same in shut restricted space, in the wake of doing shooting measure on entire occupation in impacting kept space, some of the time occupations required some new parts connection or some little improve on work however we did shooting measure on work, so again we shift occupations to kept room for same in this manner work taking care of cost increments. In this paper to keep away from this giving expense, there is need of plan and improvement of versatile sand or shot shooting machine, with the help of same, rather than dealing with work, we can do neighbourhood impacting of modified parts or new welded little segments on same spot, in this way we can limit dealing with cost occupations.

III. WORKING METHODOLOGY

This is the way toward blowing fine sand at a high pressing factor with the assistance of packed air that is gone through the nozzle at a high speed. The successions of activities in sandblasting are as per the following:

1) Stacking of abrasives into the chamber.
2) Second step is centering of compressed air through the nozzle on a superficial level to be sandblasted.

Nozzle along with controlling the pressure and velocity also helps in creating a trajectory for the blast. Pressure blast systems are the systems which are ten times more effective and quicker than the suction blasters.
Pressure blasters Pressure impact the frameworks which are multiple times more viable and speedier than the pull blasters. They are likewise simpler to use. They comprise of enormous compartment containing silica sand under high tension. A weapon is joined to the upper bit of the compartment with the assistance of a hose that can bear the rubbing impacts of sand. These blasters are modestly modest and are bound to discover. They comprise of three primary parts. A sandblasting weapon with two hoses of which one hose is associated with the lower part of the handle and the other hose is associated with the lower side of the barrel. It has a storehouse of free sand. Some sort of holder or pail is framed by this kind. As the weapon is shot, the air makes an attractions that manoeuvres the sand into the firearm. Presently sand can be reused by gathering it and setting back into the supply.

Fig. Portable Sand Blasting Machine

A. Components used in Making sand Blasting Machine

1) Air Compressor: An air compressor is a pneumatic device that converts power (using an electric motor, diesel or gasoline engine, etc.) into potential energy stored in pressurized air (i.e., compressed air). By one of several methods, an air compressor forces more and more air into a storage tank, increasing the pressure. When the tank's pressure reaches its engineered upper limit, the air compressor shuts off. The compressed air, then, is held in the tank until called into use.

Fig. Air Compressor

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2) *Valve:* The heart of any blast pot is the abrasive metering valve, which acts are the carburetor to feed the blasting abrasive into the high pressure & high velocity compressed air stream.

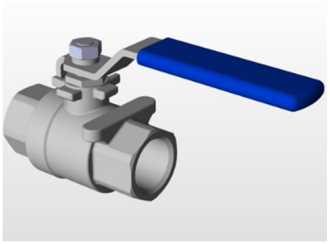

Fig. Valve

3) *Nozzles:* A nozzle is a device designed to control the direction or characteristics of a fluid flow (especially to increase velocity) as it exits (or enters) an enclosed chamber or pipe. A nozzle is often a pipe or tube of varying cross sectional area, and it can be used to direct or modify the flow of a fluid (liquid or gas).

Fig. Nozzle

4) *Nut Joint :* Jam nuts offer an effective solution for bolted joints. Jam nuts are thicker than traditional nuts, so they are able to apply greater force to the joint. Adhesive compounds may also be used as a locking solution for bolted joints.

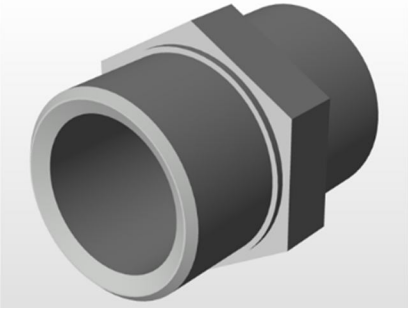

Fig. Nut Joint

5) *T-joint :* A tee, the most common pipe fitting, is used to combine or divide fluid flow. It is available with female thread sockets, solvent-weld sockets or opposed solvent-weld sockets and a female-threaded side outlet. Tees can connect pipes of different diameters or change the direction of a pipe run, or both.

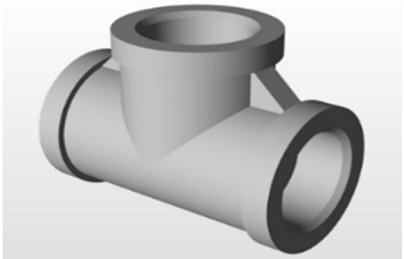

Fig. T Joint

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6) *Hose:* A hose is a flexible hollow tube designed to carry fluids from one location to another. Hoses are also sometimes called pipes (the word pipe usually refers to a rigid tube, whereas a hose is usually a flexible one), or more generally tubing. The shape of a hose is usually cylindrical (having a circular cross section).

Fig. Hose

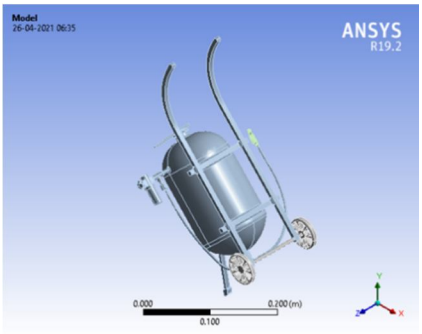
7) *Hose Clamp:* A hose clamp is designed to secure a hose over a fitting, by clamping the hose down, it prevents the fluid in the hose leaking at the connection. Popular attachments include anything from car engines to bathroom fittings. However, hose clamps can be used in a variety of different industries in order to secure the transportation of products, liquids, gases and chemicals

Fig. Hose Clamp

IV. OBSERVATION

During the practical performance of the project we observed that the compressor which we used for compressed air was delivering the pressure of 8.2 bar of compressed air from the compressor and the flow rate form the sandblasting machine was nearly 2 Sq. foot per inch. Which was fast than the available portable sand blasting machine in the market. The abrasive which is used our portable sand blasting machine was only the sand. The sand which was use in the machine was heated at a high temperature for 2 hours and then it was filtered 2 times to get the pure sand for machining purpose. While we had done a test a piece on M.S. plate. The dimensions of the M.S plate are 70x50x5 cm. It takes nearly 1 to 1hour 15 min to clean the whole M.S. plate the mixture from the machine is flow in the jet flow pattern. The nozzle is made of the cast iron and the diameter of the nozzle is 3.1 mm which help the mixture to flow in more pressure and give an accurate result while performing the work on the job.

A. Analytical representation of Portable Sand Blasting Machine using ANSYS:



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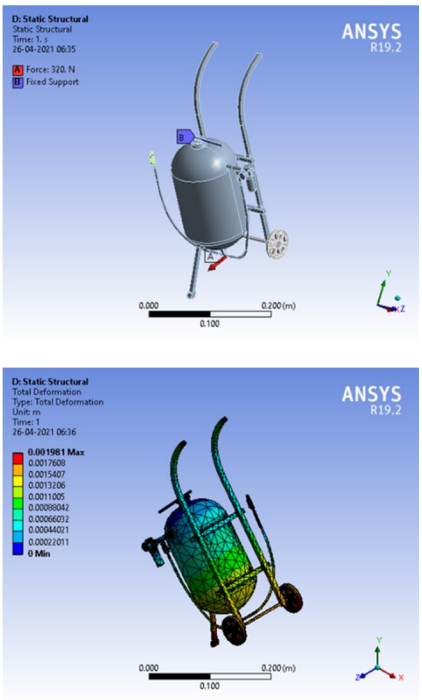

Fig. Analytical Represtantion Of Portable Sandblasting Machine Using ANSYS

V. RESULTS

Table : Comparison between Portable sandblasting machine and Portable sandblasting machine using LPG cylinder

SR.NO:-	PARAMETERS	PORTABLE SAND BLASTING MACHINE	PORTABLE SAND BLASTING MACHINE USING LPG CYLINDER
1	Length	700 mm	630 mm
2	Diameter	350 mm	317 mm
2	Pressure	6.9 bar	8.2 bar
3	Volume	60 litres	44 litres
4	Cleaning Rate	2 sq.mtrs/hr	2.4 sq.mtrs/hr
5	Speed Rate (Sq. Foot/ Inch)	1	2
6	Type Of Abrasives	Sand, Glass Bead, Aluminium Oxide, Walnut shells, Soda Blasting	Sand, glass.
7	Costing	25,000	8,000
8	Air Compressor	3 HP	3 HP
9	Standard Blast Hose Length	2 m	1 m
10	Nozzle	3.5 mm	3.1 mm
11	Recommended Abrasive Mesh	25 TO 30 MESH	25 TO 30 MESH
12	Exhaust Valve	AUTOMATIC	MANUAL
13	Tank Capacity	50 kg	47.5 kg
14	Net. Weight	10 kg	13 kg
15	Sand Storage Capacity	35 kg	29 kg
16	Metallic Storage Capacity	60 kg	40 kg

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VI. SUMMARY

Sandblasting leverages the abrasive properties of sand to create smoother surfaces with fewer physical imperfections and flaws. It's no secret that sand is rough and gritty. Because of these properties, it's able to wear away at excess or unwanted material on a surface. Sandpaper, for example, contains many individual particles of sand. When rubbed against a surface, the sand removes some of the top-layer material, thereby creating a smoother texture. Sandblasting works the same way except it involves the use of highly pressurized sand.This is one of the most commonly used Sandblasting machines in the Industry. This Abrasive blaster is safe, portable, and highly efficient. It can be used on a variety of surfaces including metal, glass, stone, ceramics, and even plastic. This is an Air operated Pneumatic Sandblasting machine.The machine contains a blast generator and works on the principle of pressure blasting. MS steel plates of thickness of at least 6 mm are used for the blast generator as per industry standards.

VII. CONCLUSION

The portable sand blasting machine is very economical & useful for heavy fabrication company. There are such big products in size and it requires sand blasting process before painting, so every time we need to re-shift such big products in confined space of blasting after welding small components or some rework on small attachments, this increase material handling cost. After manufacturing portable sand blasting machine, we can do local blasting on small components which we welded after first blasting process; this can be done on same location where we can manufacture, in this way we need not to shift same again to confined space of blasting room. On same place we can do blasting with the help portable sand blasting machine & same time we can release to painting. In this way we can save handling time as well as handling cost also. It helps to reduce human fatigue by considering handling process.

VIII. FUTURESCOPE

Due to the portable sand blasting machine the demand of the sand blasting machine may be reduced in terms of cost or demand in the market. Because the portable sand blasting machine can be moved easily and can be taken anywhere without any effort and the size of these machine is very small as compared to the traditional blasting machine. And the sand is also freely available in the market or you can buy them in very cheap. These will also less environmental hazards and you don't need highly skilled worker to operate these machine a semi-skilled worker can operate it but you have to wear all the safety gears before the machining because the pressure of the air is high it can also hurt you. While the costing of these machine is also very less as compared to the traditional blasting machine. These machine can also be used in the small scale industry it also not require a separate room for the blasting purpose. You can do in the small open area also.

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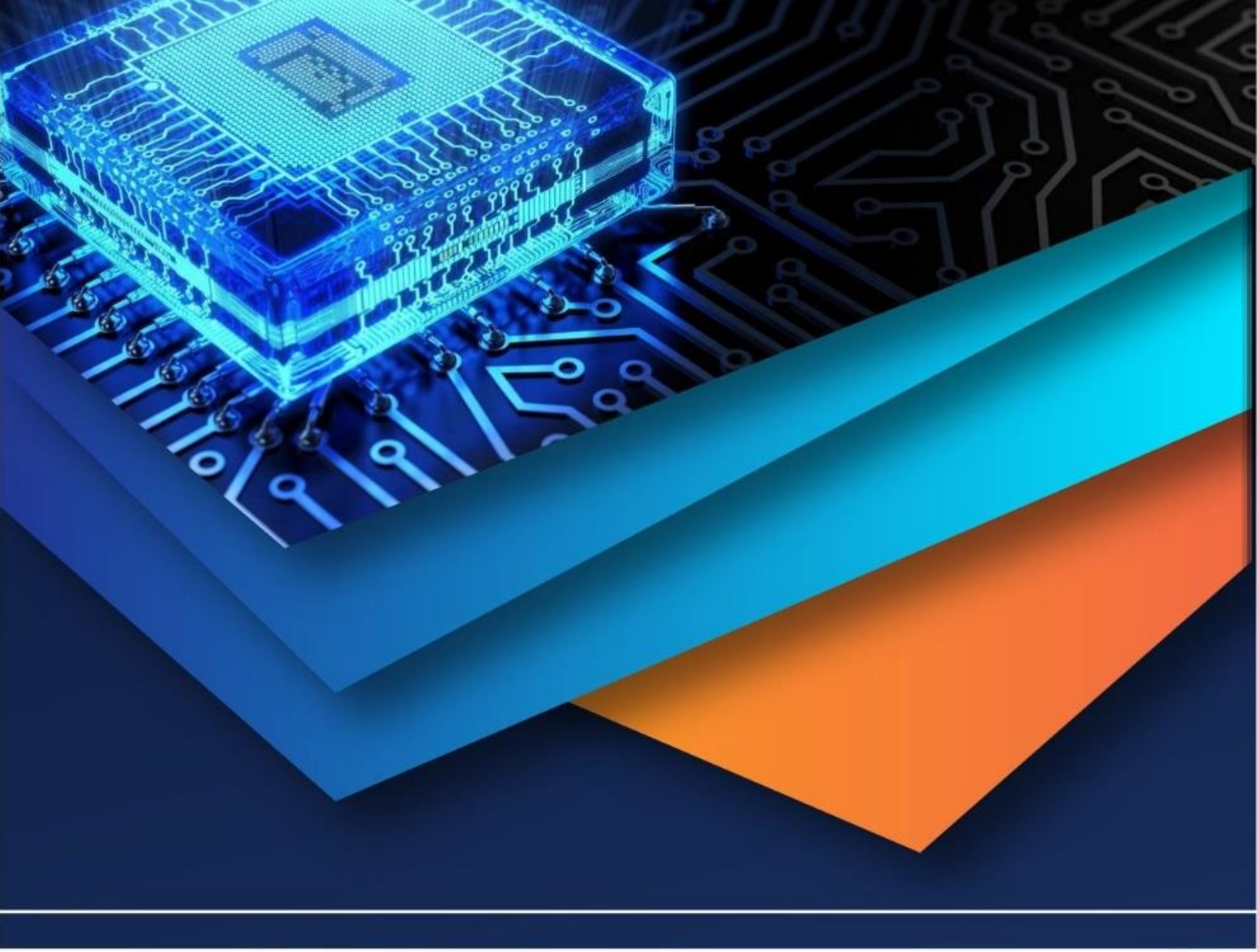

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