A Technical Seminar Report on

ABRASIVE BLAST CLEANING

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By

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May, 2022

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I, **A. Ajay Kumar** hereby declare that, this Technical Seminar Report entitled"**Abrasive Blast Cleaning**" is the bonafide work of mine. I declare that, to the best of my knowledge, the work reported here does not form part of any other project/ seminarreport or dissertation on the basis of which a degree award was conferred on an earlier occasion to any other candidate. The content of this report is not being presented by any other student to this or any other University for the award of a degree.

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CERTIFICATE

This is to certify that the Seminar report titled "**Abrasive Blast Cleaning**"submitted by **A. AJAY KUMAR**, bearing Roll **18R11A0302** to the Geethanjali College of Engineering and Technology, Hyderabad, in partial fulfillment for the award of the degree of **B. Tech in Mechanical Engineering** is a bonafide record of project work carried out by them/him/her under my/our supervision. The contents of this report, in full or in parts, have not been submitted to any other Institution or University for the award of any degree or diploma.

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ABSTRACT

Anyone who has ever driven a car run on a flat tire, but what if your tires could never go flat? In recent years a number of companies and inventors have been working on creating airless tires that would be impossible to puncture. Non-pneumatic tires (NPT), or Airless tires, are tires that are not supported by air pressure. They are used on some small vehicles such as riding lawn mowers and motorized golf carts. They are also used on heavy equipment such as backhoes, which are required to operate on sites such as building demolition, where tire puncture is likely. Tires composed of closed-cell polyurethane foam are also made for bicycles and wheelchairs. The main advantage of airless tires is that they cannot go flat, but they are far less common than air-filled tires.

The most well-known design in this field is the Michelin Tweel, a combination wheel and tire. The design was one of the first to emerge, bringing the idea of non-pneumatic tires to the public's attention. But Michelin has been slow to roll out the technology beyond the test phase.in light of this; a company called resilient technologies has also been working on an airless tire. The company recently announced that prototypes of their honeycomb-like tires will ship in 2011 for use in the US military. This will no doubt help the airless tire field, as will other startup companies working on the task like Britek.

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CHAPTER 1: INTRODUCTION

Abrasive blast cleaning is a surface preparation method commonly performed on metals or materials prior to coating. Blast cleaning involves propelling abrasive projectiles at a metal surface. The impact of these abrasive projectiles on the metal surface removes mill scale, oxide layers and other surface conditions that could negatively affect the coating application process and the corrosion resistance of the metal.

Blast cleaning uses several different methods to accelerate the abrasive projectiles to a velocity where they can create an impact energy sufficient to prepare a material's surface. Two common methods are compressed air and centrifugal wheels.

Blast cleaning uses a variety of abrasive particles or media to prepare a material's surface. These include sand, glass beads, metal shot and several others. These particles can be propelled in a dry or wet state. Blast cleaning abrasive particles can sometimes be collected for reuse or recycling.

1.0.1 HISTORY

Abrasive blast cleaning is used by a range of industries, including ship building, construction, the auto industry, and others. There are three main ways to accomplish abrasive blast cleaning today: through air pressure, water pressure, and centrifugal wheels.

But how long has abrasive blast cleaning been around? And how has it evolved over the years?

The original form of abrasive blast cleaning can be traced back to Mother Nature herself. Our ancestors observed how the constant contact of naturally flowing water and sand wears against surfaces over time, smoothing down and ridding them of surface imperfections over time.

The natural effects of sand and water became the inspiration for the first man-made blasting tool. The creation of blasting equipment was ushered in as the need for faster, more impactful cleaning grew with the onset of the Industrial Revolution and rise of metal products. This is the history of the abrasive blast cleaning.

1.0.2 AIM

Abrasive blasting is ideal for a wide range of applications and industries to remove unwanted deposits, clean surfaces, or alter the shape or properties of a surface. Abrasive blasting can be used to clean a variety of different materials including delicate one with correct media.

1.0.3 Overview

WHAT IS ABRASIVE BLAST CLEANING? Abrasive Blast Cleaning a cleaning process through which we can achieve great surface finish and etc.

CHAPTER 2: LITERATURE REVIEW

D DUDEK on Abrasive blast cleaning. They concluded that,

The size of abrasive grains regulate both the intensity of the layer remove from the surface of the workpiece and the degree of surface development of the workpiece. The surface roughness after the abrasive blasting process is undetermined - is random. As a result of the treatment with low granulation grains, an even distribution of roughness on the work surface is obtained. The using larger sizes of abrasive grains on the surface may be make deep craters. The surface after blasting is more susceptible to corrosion, hence the abrasive slurry should contain corrosion inhibitors.

Nikhil Chormale on Abrasive blast cleaning

They said, that the field of cleaning confined spaces and interior surfaces formulates a number of specific requirements, which are not met by the existing commercial products. So far, still lowering a worker inside the space is the most used technology and only some special solutions in terms of robotic prototypes exist which are limited to a specific setup or certain environments. Therefore, further research in the future to design a specialized robot for the cleaning and sanitation in large confined space has to be achieved.

Carlos A on Abrasive Blast Cleaning

Sandblasting decreases the tensile and peel bond strength of resilient lining materials to denture base resins. However, it improves the shear bond strength.

CHAPTER 3: Abrasive Blast Cleaning WORKING

Sandblasting is also known as abrasive blasting. Basically, it is the operation of forcibly propelling a stream of abrasive material against a surface. The sandblasting operation is done under high pressure to smooth a rough surface, roughen a smooth/Shape the surface to remove its contaminants. There are several variants of sandblasting process like bead blasting, Soda blasting and shot blasting.

Fig: 3.1 Abrasive blast cleaning

CHAPTER 4: ABRASIVE BLAST CLEANING

Abrasive blasting of steel substrates can provide the best possible surface preparation for coatings adhesion. If done properly, abrasive blasting thoroughly cleans the surface and creates a surface profile for mechanical adhesion. To achieve the economy available through abrasive blasting, the operator must maintain the productivity and efficiency of the cleaning system through careful attention to all of its components.

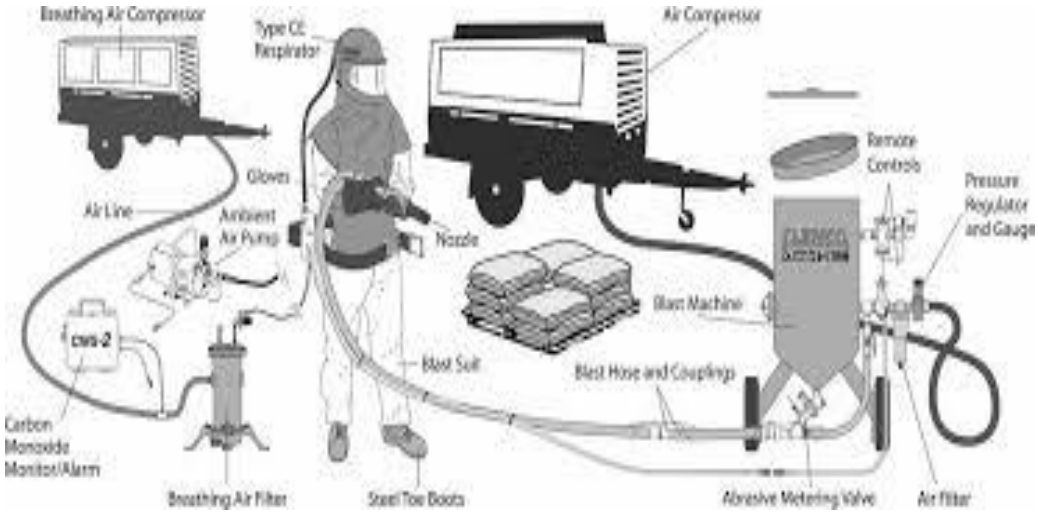

Fig: 4.1 Abrasive Blast Cleaning with details

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4.0.1 HOW IT WORKS

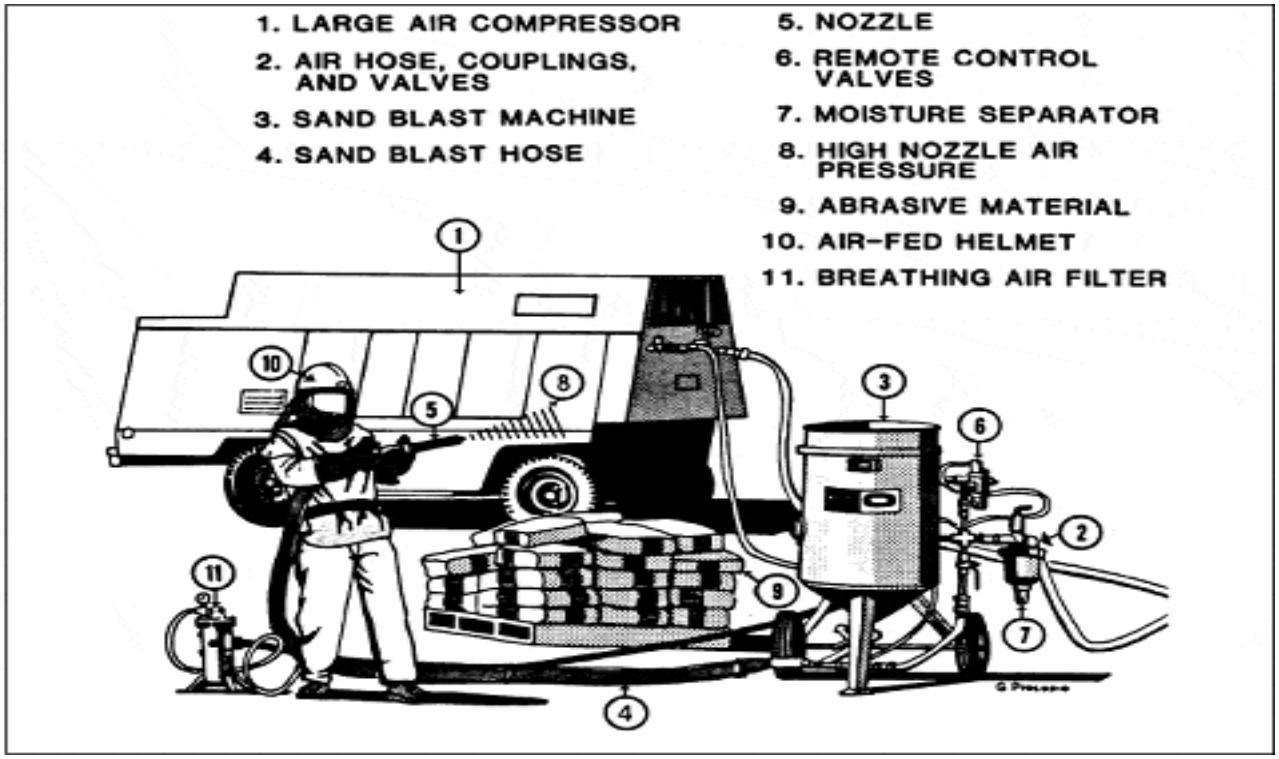

Fig: 4.2 Components of Abrasive blast cleaning

4.0.2 Abrasive blasting consists of:

- Air Compressor
- Accumulative receiver
- Pistol
- Containers with Abrasive particles
- Automation and control systems
- Connecting hoses

The main component of the installation is a compressor that delivers compressed air at different speeds. Its characteristics will be leading when choosing a product. The nozzle is used to direct and localize the jet. The best material for it is tungsten carbide, boron. You should not choose ceramic or cast iron nozzles, as they have a short service life.

The Abrasive blast cleaning additionally includes cables, power supply and hoses of the

required size. More expensive models are equipped with an automation and control system. Automation increases safety: when the worker releases the gun, a shutdown occurs. The control system not only turns on and off the compressed air supply, but also allows you to go to idle.

Hoses must withstand pressure, have minimum internal resistance. Their diameter and length affect the overall performance.

They use the finely ground silica sand to scrub and clean rust, paint and other material from surfaces. These are mainly made of metal. The sandblasters to get to the end of the stain are equipped with a gun designed in ceramic with an interior coating which minimizes the risk of liquefaction of the sand.

This gun is compressed air, which allows it to shoot the sand on the surface to be abraded with high speed. The distinguishing principle of the different types of sandblasters is the process by which the sand is introduced into the gun. The sandblasting gun is equipped with a small tank that must be connected to an air compressor, for this reason it is very often called a compressor sandblaster gun.

A special material is placed inside the tank, sold in building material resales, and consists of silica sand or synthetic abrasive sand , both dry, previously filtered and with a defined but variable grain size, so as to be able to choose the most suitable one for the job to be performed.

In this way, the pressurized air, passing quickly into the gun, sucks the sand which, impacting on the material to be treated, is able to remove paints, rust and oxides. from all those surfaces which, having irregular shapes, are difficult to treat with abrasive paper.

Remember to set the compressor at a pressure of at least 8 bar in order to always work at full capacity; furthermore, to obtain optimal results, it is important to keep the jet of air and sand never perpendicular to the material to be processed but always in angled positions.

Finally, as it lends itself well to any surface, as long as it does not contain plastic elements, one must keep in mind not to insist too much on the same area, especially when dealing with delicate materials such as aluminum, in order not to risk removing the structural material.

4.0.3 Applications

- Cleaning a surface by removing unwanted rust, scale, paint, etc.
- Change metallurgical properties or stress relieve a part by the peening action of multiple impactions.
- Mechanical cleaning of iron, steel, rods, coils, wire, etc.
- Produce a desired matte or finish.

CHAPTER 5: ADVANTAGES AND DISADVANTEGES OF ABRASIVE BLAST CLEANING

5.0.1 Advantages of Abrasive blast cleaning

- Low energy demand.
- High Quality of treated surface.
- Good potentials for process Automation For Cleaning Surfaces Such As Steel, Bricks, Cement And Concrete.
- Obtain Excellent Cleaning And Surface Preparation For Secondary Finishing Operations.
- Removal Of Corrosion Metals in industrial processes

5.0.2 Disadvantages of abrasive blast cleaning

- Initial condition of the component – Material and Contamination.
- Velocity of Abrasive
- Size(and Shape) of abrasive
- Hardness of Abrasive
- Revolving speed of work piece

CHAPTER 6: FUTURE SCOPE

Fig. 6.1 Scope of abrasive cleaning in the future

The future scope of the Abrasive Blast Cleaning will be good. Abrasive blast cleaning consumes a very less energy and has a very good potential for process Automation for cleaning surfaces such as Bricks, steels, cement and concreate. There will be a very good scope for automation abrasive blast cleaning over manual abrasive blast cleaning due to its advantages like no errors and many more.

This is a very reliable process to clean surfaces like steel, cement etc. it is used world wide by a very large number of industries for cleaning of surfaces. So, this method is not going to extinct in future and it will have its need as usually in future.

CHAPTER 7: CONCLUSION

In the conclusion, Abrasive blast cleaning will have same demand as it has now. It is a popular machining technique in the world, that every industry can afford easily. The finishing we get by this technique is very high. We hope this method could develop further or upcoming future. Already this method is used in many industries in last scale. The manual abrasive blast cleaning can be replaced by the automation abrasive blasting. The automation blast cleaning many advantages over the manual abrasive blast cleaning.

The Automation abrasive blast cleaning can be further used, because it is very low cost in cost when compared to manual one. The initial cost of the manual abrasive blasting cleaning is high. So many of the industries would prefer automated one over manual one. The error rate of the automated blast is very less when compared to manual abrasive blasting. It does require a operator, which affordable, but running manual machine needs much more man power.

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