Dry Abrasive Material Used in Steel Coating by Blasting Process for Modification of Containment System

D. Rengadurai¹, K. Naveen²
Assistant professor²
Department of Mechanical Engineering, M.E Industrial Safety Engineering
Cauvery College of Engineering and Technology, Trichy, India

Abstract:
Surface preparation before painting exiting requirement to have longer life and also for minimum maintenances this will be done by ensure two consideration factors for degree of cleanliness and degree of roughness or surface profile in order to remain the containment to provide the surface. Paint will be adhesion and so longer life and coating there are different surface preparation method like this,

- Dry Abrasive Blast Cleaning.
- Wet Blasting.
- Hand and Power Tool Cleaning.
- Flame Cleaning.
- Pickling (Chemical Cleaning).
- Vapour Degreasing.
- Weathering.

Out of which most currently used is dry abrasive blast cleaning in with there are different surface preparation method are available. Here wear to effects in all type Abrasive Blasting and find out with Abrasive Blasting is because surrounding for the blaster to safe ground is health.

I. INTRODUCTION
The correct designation in terms of geology is corrosion (Bates and Jackson, 19880) Blast cleaning can be considered to be an erosion process. Erosion as a tribological term is the removal of materials due to the action of impinging solid partials. Erosion is natural phenomenon and there exist a number of impressive examples about the material removal capability of natural erosion. Improvement in cutting and engraving stone, metal, glass, etc. (Tilghman, 1870), Benjamin Chew Tilghman (1821-1901) and AMERICM Scientist, invented the blasting. Blast cleaning is one of the most frequently utilized methods in modern industry. The starting point of the utilization of blast cleaning for industrial purposes. Abrasive blasting is a method to clean or prepare surfaces prior to use. Mechanical force is used to propel blast media such as sand, sponge or glass heads at the surface to be cleaned to remove contaminants such as paint. This method is commonly used in industries such as the marine, metal finishing, foundry and surface coating. Abrasive blasting can have a major impact on the environment, costs and health and safety of staff including:

Air pollution from the blasting media rebounding off the surface and from the contaminants being released from the surface. This can be a problem especially if blasting is conducted in the open as the pollutants can be blown into neighboring properties or around unprotected staff. This can also cause environmental damage if the contaminated dust enters waterways or hazardous materials end up in the soil.

Waste disposal of both the contaminants and the blasting media. There are different impacts of waste disposal depending if a wet or dry method is used and this is explained further below. Some blast media can be recycled.

Hazardous waste for example if the contaminated material on the surface contains lead paint. If the waste is classed as hazardous, disposal costs can be higher.

Noise from the machines used to blast the objects. This can be a safety issue for workers but can also cause nuisance to neighbours. There are also other impacts on health and safety from inhalation of solvents used to prepare the surface, contaminated material or blast media. Methods to reduce the impact on both staff health and safety and the environment include:

- Choice of appropriate blast media
- Containment of blasting operation
- Correct waste disposal.

1.1 ABRASIVE BLASTING
Abrasive blasting is used for cleaning surfaces such as steel, bricks, cement and concrete, usually to remove scale, rust, old
Abrasive blasting can also be used to remove graffiti. Abrasive blasting procedures can vary widely. They can be performed in closed environments like blasting chambers or cabinets, or on open sites such as buildings, bridges, tanks, boats or mobile plant. Abrasive blasting involves using a stream of abrasive material, propelled at high speed by compressed air, water, steam, centrifugal wheels or paddles against a surface, to clean, abrade, etch or otherwise change the original appearance or condition of the surface. It includes high pressure water and steam blasting incorporating abrasive material. Abrasive blast is the most effective method of cleaning steel and masonry surfaces prior to coating. It is mandatory for certain specialized applications such as water immersion and high temperature exposure. Recommended for removal of mill scale, heavy rust scale, and previous Coatings from large areas. Careful selection of equipment, nozzles, and abrasives are essential to economical operation and achievement of the desired results. Avoid using coarse abrasives. 18-40 mesh sand or grit will provide the 2 to 2.5 mil 5062a) blast profile recommended for use with most coating systems.

For optimum results
- Prior to blast cleaning, remove grease, oil, salt, chemicals, dusts, and similar contaminants by Chemical Cleaning.
- Prior to blast cleaning, remove all weld spatters.
- Abrasive blast to one of the grades described below.
- After blasting, remove all abrasive, dust and grit with a vacuum cleaner, clean and dry compressed air, or a clean brush.
- Blasted surfaces should be coated on the same day they are blasted before the cleaned surface can become contaminated.

II. PLANT UNDER PRESSURE

Abrasive blasting requires certain plant to be operated under pressure. Primarily these are Air receivers and blasting hoppers. The responsibilities of the employer in relation to this type of plant include:

- Ensuring any air receiver or blasting hopper used at his or her workplace is of a design registered under Part 4 of the Occupational Safety and Health Regulations 1996;
- In-service inspections are carried out in accordance with the manufacturers’ specifications or AS/NZ 3788 Pressure equipment In-service inspection; ' Pressure vessels are operated only by persons trained in their use;
- All fittings are of equivalent rating to the pressure vessel and are correctly attached;
- Blow-down procedures are developed and implemented;
- Where air supply is from a local air compressor an electrical cut-off control is fitted and regularly checked;
- A safety relief valve is fitted and regularly checked. Employers and employees must ensure all necessary steps are taken to reduce the potential risk from particulate matter.

1.2 ABRASIVE BLASTING PURPOSE

This Code of Practice provides practical advice on meeting the requirements of the Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations 1996 as they relate to abrasive blasting.

It applies to:
- All workplaces where abrasive blasting is being carried out;
- All persons who may be exposed to hazards arising from abrasive blasting in workplaces. Workplaces where:
  - Abrasive blasting products are used.
  - Processes associated with abrasive blasting are undertaken.
  - Abrasive blasting products and equipment are store

1.3 TYPES OF ABRASIVE BLASTING

- AIR (CONVENTIONAL)
- WET
- VACUUM
- CENTRIFUGAL
• Fitted with hose whip checks or hose coupling safety locks or both
• Kept as straight as possible. Long gradual curves should be used where hoses have to negotiate objects or equipment. Sharp curves may cause rapid wear on the hose resulting in damage and possibly malfunction; and
• Positioned in locations where they are not subjected to damage, fouling or restrictions such as from vehicles, buildings or fences.

2.3 BLAST CHAMBERS

The Environmental Protection (Abrasive Blasting) Regulations 1998 require abrasive blasting to be carried out in a blasting chamber unless such a chamber cannot reasonably be used because of the size, shape, position or location of the object being blasted.

The Occupational Safety and Health Regulations 1996 require:

2.4 WET ABRASIVE BLASTING

Wet abrasive blasting means abrasive blasting where water is added to the abrasive material or its propellant or is used as a propellant. Whilst the addition of water should reduce or minimize the risk of exposure to dust, other hazards associated with abrasive blasting will remain and have to be controlled. The same processes and procedures that apply to dry blasting apply to wet abrasive blasting. While a distinction can be drawn between Wet abrasive blasting and the use of water at high pressure or water jetting of material to prepare surfaces, similar requirements relate to the plant used in both processes. The three step hazard identification and risk assessment process outlined in section 2.1 must be followed before work commences and because of the high pressures used, measures should be taken to ensure the safety and health of all persons, whether operating the equipment or in the vicinity, are protected Only high pressure hoses, firmly Secured, should be used and:

• All bypass valves should be equipped with pressure safety relief valves;
• A funnel should be fitted near the end of the nozzle to minimize the risk of the water stream hitting the operator; and
• An automatic cut-off device (deadpan control) should be fitted to the nozzle. This device should be capable of being activated when the start switch is released if, for example, the operator accidently drops or loses control of the nozzle.

This is particularly important if the equipment is being used:

• In a confined space;
• Above ground level; or
• Where the wet blasting operator may be temporarily out of sight of an observer.

A deadpan control should only be used according to the manufacturer’s instructions and not disabled or removed to allow continuous function. If the nozzle is not fitted with a deadpan control the employer must ensure procedures are in place that will allow a person other than the person operating the nozzle to cut off the flow if the person operating the nozzle is unable to do so. All hoses or lines should be positioned in locations where they are not subjected to damage, fouling or restrictions such as from vehicles, buildings or fences. Personal protective equipment to be used when operating water blasting or water jetting plant includes protection for the:

• Head
• Eyes
• Body
• Hands
• Feet
• Bars and
• Respiratory system. Rust inhibitors containing chromate, nitrate or nitrite are not to be used when wet blasting.

2.5 NOISE

2.5.1. POTENTIAL EFFECTS

Hearing loss is a major risk when abrasive blasting? Excessive noise can affect the car’s ability to hear. Effects may range from temporary loss of hearing, deafness from prolonged exposure and tinnitus (ringing in the ear). Prolonged exposure leads to the destruction of hair cells in the ear. The effects of prolonged exposure are irreversible; however, the effects can be halted if preventative measures are taken. Damage to hearing depends on how loud the noise is and the length of exposure. Workers may be exposed to high noise levels that originate from:

• Abrasive discharge nozzle;
• Impact of abrasive on the substrate;
• Dust exhaust systems;
• Air inlet of the breathing helmet;
• Air compressor; or
• Air in the helmet.

2.5.2 HAZARD IDENTIFICATION AND RISK ASSESSMENT

The hazard identification process and risk assessment should identify the source of the noise, the noise level and risk to exposed workers’

2.6 WORKING IN A CONFINED SPACE

Abrasive blasting in a confined space should only be undertaken when it is not possible to avoid doing the work in that space. A safe system of work should be developed and implemented, and access limited to personnel needing to work in the confined space.

2.6.1 HAZARDS

Hazards that may be encountered in a confined space include but are not limited to:

• Chemical agents such as combustible gases or vapours, toxic gases or vapours, Combustible or toxic liquids or solids, or potentially explosive dusts;
• Oxygen deficiency or excess; and
• Physical agents such as thermal extremes, radiation, noise or flooding.

2.6.2 CONTROLS

The system of work should ensure:

• Adequate illumination is provided to ensure visibility is sufficient to allow safe work to continue;
• Where air-supplied respirators are required, the breathing airline to the respirator is protected from damage or restriction;
• Escape equipment is provided and accessible; and
• There is a means by which the stand-by person or observer is able to cut off the flow of the material if the person operating the nozzle in the confined space becomes unable to operate or control the nozzle. Consideration must also be given to whether the circumstances require safety harnesses and lines to be used.

2.7 HEAT

May be a problem with abrasive blasting. The type of personal protective equipment required to be worn, such as blast helmets, protective suits or leather coveralls, sometimes for long periods in hot conditions, contributes to this problem.

2.8 BREATHABLE AIR

2.8.1 AIR QUALITY

Air breathed from airline respiratory equipment must be supplied at a regulated rate, with the prescribed oxygen content. The temperature of the air must be maintained within a range of 15 degrees Celsius to 25 degrees Celsius. The air must be filtered to ensure that there are no unpleasant or nauseous odours. Filters should be cleaned at least once in each day they are used. To eliminate the likelihood of the operator inhaling moisture or condensed liquid an efficient condensate trap with a drain cock should be cleaned at least once in each day they are used. An efficient ring circuit or a method for “leaking off” air must be used to eliminate stale air. Hoses used for the delivery of breathable air should be specifically designed for this purpose. Equipment should be maintained in good condition and in an efficient and effective working order. Where a person works in a toxic or oxygen deficient atmosphere a secondary or emergency air supply must be provided. A back up or secondary air supply must have an adequate automatic warning device which is activated if the primary air supply fails. Specifications for air breathed from airline respiratory equipment are in Regulation.

III. STANDARD COATING

The manufacturer’s standard coating shall be used for the following equipment

• Indoor electrical equipment
• Instrument and control panels
• Insulated rotating equipment.

3.1 EQUIPMENT CLEANING

The following equipment shall be cleaned with biodegradable, water soluble cleaner and an epoxy primer shall be applied (tie-coat) to the manufacturer’s standing coatings prior to the specified intermediate coat.

• Fan and blower housing
• Outdoor electrical equipment
• Engines and electric motors
• Pumps, compressors and other non-insulated rotating equipment
• Control and relief valves

Equipment shall be recoated as specified if the coating system applied by equipment manufacturer/packager does not comply with this specification or if touch up repairs are necessary.

3.2 ENVIRONMENTAL REQUIREMENTS

The contractor will recognize Company’s commitment to preserving the environment and shall comply with local codes and standards for transporting, storing, and disposing of hazardous materials and hazardous wastes. Upon completion of the job, the contractor shall notify the company of the volume and type of hazardous waste generated. Upon completion of the job, all non-hazardous wastes, such as empty paint cans, clothes blasting abrasives and equipment, shall be removed by the contractor from the job sites and properly disposed.

3.3 REQUIREMENTS OF BLASTING

Only dry blasting procedures are allowed. Definitions of and requirements for, the various methods of surface cleaning are given below:

• White Metal Blast: As per SSPC SP5, & visual reference as per ISO 8501-1
• Near-White Blast: As per SSPC SPIO, & visual reference as per ISO 8501-1
• Commercial Blast: As per SSPC SP6, & visual reference as per ISO 8501-1
• Brush-off Blast: As per SSPC SP7, & visual reference as per ISO 8501-1

3.4 BLASTING PREPARATION

1. Rough Edges Rough or sharp edges shall be broken with a power grinder to a 3 mm radius before blasting.
2. Weld Flux and Spatter Weld flux, slag spatter, slivers etc. shall be ground smooth before blasting. Any surface on which grinding is done after blasting shall be blast cleaned to obtain proper anchor pattern.
3. Surface cleaning prior to blasting, all deposits or grease or oil shall be removed from the surface in accordance with SSPC-SP1 Solvent Cleaning using biodegradable water soluble cleaner.
4. Chemical Contamination All chemical contamination shall be neutralized and/or flushed off prior to any other surface preparation.

5. Equipment Protection Items such as motors, machined surfaces, gauges, electrical and instrumentation items tags and nameplates, stainless steel galvanized steel, aluminium, brass, plated surfaces etc. shall be protected to prevent damage or contamination during blasting or painting. Prior to blasting, openings on engines, pump, vessel, piping etc. shall be effectively sealed to prevent abrasive entering and damaging internal components. All packaged equipment shall be covered and special care taken to cover and seal all instrumentation.

3.5 BLASTING OPERATIONS

1. Weather conditions Blast cleaning shall not be done on any surface that is moist, or that may become moist, before the application or a primer. No blasting is permitted when the Steel temperature is less than 3°C above the dew point, as measured by a sling hydrometer, or when the relative humidity of the air is more than 85%.

2. Preliminary Blasting If blasting is performed at night, the surfaces shall be re-blasted the following day to provide the specified surface preparation standard and the anchor profile required for the specified coating system.

3. Blasting and Painting Blasting shall not be done adjacent to painting operations or coated surfaces that are not fully dry. Blasting shall overlap previously coated surfaces by at least 150 mm.

3.6 BLASTING EQUIPMENT

1. Compressed Air The air compressor shall be capable of maintaining a minimum of 700 kpa air pressure at each blasting nozzle. The compressed air supply shall be free of water and oil. Adequate separators and traps shall be provided on the equipment, which shall be regularly purged of water and oil to maintain efficiency.

2. Nozzle The nozzle shall be a 10 mm (maximum) internal diameter venture style nozzle.

3. Power Tools Power tools may be used to obtain a ‘near white’ surface that is moist, or that may become moist, before the application or a primer. No blasting is permitted when the Steel temperature is less than 3°C above the dew point, as measured by a sling hydrometer, or when the relative humidity of the air is more than 85%.

4. Shot Blasting Equipment Shot blasting equipment may be used for specific applications. Shot shall be changed as required to maintain the angular profile requirement.

3.7 BLASTING ABRASIVE

1. Abrasive the abrasive shall be as per SSPC-AB-1. The abrasives shall be copper slag, steel balls, garnet or coal slag and shall be free of contamination of dust and chlorides to produce the required anchor profile and graded as to be free from clay, silt or other matter likely to become embedded in the steel surface. Abrasives which have a tendency to shatter and adhere or embed in the steel surface shall not be acceptable. Recycled abrasive shall not be used. Use of silica sand is not permitted.

2. Shot Blasting Material Shot blasting material shall pass through a 16 mesh screen. At least 15% steel grit shall be mixed with the graded shot to remove any rust, scale or other impurities pined into the surface by the shot.

Shot blasting material is limited to iron, steel or synthetic shot which is applied by compressed air nozzles or centrifugal wheels. Shot blasting material shall be checked at least two times a week for replacement of abraded material.

IV. SURFACE PREPARATION

The quality of surface preparation, and surface repair on new, or repaint surfaces, significantly affects the amount of preparatory work that will be required for all subsequent repaints. Surface preparation and surface repair are the most important requirements for maximum durability from any paint system. Because the results of surface preparation and repair are quickly concealed by the first coat of paint, the effects are not usually evident until premature paint failure occurs. The first step should always be a thorough examination of the surface to be painted, checking for peeling and faded paint, dirt, chalking, grease, cracking, knots, bare areas, mildew, rust, nail stains and structural problems. All surfaces, whether painted or unpainted, must be clean, free from shine, sound and dry prior to finishing.

4.1 SURFACE PREPARATION METHODS

- Dry Abrasive Blast Cleaning.
- Wet Blasting.
- Hand and Power Tool Cleaning.
- Flame Cleaning.
- Pickling (Chemical Cleaning).
- Vapour Degreasing.
- Weathering.

4.2 TYPES OF DRY ABRASIVE BLASTING

- Sand Blasting.
- Capper Slag Blasting.
- Cornet Blasting.
- Shot Blasting.
- Grit Blasting.
- Shot & Grit Blasting.
- Walnut Blasting.

Table.1. Recorded Dustclearance Condition In Dust Monitor In Sand Blasting

<table>
<thead>
<tr>
<th>INSTALLATION</th>
<th>FLOW PATTERN</th>
<th>AIR CHANGES PER MIN</th>
<th>ABRASIVE</th>
<th>TIME AFTER BLASTING SHUTDOWN (SEC)</th>
<th>TOTAL DUST CONCENTRATION MG/M³</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-3</td>
<td>Updraft</td>
<td>7.1</td>
<td>Sand</td>
<td>120</td>
<td>≤1.0</td>
</tr>
<tr>
<td>P-9</td>
<td>Crossdraft</td>
<td>7.0</td>
<td>Sand</td>
<td>15</td>
<td>≤1.0</td>
</tr>
</tbody>
</table>
Table 2: The Five Types of Abrasive Blasting Cleaning Systems Now in Common Use Are Noish Survey Result

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>ABRASIVE</th>
<th>NUMBER REPORTED</th>
<th>% OF TOTAL USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sand</td>
<td>115</td>
<td>44.7</td>
</tr>
<tr>
<td>02</td>
<td>Shot grit</td>
<td>88</td>
<td>26.4</td>
</tr>
<tr>
<td>03</td>
<td>Shot</td>
<td>43</td>
<td>16.7</td>
</tr>
<tr>
<td>04</td>
<td>Grit</td>
<td>25</td>
<td>9.7</td>
</tr>
<tr>
<td>05</td>
<td>Garnet</td>
<td>18</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Table 3: Noish Survey Result by Surface Blasted

<table>
<thead>
<tr>
<th>SURFACE</th>
<th>NUMBER REPORTED</th>
<th>% OF TOTAL USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron / steel</td>
<td>111</td>
<td>44.9</td>
</tr>
<tr>
<td>Masonry (brick/stone/concrete)</td>
<td>46</td>
<td>18.6</td>
</tr>
<tr>
<td>Sand castings</td>
<td>27</td>
<td>10.9</td>
</tr>
<tr>
<td>Aluminum</td>
<td>14</td>
<td>5.6</td>
</tr>
<tr>
<td>Copper/brass</td>
<td>12</td>
<td>4.8</td>
</tr>
<tr>
<td>Wood</td>
<td>9</td>
<td>3.6</td>
</tr>
<tr>
<td>Glass</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>plastic</td>
<td>1</td>
<td>0.4</td>
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</tbody>
</table>

Table 4: Noish Survey Result for Blasting Area

<table>
<thead>
<tr>
<th>BLASTING AREA</th>
<th>NUMBER REPORTED</th>
<th>% OF TOTAL USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sut doors</td>
<td>92</td>
<td>35.5</td>
</tr>
<tr>
<td>Special room</td>
<td>59</td>
<td>22.7</td>
</tr>
<tr>
<td>Cabinet</td>
<td>55</td>
<td>22.2</td>
</tr>
<tr>
<td>General work area</td>
<td>33</td>
<td>12.7</td>
</tr>
<tr>
<td>other</td>
<td>26</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Table 5: Noish Survey Result of Blasting Process

<table>
<thead>
<tr>
<th>BLASTING PROCESS</th>
<th>NUMBER REPORTED</th>
<th>% OF TOTAL USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry blast</td>
<td>148</td>
<td>77.0</td>
</tr>
<tr>
<td>Centrifugal</td>
<td>30</td>
<td>15.6</td>
</tr>
<tr>
<td>Wet blast</td>
<td>11</td>
<td>5.7</td>
</tr>
<tr>
<td>Vacuum</td>
<td>3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

5.1 CONTAINMENT BOX

- Dust and paint chips that are created during the removal of the paint are first controlled through the use of a containment system.
- The containment system either surrounds the entire work area or surrounds the paint removal tool.
- To build the containment system, a large "box" is built around the work area. When work is complete on that area the containment box will be disassembled and moved to the next work area.
- The containment box is surrounded by impermeable tarpaulin materials that are designed to prevent dust and debris from seeping through.
- The workers conduct the paint removal activities inside of the containment, completely isolated from the outside environment.
- The containment box, while protecting the public and the environment from emissions, also provides the workers with comfortable, convenient access to the steel.
- This improves the quality of both the paint removal and inspection operations. In the case of vacuum shrouded power tool cleaning, the equipment is fitted with its own containment cover.
- The need for additional containment materials in the work area is limited, and in some cases may not be necessary at all.

V. CONTAINMENT SYSTEM

- As currently specified, methods that do not involve open abrasive blasting (i.e., hand tool cleaning and power tool cleaning) do not require total enclosure because minimal fugitive dust is generated. However, because paint residue and other foreign material is generated by the process, some form of debris containment is required.
- This can be as simple as a tarp (or diaper) placed under the working area. All material falls onto the tarp, is picked up at the end of each day, and is placed into a waste container for "proper" disposal. Removed paint or other debris shall not be allowed to remain at the site following a cleaning operation. It must be picked up, containerized, and disposed of in accordance with the contract documents.

5.2 CAPABILITIES

- Blast boxes
- Tumblers
- In-house abrasive blast booths up to 40 feet in size
- 5500 square foot blast room for larger projects
- 1 30,000 square foot blast room for the largest of projects.
- Portable rigs for outside projects and repairs

5.3 REQUIREMENTS FOR BLASTING

- MS Shall outer dia 300mm, height 150mm and 16mm thickness.
- Blasting machine
Air Compressor
- Dry abrasives (sand blast).

VI. BLASTROOM

![Blast Room Image](image)

**Figure 1. Blast Room**

6.1 BLASTROOMS ARE

- Environmentally Safe
- Cost effective
- They come in pre-assembled sizes according to on the kind of work to be done
- They can be standard field-erected or based on your idea, custom blast rooms are also made.

We welcome your enquiry and look forward to working with you to satisfy your surface preparation and finishing requirements.

6.2 BLAST ABRASIVE PARTIALS

- Silicon carbide, generally used for non-ferrous metals
- Aluminium oxide or alumina, the most widely used abrasive, generally used for ferrous alloys, high tensile materials and wood.
- Diamond, most often used in ceramic grinding or final polishing due to high hardness and cost
- Cubic boron nitride (CBN)
- Garnet, usually used for machining of wood.
- Zirconia/Alumina alloys, suited to carbon and stainless steels and welds Glass, usually used for pressure blasting operations.
- Colloidal silica, generally used for finishing operations as it is only available as a suspension of extremely fine particles.

VII. EXPERIMENTAL SETUP

7.1 MOISTENING CONTAINMENT SYSTEM

**RAW MATERIAL – HOLLOW SHELL**

![Raw Material Hollow Shell Image](image)

**Figure 2. Raw Material Hollow Shell**

MS Open shell
- Outer Diameter 300mm

**MOISTENING CONTAINMENT BOOTH**

![Moistening Containment Booth Image](image)

**Figure 3. Moistening Containment Booth**

1 Inch L plate
- 2feet - 6 nos
- 3feet - 4 nos
- 12mm ms plates – 2 nos
- Shack material 1.5 kg

**7.2 WATER SPRAY CONTAINMENT SYSTEM**

**RAW MATERIAL MS HOLLOW SHELL – BEFORE BLASTING**

![Raw Material MS Hollow Shell Image](image)

**Figure 5. Raw Material MS Hollow Shell Before Blasting**

Outer Diameter 300mm
Height 150mm
Thickness 16mm

**WATER SPRAY CONTAINMENT BOOTH**

![Water Spray Containment Booth Image](image)

**Figure 6. Water Spray Containment Booth**

1 Inch L plate
- 2feet - 6 nos
- 3feet - 4 nos
- 12mm ms plates – 2 nos
- Shack material 1.5 kg

**BLAST WORKING AREA BEFORE BLASTING**

![Blast Working Area Before Blasting Image](image)

**Figure 7. Blast Working Area Before Blasting**

**BLAST WORKING AREA AFTER BLASTING**

![Blast Working Area After Blasting Image](image)

**Figure 8. Blast Working Area After Blasting**
7.3 DUST SAMPLING TEST RESULT

Table 6. Sampling test 1 moistening containment system

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>Sampling weight for shackle material Kg</th>
<th>Moistening Shack Weight Kg</th>
<th>Dust moistening shack weight Kg</th>
<th>Variation range of dust Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1.5</td>
<td>2.2</td>
<td>3.4</td>
<td>0.9</td>
</tr>
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</table>

Table 7. Sampling Test 2 Water Over Spray Containment System

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>Sampling weight for shackle material Kg</th>
<th>Water spray Shack Weight Kg</th>
<th>Dust water spray shack weight Kg</th>
<th>Variation range of dust Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1.5</td>
<td>3</td>
<td>4.2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

7.4 DUST ANALYSIS TEST

Table 8. Blasting method

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>Blasting method</th>
<th>Operating area blasting dust factors (micron)</th>
<th>Dust factors in moistening system (micron)</th>
<th>Dust factors in water spray system (micron)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sand blasting</td>
<td>20.4</td>
<td>14.7</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Compare to TLV for silence sand content after containment system is less rate of OSHA/ACGH requirement of dust factor on 10mg/m3, hence safe blasting work areas.

Table 9. Containment system

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>CONTAINMENT SYSTEM</th>
<th>DUST EXPLOSIVE RANGE KG</th>
<th>DUST OBSERVED LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Moistening containment system</td>
<td>3.4</td>
<td>Low</td>
</tr>
<tr>
<td>02</td>
<td>Water over spray containment system</td>
<td>4.2</td>
<td>High</td>
</tr>
</tbody>
</table>

Dust sampling system is observed high level dust in environment.

VIII. CONCLUSION

From this experiments one can easily understand that sand blasting with wet atmosphere is very useful to control air pollution and sand particles fly in all directions it is also used to contaminate the sprayed sand dusts on the wet surface in bulk quantity so collection and cleaning of sand particles in large quantity. This process may be extended to huge and lengthy particles also further studies researches lead to set up more sophisticated one. Furthermore this process plays a key role developing occupational health of the workers who are working in a highly polluted and contaminated area. It will also used to improve the safety aspects in a considerable percentage so it is proved by experimentally that wet environment sand blasting is more useful than the dry sand blasting.

IX. REFERENCES


