1. INTRODUCTION

In the present scenario of globalization of economy, significant importance has been attached to technology upgradation, improvement in product & services and competitiveness. Necessity has emerged to review existing processes and introducing new processes to cope with the challenges.

Grit / Shot Blasting & Shot Peening process is one of process which is gaining wide appreciation and is becoming a part of manufacturing processes. There are numerous applications where the process has proved its worth and popularity specially for removal of rust, carbon, scale, corrosion, paint, chemical deposits and burrs. In some of the applications, the blasting process has all together replaced the subsequent hazardous chemical treatments and keep the environment eco-friendly.

2. SPECIAL PURPOSE AIR OPERATED BLAST CLEANING MACHINES

The concept of special purpose machines to suit individuals needs for obtaining consistent blasting results is becoming popular. The extent of automation and sophistication employed depends upon the qualitative and quantitative end results required. We at MECSHOT in close cooperation with clients have developed, designed, manufactured and supplied various types of special purpose machines matching with features and quality of imported machines at cheaper price. Some of the such machines with its salient features and applications are reproduced below;

2.1. Turbo Generator Blade - Shot Peening Machine

The shot peening is an established surface treatment process particularly in automotive, aircraft and space industries. The components are shot peened to improve fatigue strength.

For shot peening of turbo generator blades, we have supplied custom built Semi Automatic Shot Peening Machine working on direct pressure principle and of continuous type. The machine is featured with motorised indexing turn table with multi satellite, satellite rotation through variable speed drive, preset timer for shot peening duration and shot flow control through manually operated separator to control shape and size of shots being used.

The dust generated during shot peening process is collected in paper filter.
2.2. Tyre Mould Abrasive Blast Cleaning Machine

Deposition of foreign material on tyre moulds during tyre moulding process is inherent and perpetual problem. After certain number of moulding process, these foreign particles need to be removed without affecting the dimensional tolerances and finish of the mould to obtain consistent quality of moulded products. Therefore mould cleaning by wet / dry abrasive blasting using fine glass beads or organic abrasives of coarser grade like plastic grit is normally practised by all leading tyre manufacturers.

We have supplied custom built tyre mould machines to several leading tyre manufacturers. The equipment is featured with motorised tilting type turn table mounted on trolley. The mould is loaded outside the blasting cabinet on trolley. The movement of trolley is motorised and moves on track extention.

The abrasive recovery is automatic and fabric bag type dust collection system is incorporated as standard practice to keep the dust emission level within prescribed limits. However, use of paper filter element cartridge type with reverse jet dust collection system is also getting popularity, where the dust emission level is much less compared with fabric bag type dust collector.

2.3. Roll Etching Machine

The rolls are etched for generating desired surface roughness so that sheets being rolled out can have inbuilt roughness to facilitate proper bonding of paint. During the rolling process, the rolls loose the surface roughness due to friction. Periodically, these rolls are etched for maintaining desired surface roughness. The rolls being of harder nature, Pressure Type Dry Abrasive Blasting Machine using Aluminium Oxide, chilled Iron Grit of 12 - 25 Mesh or Steel Shots of Coarser Grade as abrasive is quite popular.

The blasting equipment is featured with motorised workcar with motorised job rotation facility. The roll is loaded outside the blasting cabinet on workcar which moves on track extention. The blasting nozzles are reciprocating through hydro pneumatic or lead screw mechanism while the job is rotating in blasting cabinet. The operator is to simply load and unload the job.

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4. Cookware Blast Cleaning prior to Teflon Coating

Teflon coated cookwares popularly known as non-stick wares are popularizing very fast and accordingly the demand is also expanding. The cookwares are
of aluminium and require surface cleaning prior to teflon coating for removal of oxide layer as well as to impart surface roughness to facilitate proper adhesion of teflon coating. Normally aluminium oxide of 40 Mesh is used as blast media to get the desired surface roughness range of 4 - 7 Ra value.

The abrasive blast cleaning machine is featured with rotating satellites and rotary table with multi blast guns oriented at different blasting stations. Air wash guns are also provided to air wash the blasted utensil to remove residual dust. The operator is simply loading and unloading the cookwares on and from satellite located on rotary table. The satellite gets rotating while inside the cabinet. The blast guns also reciprocate or oscillate and are set according to the size of cookware.

2.5. Needle Cleaning & Deburring Machine

Various types of needles including hypodermic syringes are having substantial burrs developed during manufacturing process. The burrs so produced are necessarily to be removed to avoid painful tissue puncture. The needle cleaning and deburring by dry blasting process using Fine Glass Beads as blast media is a productive and well established method for mass production.

The air operated blast cleaning machine is featured with closed type cabinet and pneumatically operated reciprocation table. The needle belt is placed on table outside the cabinet and in one pass, the complete heel portion of needle belt is cleaned / deburred without damaging the profile of needle. Abrasive cleaned / deburred without damaging the profile of needle. Abrasive used being of very fine size, a fluidization system is incorporated to ensure free and smooth abrasive flow for recycling.

The abrasive recycling is automatic and the dust generated during blasting process is collected in fabric bag type dust collector housing, thus keeping environment clean & eco-friendly.

2.6. Mobile Closed Circuit Vacuum Blast Cleaning Machine

Blast cleaning of huge structures like tanks, vessels and hull of ships is an essential activity. By virtue of size and non movement of such jobs into the blast room, the blasting operation becomes difficult [particularly recycling of spent abrasive and dust collection]. Therefore, mobile closed circuit vacuum blast cleaning machine is right solution, wherein the blast cleaning and abrasive recovery is simultaneously at the job itself and does not create dust nuisance, thus keeping the environment clean and eco-friendly.

The machine is featured with double pressure vessel and is of continuous operating type. The machine can be supplied with the provision of one or two blast nozzles with 15 m. blast hose length depending on requirement and is suitable to handle varieties of abrasives sizes. The equipment is mobile and is suitable for 'on situ' applications.
The dust generated during blasting and spent abrasive is collected from the job surface through suction hose. The suction is created by electric motor driven root type vacuum pump. The reclaimed abrasive is recycled and dust is collected in paper filter element cartridge reversejet type dust collector housing with self cleaning system. We have manufactured and supplied number of such equipments at various installation of Naval Dockyard and those are working satisfactorily.

2.7. Tube I.D. Cleaning Machine

In certain critical applications, like zirco alloy tubes, the internal tube cleaning and finishing is essential to impart closed range surface roughness as part of manufacturing process. We have manufactured and supplied automatic pressure type blasting equipment having lance type nozzle system for blast cleaning of zirco alloy tubes of 20 mm I.D. and of 5 m. length. Based on its performance a repeat order is under execution.

The machine is featured with double pressure vessel and of continuous type with abrasive relclaimer and recovery system. The tubes are conveyed automatically at blasting station through automatic tube transfer arrangement. The lance type nozzle transverse inside the individual tube upto the full length and 5 tubes are blast cleaned at a time. The equipment is incorporated with PLC control system for operational sequence and datas generated are fed to the centralised data acquisition system for records.

The wet type dust collection system working on scrubbing principle is incorporated with the equipment. The dust gets collected into the hopper in sludge form and is discharged periodically through a motorised screw conveyor system. Thus, the equipment is dust free & keep the environment clean and eco-friendly.

3. POPULAR APPLICATIONS AND MODELS

We have supplied number of standard models for some of the the industrial applications as enumerated below;

- Blast cleaning of LPG Cylinders, Piston rings, Automotive components, Mould texturising, deflashing and deburring of moulded components, Inline wire cleaning, shot separator and numerous other machines for various applications.

4. CONCLUSION

A careful selection of equipment, abrasive and adjustment of blasting parameters are vital to achieve optimum blasting results.

Selection of abrasives plays a vital role in accomplishing the blasting process. Abrasives selection depends upon the job material, its condition before blasting, surface roughness required after blasting, rate of stock removal and subsequent operation after blasting.
The desired blasting results can be manipulated by proper selection of abrasives and optimum adjustment of pressure, nozzle size, nozzle distance from the job and exposure time of blasting. As the size of abrasive goes on increasing the surface roughness produced on the job shall also be coarser and vice versa. The Nozzle size and its distance shall affect the pattern width of blasting accordingly. With the decrease of pressure, the surface roughness produced is finer compared with increased pressure.
MOTORISED WINCH ARRANGEMENT

LIGHT BOX

GUN SLIDING

HAND WHEEL

CONTROL PANEL

SIDE DOOR BLAST GUN

TURN TABLE

WORK CAR

TRACK EXTENSION

FILTER ELEMENT TYPE DUST COLLECTION

RECLAIMER

RECOVERY HOSE

UPPER VESSEL

LOWER VESSEL

Blast nozzles

GUN

BRUSH

FEED VALVE

MEC SHOT BLASTING EQUIPMENT PVT LTD.

DESIGN NO. MS/9252-05

TITLE: MOBILE CLOSED CIRCUIT CONTINUOUS MARYED SHOT BLASTING MACHINE

MODEL: PSC