

Shot Peening In Aviation

Shot peening, a technique for improving fatigue strength. Shot peening is a mechanical cold working process in which the job surface is air blast with small spherical balls. Small dimples are formed on the surface of the peening part by the striking tinny spherical balls (working as tinny ball bane hammers). There by producing a layer of high magnitude compressive residual stresses. This phenomenon creates compressive stresses under the top surface of substrate and relives tensile stresses. The tests have resulted in increase of fatigue life of the job.

Shot peening on propeller shafts & impellers of aircraft

Mec Shot has manufactured a robotic machine for aircraft industry for shot peening of different parts i.e. turbine blades, impellers & propeller shaft of aero engines.

The robotic cabinet was designed and manufactured along with its mechani-

cal recovery, size and shape classifier and dust collection system. The door mounted turn table assists the operator for easy loading and unloading of the components. The turn table provided with the system works as a 7th Axis. The 6 axis robot manipulates the peening nozzle as per the pre set parameters in the SEIMENS PLC after testing required intensity on Almen strips. Shot flow rate, air pressure, distance and time can be set. Almen strips are checked for intensity and results are recorded

Residual stress and measurement

Determination of this residual stress in a non-destructive manner is done by x-ray diffraction (XRD) method. This method is based upon linear elasticity, in which the residual stress in the material is calculated from the strain measured in the crystal lattice, and are not usually significantly affected by material properties such as hardness, degree of cold work or preferred orientation.

Dry Shot Peening Machine

Furthermore, the company based in India has designed, manufactured, installed and commissioned a common shot peening/blasting machine for shot peening and surface preparation of aircraft components for plasma/HVOF coatings.



Dry shot peening machine

It operates on the suction principle of abrasive blasting. The guns lift the shot/abrasive from storage tank to the reciprocating nozzles which strikes the rotating aircraft components. Provision has been made for varying the ratio of air & abrasive. A PLC controlled automation has been provided for a auto sequence operation.

The work piece is placed in a fixture mounted on turn table. The blasting will be accomplished by the guns reciprocating by a XY manipulator. The dust created during blasting is entrapped in filter elements keeping the environment friendly.

Wet ceramic bead peening machine

The same company has recently designed, manufactured, installed and commissioned a blasting machine for shot peening of air craft blade's air foils area.

The wet blaster operates using slurry of zirconium shots and water mixed in a requisite ratio. The slurry is pumped by reciprocating blast guns at a pre-set parameters to achieve shot peening



The shot peening machine for propeller shafts and impellers is equipped with an operator friendly touch screen. All the required information for operating, servicing and maintenance is displayed as per job code

