



SHOT PEENING INCREASES FATIGUE LIFE OF AUTO COMPONENTS



By. Mr. P. A. PATEL

PATEL FURNACE & FORGING PVT. LTD.

(SHOT BLASTING DIVISION)

A - 2/510, G.I.D.C., Makarpura, VADODARA - 390 010.

E-mail : patelf@satyam.net.in / patelf@dataone.in www : pshotblast.com M. : +91 9824038602

Shot peening increases fatigue life of auto components like **Coils Springs, Leaf Springs, Gears, Rocker Arm, Pinion, Torsion Bar, Connecting Rod, Crankshaft** and other components for **two wheeler** and **four wheeler** and other industries.

It is rear that we go from one place to another by road and not find a vehicle broke down on the road, due to fatigue failure of axle shaft or the spring and so on, thus creating obstacles in the flow of traffic and sometimes resulting in serious accidents. These fatigue failures can be reduced and are being almost eliminated by use of shot peening.

Shot peening is done through shot peening machines. Two Systems of Blasting : Fig - 1 "Pressure Blast System": In pressure blasting system the blast media is stored in pressurized vessel, which is mixed with compressed air. The air flow accelerates the media, through a blast gun on to the surface. In 'blast Wheel Blasting System : Fig - 2 In blast wheel system the blast media is fed to the center of the blast wheel, which is rotating at high speed. The media is rapidly accelerated by centrifugal force and is directed on the surface to be shot peened. as shown in (Fig. 2.)




Fig - 1 10mm Nozzle 5 Bar Pressure.
Blast Media Flow : 22 Kgs./Min.
Air Consumption 275 M/Hr.
Energy Consumption 25 KW.
Specified Energy Consumed 1.14 KW/KG.

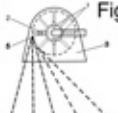


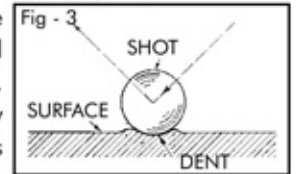
Fig - 2 Blast Media Flow 150 Kgs./Min.
Air Consumption Negligibal
Energy Consumption 7.5 KW
Specified Energy Consumption 0.05 KW/Kg.

This comparison of different blasting systems, clearly shows that the blast wheel blasting system (fig-2) has the lowest specified energy consumption. Blast wheels are driven by electric motors, whereas the air required by the air blasting system (fig-1) has to be generated by a compressor which is to be purchased and maintained in addition to blast machine itself and the additional power cost.

SHOT PEENING PROCESS

Shot peening is a cold working process in which the surface of a part is bombarded with small spherical media

called steel shot. Each piece of shot striking the material acts as a tiny peening hammer, imparting to the surface a small indentation or dimple (Fig. 3). In order for the dimple to be created, the surface fibers of the material must be yielded in tension. Below the surface, the fibers try to restore the surface to its original shape, thereby producing below the dimple, a hemisphere of cold-worked material highly stressed in compression. Overlapping dimples develop a even layer of metal in residual compressive stress. It is well known that cracks will not initiate or propagate in compressively stressed zone. Since nearly all fatigue and stress corrosion failures originate at the surface of a part, compressive stresses induced by shot peening provide considerable increases in part life.



A few examples of the type of parts which have shown a good response to shot peening include:

Part	Life Increase
Crankshafts	900% Life Increase
Leaf Springs	600% " "
Connecting Rod	1000% " "
Coil Springs	1370% " "
Gears	1500% " "
Steering Knuckles	475% " "
Rocker Arms	1400% " "

The advantages to be derived from these fatigue life improvements are manifold and affect practically every phase os manufacturing design, production and sales.

APPLICATION OF SHOT PEENING

In general, shot peening will lengthen the fatigue life of any part that is subject to bending or twisting stress. **all Two wheels motor bikes like Honda, Bajaj, Suzuki, T.V.S etc. and 4 wheelers Cars like Maruti, Hundai, Tata**



Fiat, M & M, B.M.W, Volvo & others uses shot peening process on their components to increase fatigue life of Parts like.