A

Project Report

On

Surface Nanocrystallisation of AISI 316 by Shot Peening

Submitted in partial fulfilment of the requirement of the degree of

Master of Technology

(Materials Engineering)

By

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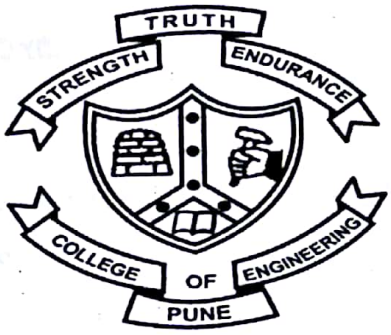

DEPARTMENT OF METALLURGY AND MATERIALS SCIENCE

College of Engineering, Pune

(An autonomous institute of Govt. of Maharashtra)

2017-18

Abstract

Surface properties are vital for engineering performance of the components. There are many surface treatments to improve surface properties like carburizing, electroplating, nitriding, induction hardening and shot peening. Shot peening is commonly used among them. Shot peening is a process which is used for inducing compressive residual stresses to improve fatigue life of component. Recently shot peening is employed to synthesized nanocrystalline layer on metallic components.

In this project severe plastic deformation was performed by shot peening method on austenitic stainless steel (AISI 316 stainless steel). Shot peening have been performed on plates of AISI 316 stainless steel specimen for different flow rates of air with and without mixing water. Specimens were analyzed by taking surface roughness, surface hardness, hardness traverse, XRD, optical and electron microscopy. It was observed that when water is mixed with air flow AISI 316 stainless steel showed better results in terms of hardness, grain size, and depth of nanocrystallization. This is because of non-adiabatic conditions rendered by water cooling.