

A

Report on

**FATIGUE STUDIES OF SHOT/SHOCK PEENED GAS
TURBINE BLADE ALLOYS**

A Project report submitted for the partial fulfillment of the requirements for award of
Degree of

BACHELOR OF TECHNOLOGY

IN

MECHANICAL ENGINEERING

Submitted by

P.ANAND

[19815A0361]

K.DURGA APARNA

[19815A0344]

K.NARESH

[19815A0341]

MD.K.SUBHANI

[19815A0350]

M.KIRAN

[19815A03A4]

Under the guidance of
P. SADHANA M.Tech
ASSISTANT PROFESSOR



DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(PERMANENTLY AFFILIATED TO JNTU-KAKINADA, ACCREDITED BY NBA &

NAAC, APPROVED BY AICTE, RECOGNISED BY UGC 12f & 2b)

(Affiliated to Jawaharlal Nehru technological university Kakinada, A.P)

TAMARAM, MAKAVARAPALEM, NARSIPATNAM-531113

2019-2022

DEPARTMENT OF MECHANICAL ENGINEERING
AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY



CERTIFICATE

This is to certify that the project entitled is **FATIGUE STUDIES OF SHOT/SHOCK PEENED GAS TURBINE BLADE ALLOYS** the record of the work carried out by Submitted by **P.ANAND [19815A0361], K.DURGA APARNA[19815A0344], K.NARESH [19815A0341], MD.K.SUBHANI [19815A0350]M.KIRAN [19815A030A4]** students of final year B. Tech in the department of Mechanical engineering. This work is done for the partial fulfillment for the award of **BACHELOR OF TECHNOLOGY** during the year 2021-2022.

**P. SADHANA [M.TECH]
ASSISTANT PROFESSOR**

PROJECT GUIDE

**V. HARI KIRAN [M.TECH],[P.HD]
ASSOCIATIVE PROFESSOR**

HEAD OF DEPARTMENT

External Examiner

ABSTRACT

In the present investigation, uniaxial loading and fatigue behaviour of shot peened medical grade Ti-alloy (Ti-6Al-4V) was studied. It was believed that the maximum failure of medical grade alloys is due to the cyclic fatigue loading. A medical device once deployed in human body is expected to withstand fatigue loading more than one million cycles depending on type of loading and unloading cycles. There are many surface engineering techniques such as heat-treatment and sand blasting developed to improve the fatigue life of metallic alloys, however shot peening is supposed to be the most effective contact-type surface engineering technique developed till date. A compressive residual stress will be generated on the surface during shot-peening, and this helps in delaying the crack propagation process. High speed ceramic or metallic balls are imparted on the target surface using high pressure compressed air during this process. The impact energy is transformed into plastic deformation of the polycrystalline material and compressive residual stresses are developed on the surface, and it can be realized upto several microns along the depth direction. The present work involves shot peening of Wire EDM cut ASTM Ti-6Al-4V alloy surface using ceramic shots, and after shot peening their fatigue life will be evaluated.