SYNOPSIS

TITLE OF THE PROJECT:

ANALYSIS OF BIONIC STRUCTURES FOR MANUFACTURING OF WALKING AIDS FOR PHYSICALLY CHALLENGED.

PROJECT REFERENCE NO: 46S_MTech_098

NAME OF THE COLLEGE:
BLDEA'S V P DR. P. G HALAKATTI COLLEGE OF ENGINEERING AND TECHNOLOGY ASHRAM ROAD, VIJAYAPUR – 586103

DEPARTMENT: MECHANICAL MACHINE DESIGN

Guide(s) Name: Dr.I.G. BHAVI and Dr.B.M. ANGADI

INTRODUCTION

Bionic structures are artificial structures that are designed to mimic the structures found in nature for the purpose of improving mechanical strength and durability. Bionic structure is a structure inspired by nature mainly its strength and functionality. This is done by recognizing structures of plant or animal species. Abstracting general principals from these biological systems and transferring these principles into design of the structure. Bionic structures for walking aids are becoming increasingly popular due to their ability to provide greater support and stability to people with mobility issues. These structures are designed with the latest technology to mimic the natural structures and improve walking ability.

OBJECTIVE

- To Identify bionic structures with light weight and high stiffness characteristics.
- To improve the stability.
- Ability to provide greater support.
- Comparison of experimental and finite element analysis results.
- To improve walking ability.

METHODOLOGY

1. Identifying different bionic structures having highest difference with the light weight.
2. Generation of 3D model with standard dimension as per ASTM.
3. Carrying out FEA for weight optimization and improvement in stiffness of the structures.
4. Manufacturing of components of standard dimensions using 3D printing technology with generated 3D model as an input.
5. Experimental testing to determining the stiffness of various Bionic structures.

Comparing the experimental results with finite element analysis results.

WORK PLAN

The bionic structures with (dimension) are designed using CATIA V5R20 software and exported into STL format and then the prototype of structures were created using 3D printing technology. After 3D printing the samples were tested for compression strength and bending strength using standard testing methods. These results are compared with analytical testing by FEA ANSYS software.

EXPECTED OUTCOMES

- Identification of best bionic structures for lightweight and having good stiffness characteristics.
- To reduce the strain and fatigue of a physically challenged people.
- Aesthetically good looks.
- Low cost.