

A

Project Report on

**PREDICTION OF THERMO- MECHANICAL BEHAVIOR OF HEMP-  
FIBRE POLYMER COMPOSITES**

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

Degree of

**BACHELOR OF TECHNOLOGY**

IN

**MECHANICAL ENGINEERING**

Submitted by

**B.SUNIL NAGA SATYANARAYANA** (19815A0306)

**B.VARMA** (19815A0305)

**G.SIVAJI RAO** (19815A0313)

**B.ANAND** (18811A0307)

Under the guidance of

**P.RAMANA BABU 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**

**2018-2022**

DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY



CERTIFICATE

This is to certify that the project entitled is the record of the work carried out by **B.Sunil (19815A0306), B.Varma (19815A0305), G.Sivaji (19815A0313), B.Anand (18811A0307)** students of final year B. Tech have done project work on **“HEMP FIBRE POLYMER COMPOSITES”** at AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY in the department of MECHANICAL ENGINEERING. This work is done for the partial fulfilment for the award of BACHELOR OF TECHNOLOGY during the year 2021-2022.

Project Guide

**P.RAMANA BABU** M.Tech  
Assistant professor

Head of the Department

**V. HARI KIRAN**, M. Tech,(Ph.D)  
Associate professor

External Examiner

## ABSTRACT

The use of natural fibre is gaining momentum as a substitute to glass or carbon reinforced in polymer composites. The effect of high moisture content in fibres causing poorly connected to the matrix, which resulting degraded the composites mechanical qualities. This work in order to exclude the creation of natural fibre (i.e., Hemp Fibre) reinforced composites, to overcome the interfacial problem. Hemp fibres are strong, durable as well volatility in characteristics then other textile fibres. The hemp fibre surface treatment utilizing alkaline solutions enhanced fibre-matrix adhesion. Thermal degradation of hemp fibre polymerization is exhibited by Thermo Gravimetric Analysis (TGA) and found that the hemp fibres are stable up to 230 °C. The most frequent production approach for open mould composites is the hand layup method recommended in this study. Mechanical test results indicate that hemp fibre treatment enhances both the tensile and flexural capabilities of epoxy composite reinforced with hemp fibre (5, 7.5, and 10 % weight). Alkali-treated hemp fibre composite reinforced with 10% wt had the maximum tensile and flexural strengths of 80.52 MPa and 56.52 MPa, respectively. Tensile strength of treated fibre composites containing 5%, 7.5% and 10% was improved by 32.23%, 30.69% and 49.04% respectively, when compared to untreated hemp composites. Scanning Electron Microscopy (SEM) was used to examine the untreated and treated surfaces of hemp fibres.