

# Gajendra Pandey

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## **Background:**

Completed post-graduation in Mechanical Engineering (Solid Mechanics and Design) from Indian Institute of Technology, Kanpur.

## **Projects:**

### **1. (M-Tech.) (IMPACT CHARACTERIZATION OF FRP PANELS AND T-JOINT) Experimentally Determining the Impact Properties of Composite Panels as well as T-joint.**

Mainly working on prepregs. In this experiment we first impact the panel with some particular energy and then compress it till it fails. Polymer composites are known for many attractive properties but their impact-induced resistance is poor. Impact of a foreign body affects the strength of composites considerably. Compression After Impact (CAI) properties becomes a critical parameter in design of structures especially in the aerospace applications. Thus one needs to perform impact tests on the polymer composite panels under controlled conditions and then determine compressive strength.

An air gun test setup is used to perform the impact tests under controlled conditions. An aluminum striker is used to impact the FRP panels. The velocity of the striker bar is measured with the help of a laser beam intersecting the striker bar and recording the pulse on a digital oscilloscope. The velocity of the striker bar is controlled to have desired impact energy.

Two types of specimens are used to determine the compressive strength after impact, (i) glassfiber angleply laminate (GAL) and (ii) glassfiber fabric laminate (GFL). After conducting experiments it is seen that the compressive strength of GAL specimens after impact is 15.7 MPa and that of the GFL specimen is 58.5 MPa. In comparison to GAL, the GFL specimens are thus found to possess considerably higher compressive strength after impact.

T-Joints are extensively used to make large FRP structures as one piece especially in aerospace industries. Impact of a foreign body affects the strength of T-Pull specimen considerably. A test facility to determine the tensile strength of T-Pull specimens after it is impacted by a striker bar is designed, fabricated and made functional. One test was performed on an unimpacted T-Pull specimen, supplied by NAL Bangalore, to establish that the setup works well.

2. **(B.E.) Torsion of Non Circular Bar – A Comparative Study Between Finite Element Approach and theory of Elasticity Approach.**

In this study a comparison is made between the results obtained by two well-established methods of stress analysis, namely the classical, theory of elasticity and numerical technique, the finite element approach. The two methods are applied to well-known problem of “Torsion of Non circular bars” and the results are compared. While solving the problem through finite analysis, requirement of large memory storage is in general a drawback for complex geometries. In view of this the bandwidth storage technique and bandwidth reduction techniques are used. In the present work the well-established bandwidth reduction method, Cut-hill Mckee Approach is applied before using the finite element approach.

3. **Optimization of Full Sleeve Shirt using Genetic Algorithm.**

This problem includes the optimization of cloths required in making a Full Sleeve Shirt. Genetic Algorithm is used here to optimize the cloth. The generalized code is written so that it can be used for optimizing different geometry by little modification. The code is written in C and for visualization OpenGL is used.

4. **Fluid Flow through bent pipe.**

In this problem flow through a bent tube is analyzed by using Finite Element Approach.

5. **Impact Properties of Composites.**

Since many properties of composite materials are yet to be determined and impact properties of composite materials are one of them. So here some of the impact properties of composite materials are determined through experiments.

6. **Propagation of Crack in Glass.**

In this problem the propagation of crack developed in glass is studied.

### Professional Courses During M-Tech Programme:

1. Composite Materials
2. Fracture Mechanics
3. Finite Element Method
4. CAD
5. Advanced Solid Mechanics
6. Programming in Numerical Analysis
7. Analysis and Design of Machine Tools.

### Computer Awareness:

*Languages and Libraries:* C, C++, OpenGL and Tcl/Tk

*Packages:* AutoCAD, MS-Office, ATILA, MATLAB, FEMLAB

*Operating Systems:* Windows, Linux, UNIX, DOS, and SOLARIS

### Educational Qualifications:

EXAMINATION	YEAR OF PASSING	% OF MARKS/ CPI	INSTITUTE	SUBJECTS
B.E.	2000	72.33 %	Pt. Ravi Shankar Shukla University (Raipur, Chattisgarh, India)	Mechanical
M-Tech	2002	8.3/10.0	IIT Kanpur (Uttar Pradesh, India)	Mechanical (Solid Mechanics and Design)

### Work Experience:

Worked on a project titled “*Micro-Flying Robot*” under **Dr. Bishakh Bhattacharya** from 06/07/2002 to 05/11/2002 in *Indian Institute of Technology Kanpur, India*. In this project I used various FEM software like **ATILA**, **FEMLAB** for vibration control of piezoelectric materials and visco-elastic materials.

### Personnel Details:

*Date of Birth:* 25 August, 1977

*Sex:* Male

*Marital Status:* Single

*Nationality:* Indian

## **Extra Curricular Activities:**

1. Active member of JESID club (student club) of GEC Raipur (1996-97).
2. Public Relation Officer of JESID club of GEC Raipur (1997-99).
3. Vice President of JESID club of GEC Raipur (1999-2000).
4. Pooling Booth member of Gymkhana Election of IIT Kanpur (2001).
5. Coordinator of security cell of Annual function of IIT Kanpur (Antragni-2001).

## **References:**

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