

VISVESWARAIAH TECHNOLOGICAL UNIVERSITY
BELGAUM – 590014



Project Report On

**“IMPROVEMENT IN THE DESIGN AND FABRICATION
OF LOW COST FILAMENT WINDING MACHINE”**

*A Project report submitted to Visveswaraiah Technological University
in partial fulfillment of the requirement for the award of degree of Bachelor of Engineering
in Mechanical Engineering*

By

ASLAM S	(4JN07ME400)
JITHIN PRAKASH	(4JN06ME031)
MOHAMMED ALEEM ULLA	(4JN06ME039)
MOHAMMED ALI	(4JN06ME040)

Under the guidance of

Dr. K. Sabeel Ahmed M.Tech., PhD
Professor, Department of Mechanical Engineering

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Department of Mechanical Engineering
JAWAHARLAL NEHRU NATIONAL COLLEGE OF
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ABSTRACT

In general, filament winding technique is used to fabricate composite pipes. In the present work, an attempt is made to design and fabricate a low cost filament winding machine to fabricate tubes and pipes at the specimen level. The fabricated machine mainly consists of a carriage assembly, switch mechanism, speed reduction mechanism and mandrel. Speed of carriage can be varied from 150, 200 250 and 300 rpm while the mandrel speed can be varied using a speed reduction pulleys from 20, 30 and 40 rpm. Various parts of the machine are designed from strength point of view. The overall size of the machine is 1270 mm length $\times$ 600 mm wide $\times$ 1050 mm height. It is floor mounted and is convenient to use.

The fabricated machine is tested for its performance by casting a jute/epoxy and jute/glass epoxy hybrid pipes. The observations from the test reveal that the developed machine can be successfully used to fabricate small sized specimens with any fiber and resin combination. The working of machine is found to be smooth with out any vibrations. The fiber orientation angles (helix angles) achieved are 70°, 65° and 55°, depending on the relative speed of the mandrel and carriage. It is possible to produce specimens with different diameters by changing the mandrel of required sizes.

However, the machine developed has a limitation that the length of the specimen that can be produced is limited to 500 mm. The cost of the fabricated machine has been estimated to Rs 8, 000=00 based on the material and labor cost.