

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
"Jnana Sangama, Belagavi-590018"**



FABRICATION OF BYPRODUCT USING BIODIESEL

A Project Report

Submitted in Partial Fulfillment of the Requirement for the
award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

Abirami V 1GV17ME042

Preetha K 1GV17ME039

Vignesh Prabhu H 1GV17ME032

Under the Guidance of

Mr. Sagar S

Assistant Professor
Department of Mechanical Engineering



Dr T Thimmaiah Institute of Technology

Oorgaum, Kolar Gold Fields – 563120

2017 – 2021

Dr T Thimmaiah Institute of Technology
Department of Mechanical Engineering

Oorgaum, Kolar Gold Fields -563120



CERTIFICATE

We hereby declare that the work to be submitted in the project is in line with the synopsis and topic, **“Fabrication of Byproduct using Biodiesel”**. The project work to be submitted to the institution is the original work and has not been submitted by us anywhere and to the best of our knowledge has not been carried out by anybody else and reported.

Place: KGF
Date:

Vignesh Prabhu H 1GV17ME032

Preetha K 1GV17ME039

Abirami V 1GV17ME042

ABSTRACT

Biodiesel, one of the most important sources of renewable energy, is produced in large quantities around the world. Biodiesel is a promising alternative, and renewable, fuel.

Biodiesel is prepared from the non edible oil of pongamia pinnata by transesterification; however, its production generates different kinds of residues and by products which raise economic and environmental concerns. As its production increases, so does production of the principle co-product, crude glycerol.

Biodiesel, one of the most important sources of renewable energy, is produced in large quantities around the world; however, its production generates different kinds of residues and by-products which raise economic and environmental concerns. This review presents a compilation of the data on current state of transformation of residues and by-products of biodiesel industry into products that are suitable for bio-refining. The review has analyzed glycerol

The effective utilization of crude glycerol will contribute to the viability of biodiesel. In this review, a byproduct from making biodiesel is glycerin. This glycerin can be filtered to remove any food particles or impurities, and used as an industrial degreaser in its raw form, composted and used as a fertilizer, or made into bar soap.

Bar soap made from glycerin byproducts is excellent for use in the shop because of its degreasing abilities, but can also be used as a household soap for everyday use. Adding fragrances and dyes will make household use more appealing to other members of the household.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANASANGAMA, BELAGAVI-590018

2020-2021



A PROJECT REPORT OF PHASE - I

ON

**“A STUDY MODEL OF MULITI OPERATIONAL
USING PNEUMATIC KIT”**

Submitted in partial fulfilment of the requirements for the award of degree

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

AKSHAY H R 1GV15ME003

MOHAN KUMAR J R 1GV16ME414

YASHWANTH V R 1GV16ME052

SACHIN K KHANDIBAGOUR 1GV15ME029

Under the esteemed guidance of

Mr. ANAND GADEKAR

Associate Professor

(DEPARTMENT OF MECHANICAL ENGINEERING)



Dr. T. THIMMAIAH INSTITUTE OF TECHNOLOGY, OORGAUM

KOLAR GOLD FIELDS, KARNATAKA - 563120.

Dr. T. THIMMAIAH INSTITUTE OF TECHNOLOGY



DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work of phase-I entitled **“A STUDY MODEL OF MULTI OPERATIONAL USING PNEUMATIC KIT”** carried out by Mr **AKSHAY H R (1GV15ME003)**, **MOHAN KUMAR J R (1GV16ME414)**, **YASHWANTH V R (1GV16ME052)** and **SACHIN K KHANDIBAGOUR (1GV15ME029)** a bonafide students of VII semester Mechanical Engineering in partial fulfilment for the award of Bachelor of Engineering in **Dr. T. Thimmaiah Institute of Technology** of Visvesvaraya Technological University, Belagavi during the year of 2020-2021. It is certified that all correction/suggestion indicated for Internal Assessment been incorporated in the report.

The project report has been approved as it satisfied the academic requirements in respect of project work phase-I prescribed for the side degree.

Project Guide

Mr. Anand Gadekar

HOD

Dr. H G Shenoy

Principal

Dr. Syed Ariff

ABSTRACT

Pneumatic actuators are the devices used for converting pressure energy of compressed air into the mechanical energy to perform useful work. In other words, Actuators are used to perform the task of exerting the required force at the end of the stroke or used to create displacement by the movement of the piston. The pressurized air from the compressor is supplied to reservoir. The pressurized air from storage is supplied to pneumatic actuator to do work. Pneumatic systems are used extensively in industry, and factories are commonly plumbed with compressed air or compressed inert gases. Pneumatic actuators offer several advantages over electromechanical and hydraulic actuators for positioning applications. The pneumatic actuator represents the main force control operator in many industrial applications, where its static and dynamic characteristics play an important role in the overall behavior of the control system. Therefore, improving the dynamic behavior of the pneumatic actuator is of prime interest to control system designers. The main objective of this project is to prepare a model of multi operational Pneumatic Kit for educational purpose and future use. This report deals with the introduction, objective, reason and requirements for the project.

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
“Jnana Sangama, Belagavi-590018”**



**To minimize the problems and defective measures associated with the
manufacturing of Spur gear by using the TQM and Six Sigma Lean
manufacturing techniques and approaches**

A Project Report
Submitted in Partial Fulfillment of the Requirement for the
award of

**BACHELOR OF ENGINEERING
IN
MECHANICAL ENGINEERING
BY**

S Akshay Kore 1GV17ME004

Syed Shahzama S 1GV17ME040

Altamesh Rabbani 1GV18ME401

Gowtham R 1GV18ME405

Mujammil Ahmed 1GV16ME415

Under the Guidance of

Mr. Dileep R

Associate Professor
Department of Mechanical Engineering



**Dr. T Thimmaiah Institute of Technology
Oorgaum, Kolar Gold Fields – 563120**

2017-2021

Dr T Thimmaiah Institute of Technology Department of Mechanical Engineering

Oorgaum, Kolar Gold Fields -563120



Certified that the project work entitled **“To minimize the problems and defective measures associated with the manufacturing of Spur gear by using the TQM and Six Sigma Lean manufacturing techniques and approaches”** carried out by **S Akshay Kore – 1GV17ME004, Syed Shahzama – 1GV17ME040, Altamesh Rabbani – 1GV18ME401, Gowtham R – 1GV18ME405 and Mujammil Ahmed – 1GV16ME415**, a bonafide students of Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, in partial fulfillment for the award of **Bachelors Degree in MECHANICAL ENGINEERING**, of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year **2017-2021**. To the best of our knowledge, the work reported has not been submitted by me elsewhere for the award of the degree and is not the repetition of the work carried out by others.

Certified that the above declaration made by us is true to the best of our knowledge.

Signature
Professor and Head

ABSTRACT

The cruciality of choosing this topic relevant to manufacturing issues of spur gears are that it's a case of rejections and reworks relative to the manufacturing of the gears and its objective is all about that it leads to large consumption of time and delay in achieving the target at the prescribed time., It is to minimize variations in the manufacturing of spur gears. In define phase after gathering the data analyzed what is the cause and effects of these defects using fish bone diagram and SIPOC diagram. In measure phase Pareto analysis is done to measure which types of defects are occurred and cumulative percentage of defects are measured. In analysis phase statistical process control is done after collecting the data while machining and finding the revised control limits to make the process stable. In improvement phase process failure mode effects analysis (FMEA) is done to identify potential mode of failure, potential cause of failure, and effects of failure are in control phase control measures are proposed in order to minimize defects.

A PROJECT REPORT OF PHASE - 2

On

“DESIGN OF MULTIPURPOSE SUPER CLEANER FOR COVID-19”

In partial fulfilment of the requirement for the award of degree

Bachelor Of Engineering

In

MECHANICAL ENGINEERING

OF VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

BY

ARCHANA .K (1GV15ME047)

ABIRAMI .R (1GV18ME400)

MENAGA .M (1GV18ME409)

SOWMYA .S (1GV18ME415)

Under the guidance of

Mrs. ANITHA DEVI S H

Assistant Professor

DEPARTMENT OF MECHANICAL ENGINEERING

Dr.TTIT



2020-2021

DEPARTMENT OF MECHANICAL ENGINEERING

Dr.T. Thimmaiah Institute of Technology

Oorgaam, KGF- 563120

Dr.T. THIMMAIAH INSTITUTE OF TECHNOLOGY



Kolar Gold Fields -563120.

DEPARTMENT OF MECHANICAL ENGINEERING
CERTIFICATE

Certified that the project work of phase-2 entitled
“DESIGN OF MULTIPURPOSE SUPER CLEANER FOR COVID-19”

Is a bona fide work carried out by

ARCHANA .K	(1GV15ME047)
ABIRAMI .R	(1GV18ME400)
MENAGA .M	(1GV18ME409)
SOWMYA .S	(1GV18ME415)

The students of 8th semester B.E. Mechanical Engineering under our supervision and guidance submitted in partial fulfilment of the requirements for the award of degree of Bachelor of Engineering of visvesvaraya technological university, during the academic year 2020-2021.

Signature of the Guide

Mrs. Anitha Devi S H

Assistant Professor

Department of Mechanical Engg.

Dr.TTIT

Signature of the HOD

Dr. H.G. Shenoy

Vice principal & HOD

Department of Mechanical Engg.

Dr.TTIT

ABSTRACT

Cleanliness is the main basic need for all human beings and is the daily routine process especially in this COVID-19 times. With the new programme from the Government of India that is Swacch Bharat Abhiyan (SBA) or Swacch Bharath Mission (SBM) aiming to clean up the streets, roads and infrastructure of Indian cities there is need for cleaning our environment effectively. A novel method of cleaning application for Indian conditions has been through of and we developed with modified technology suitably. Since 1952 this equipment can be used for doing the long distance and wide width areas reducing the human effort so that the cleaning can be done in a single drive. Many large machines have been made to overcome this problem but it is very costly and in order to make effortless and very efficient cleaning our super cleaner be conveniently used.

So we arised with the thought to design a single cleaning machine by which the entire cleaning processes like sweeping, mopping, sanitizing, vacuuming and cob web cleaning could be done. In our project we are aimed to use easily available materials with low cost that can be easy to use and control. It being the better alternative for conventional cleaning, our multi-purpose super cleaner designed can be ideally used in airports, railway platform, bus stand, malls, schools, colleges, hospitals, auditorium and in many other commercial places as well as for domestic cleaning too. Our proposed project could also replace the tedious human labour along with timely sanitation in crowded areas.

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
“Jnana Sangama, Belagavi-590018”**



**Evaluation of Steel wire ropes using Destructive and
Non-Destructive testing**

A Project Report

Submitted in Partial Fulfilment of the Requirement for the award of

**BACHELOR OF ENGINEERING
IN
MECHANICAL ENGINEERING
BY**

Bhargav JP 1GV16ME007
Syed Raiyan Ahmed 1GV17ME029
Tejas Kumar N 1GV17ME030
Sabahat Fathima 1GV17ME041

**Under the Guidance of
Dr. NARASIMHA C**

Associate Professor
Department of Mechanical Engineering



**Dr T Thimmaiah Institute of Technology
Oorgaam, Kolar Gold Fields – 563120**

2017 – 2021

Dr T Thimmaiah Institute of Technology
Department of Mechanical Engineering

Oorgaum, Kolar Gold Fields -563120



Certified that the project work entitled “**EVALUATION OF STEEL WIRE ROPES USING DESTRUCTIVE AND NON-DESTRUCTIVE TESTING**” carried out by **BHARGAV. J.P (1GV17ME007)**, **SYED RAIYAN AHMED (1GV17ME029)**, **TEJAS KUMAR. N (1GV17ME030)** and **SABAHAT FATHIMA (1GV17ME041)** a Bonafede students of VIII semester Mechanical Engineering In partial fulfilment for the award of Bachelor of Engineering in Dr. T. Thimmaiah institute of technology of Visvesvaraya Technological University, Belagavi during the year of 2020-2021. It is certified that all correction/suggestion indicated for Internal Assessment been incorporated in the report.

The project report has been approved as it satisfied the academic requirements in respect of project work prescribed for the side degree.

Signature
Professor and Head

ABSTRACT

This project involves in detail study of the steel wire rope for safe operations, by this study, a detailed evaluation of cage suspension gear parts and steel wire rope condition is determined which in turn gives safety of men and machinery in the mining operations.

Destructive tests are claimed out to the specimen's failure, in order to understand specimen's performance or material behaviour under different loads. In this method specimens are broken or damaged, intentionally. Destructive testing is most suitable, and economic, for objects which will be mass-produced, as the cost of destroying a small number of specimens is negligible. It is usually not economical to do destructive testing where only one or very few items are to be produced. NonDestructive Testing (NDT) techniques are used in science and industry to evaluate the properties of a material, component or system without causing damage.

It is the testing of materials, for surface or internal flaws or metallurgical condition, without interfering in any way with the integrity of the material or its suitability or

service The goal of this project is to evaluate the condition of cage suspension gear parts such as Bridle Chains, Right angle double jaw chase block, Chase plate,

Distribution plate, King type detaching hook, D Shackles with Pins and steel wire rope for safe operations in mining industry before it reaches the failure condition

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
JNANASANGAMA, BELGAVI – 590018
2020-2021



“A PROJECT PHASE II REPORT”
(17MEP85)
On

**“DEVELOPMENT OF CASTING PATTERN USING
RAPID PROTOTYPING”**

In partial fulfilment for the award of the degree of

**BACHELOR OF ENGINEERING
In
MECHANICAL ENGINEERING**

Submitted By:

GAJENDRA R N (1GV16ME009)
PAVAN KUMAR C (1GV16ME023)
PUNITH H D (1GV16ME028)
SHARATH S R (1GV16ME039)

Under the Guidance of

**MR.BALA SUBRAMANIAM N S
ASSISTANT PROFESSOR**



**DEPARTMENT OF MECHANICAL ENGINEERING
Dr. T. THIMMAIAH INSTITUTE OF TECHNOLOGY
OORGAUM, KOLAR GOLD FIELDS, KARNATAKA – 563120**

Dr.T THIMMAIAH INSTITUTE OF TECHNOLOGY
OORGAUM, KOLAR GOLD FIELDS – 563120
DEPARTMENT OF MECHANICAL ENGINEERING



CERTIFICATE

This is to certify that the Project Entitled **Development of Casting pattern using Rapid Prototyping** has carried out by

GAJENDRA R N (1GV16ME006)

PAVAN KUMAR C (1GV16ME023)

PUNITH H D (1GV16ME028)

SHARATH S R (1GV16ME039)

The students of **Dr. T THIMMAIAH INSTITUTE OF TECHNOLOGY** in partial fulfillment for the award of **BACHELOR OF ENGINEERING** in **MECHANICAL ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM** during the year 2020-2021. It is certified that all correction/suggestion indicated for internal assessment have been incorporated in the report deposited in the department library.

.....
Guide

.....
HOD

.....
Principal

Name of Examiners

Signature with date

- 1.
- 2.
- 3.

ABSTRACT

The competition in the world market for manufactured products has intensified tremendously in recent years. It has become important to produce the product fast to reach the market as early as possible, by using the available new technology.

In order to improve the quality in foundries the CAD/CAM and other advanced manufacturing techniques have been used as a tool to achieve quality and productivity. In this concern, the use of Rapid Prototyping (RP) is not yet fully practiced in foundries. This project work provides an initial study on the fabrication of a master pattern (step bar) of casting using rapid prototyping technique as well as presenting its scope and benefits compared to the current practices.

The main objective of this work is to enlighten the foundry engineers to make use of rapid prototyping technology (fused deposition modeling), to reduce the lead-time in the production of sand castings of an acceptable quality and dimensional accuracy. In the present work a model of the component (pattern) is prepared in the CAD software (CATIA) and then imported in R.P Software and.STL information is supplied to FDM (Fused Deposition Model) Machine to prepare the R.P.Model. The finally prepare R.P.Model is used as pattern to produce casting in foundry. In order to have a comparison between the R.P.Model casting, a wooden pattern of the same size of R.P.Model is also used to produce the same component in the foundry. The work is extended to study microscopic observation of castings and mechanical properties obtained by using both the castings.. A comparative study of surface roughness of the RP model and wooden model is being done to observe the effect

The results obtained by comparative study between casting obtained by R.P.Model pattern and wooden pattern shows that there is variation in the surface roughness of the components where as the mechanical properties will almost remain same. The surface quality of the component obtained by using R.P is good.

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
“Jnana Sangama, Belagavi-590018”**



A Project Report on

**Study on Semi-Automatic Train Coupling Design Using
Hydraulic Cylinder**

Submitted in Partial Fulfillment of the Requirement for
the award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

Girish J K 1GV17ME011

Hemanth L G 1GV17ME016

Chethan Kumar B 1GV17ME038

Sanjay S Murthy 1GV16ME034

Under the Guidance of

Dr. MANJUNATHA BABU N S

Associate Professor

Department of Mechanical Engineering



Dr T Thimmaiah Institute of Technology

Oorgaum, Kolar Gold Fields – 563120

2017 – 2021

Dr T Thimmaiah Institute of Technology
Department of Mechanical Engineering
Oorgaum, Kolar Gold Fields -563120



Certified that the project work entitled **“Study on Semi-Automatic Train Coupling Design Using Hydraulic Cylinder”** carried out by **Girish J k-1GV17ME011, Hemanth L G-1GV17ME016, Chethan Kumar B-1GV17ME038 & Sanjay S Murthy-1GV16ME034**, a bonafide students of Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, in partial fulfillment for the award of **Bachelors Degree in MECHANICAL ENGINEERING**, of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year **2017-2021**. To the best of our knowledge, the work reported has not been submitted by me elsewhere for the award of the degree and is not the repetition of the work carried out by others.

Certified that the above declaration made by us is true to the best of our knowledge.

Signature
Professor and Head

ABSTRACT

Transportation is the key for the development of country, and it's vital to make the transportation quick and safe, perhaps Indian Railways is India's national railway system operated by the ministry of railways. To build structurally strong and reduce time for coupling, the Hydraulic System is used.

At present manual system of coupling is used, in this process the technician is forced to get down on to the track and fix the hook with meshing part. This is Time consuming and also it leads to human fatality.

Semiautomatic coupler is designed to ensure a permanent mechanical and hydraulic connection between the engine and compartment unit. It does not need to be uncoupled unless there is any emergency or when in a maintenance workshop.

In this process the coupling speed is faster, reduces potential impact damage and increases passenger protection.

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
“Jnana Sangama, Belagavi-590018”**



Design and Prototype of Smart Automated Pill Dispenser

A Project Report

Submitted in Partial Fulfillment of the Requirement for the

award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

R. Hemanth Kumar **1GV17ME014**

S. Kishore Raj **1GV17ME020**

Wasi Ulla Khan Junaid **1GV17ME036**

S. Subashkaran **1GV18ME417**

Under the Guidance of

S. Suresh Kumar

Associate Professor
Department of Mechanical Engineering



Dr T Thimmaiah Institute of Technology

Oorgaum, Kolar Gold Fields – 563120

2017 – 2021

Dr T Thimmaiah Institute of Technology

Department of Mechanical Engineering

Oorgaum, Kolar Gold Fields -563120



Certified that the project work entitled **“Design and Prototyping Of Smart Automated Pill Dispenser”** carried out byby Mr. **R HEMANTH KUMAR (1GV17ME015)**, **S. KISHORE RAJ (1GV17ME020)**, **WASI ULLA KHAN JUNAID (1GV17ME036)** and **S. SUBASHKARAN (1GV18ME417)**, a bonafide students of Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, in partial fulfillment for the award of **Bachelors Degree in MECHANICAL ENGINEERING**, of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year **2017-2021**. To the best of our knowledge, the work reported has not been submitted by me elsewhere for the award of the degree and is not the repetition of the work carried out by others.

Certified that the above declaration made by us is true to the best of our knowledge.

Signature
Professor and Head

ABSTRACT

In this era of modern medicine where humans are largely dependent on the use of pills/tablets we know at least 1 or more who have to take their medication in the form of pills/tablets in order to live a healthy life.

In this project, we focus on a Smart automated machine which will help a person to take his/her pills on time according to a schedule and mainly focusing on making sure that your loved ones who are either old aged or having memory loss or have difficulty in remembering the medicine schedule take their pills on time from the touch of your phone around the world.

The project includes designing and fabrication of the body and the parts of the final product. Design will be done using software's like Solid Works or AutoCAD. The physical product will have PLC circuits and a Bi-directional rotating mechanism which will be enclosed inside the body of the product. This product will also be WI-FI enabled and has a dedicated smart app which can be downloaded on the phone. It also has a colored LCD panel screen which is mounted on the body and be accessed with the buttons provided on the body.

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
“Jnana Sangama, Belagavi-590018”**



A Project Report on
Modeling and Analysis of Liquefied Gas Storage Tanks

Submitted in Partial Fulfillment of the Requirement for
the award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

Jagannatha S 1GV17ME017

Mahesh S 1GV17ME021

Sridhar S 1GV17ME027

Under the Guidance of

Mr. THONTARAJ URS T S

Assistant Professor
Department of Mechanical Engineering



Dr T Thimmaiah Institute of Technology

Oorgaum, Kolar Gold Fields – 563120

2020 – 2021

Dr T Thimmaiah Institute of Technology
Department of Mechanical Engineering

Oorgaum, Kolar Gold Fields -563120



Certified that the project work entitled “**Modeling and Analysis of Liquefied Gas Storage Tanks**” carried out by **Jagannatha S-1GV17ME017, Mahesh S-1GV17ME021 & Sridhar S-1GV17ME027**, a bonafide students of Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, in partial fulfillment for the award of **Bachelors Degree in MECHANICAL ENGINEERING**, of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year **2017-2021**. To the best of our knowledge, the work reported has not been submitted by me elsewhere for the award of the degree and is not the repetition of the work carried out by others.

Certified that the above declaration made by us is true to the best of our knowledge.

Signature
Professor and Head

ABSTRACT

The finite element analysis (transient thermal and structural) of hydrogen tank is performed with ANSYS Software.

This analysis incorporates temperature dependent material properties, temperature and pressure variations across the height of the tank during chill-down with liquid Nitrogen (LN₂) followed by liquid Hydrogen (LH₂) for analyzing behaviour of the tank.

Temperature distribution of the tank and magnitude are obtained and used for estimation of transient heat transfer, induced thermal stress, structural stress, distortion in the material due to chill-down and pressurization. In order to avoid thermal crack, chill-down at controlled rate of cooling restricting temperature difference across the tank height is maintained.

After a cryogenic liquid has been liquefied and purified to the desired level; it should then be put away and transported. Cryogenic fluid storage-vessel and transfer line design has progressed rapidly as a result of the growing use of cryogenic liquids in many areas of engineering and science.

Cryogenic Pressure vessels are weight vessels are utilized for capacity cryogenic fluids with least warmth in-spill into the vessel from the outside beyond what many would consider possible. The test of configuration is to utilize such materials that don't lose their alluring properties at such a low temperature. Here the most extreme care is taken to plan a capacity vessel fulfilling both mechanical and Thermal Properties.

The outcomes will be contrasted with the current vessel of industry. Glass epoxy can be utilized which decrease warm exchange from conduction of Surge plates which are will bolster from external vessel to inward vessel.

The glass epoxy significantly with stands the temperature. They appear in these sectors industrial compressed air receivers and domestic hot water storage tanks. Other examples of pressure vessels are diving cylinders, recompression chambers, distillation towers, pressure reactors, etc.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
“Jnana Sangama, Belagavi-590018”



**“PREPARATION AND CHARACTERIZATION OF COMPOSITES
MADE FROM SEED AND ROOT FIBRE WITH EPOXY RESIN”**

A Project Report

Submitted in Partial Fulfillment of the Requirement for the award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

ABHISHEK KUMAR SHARMA M	1GV17ME002
PRADYUMNA H	1GV17ME013
C NIKHIL	1GV17ME008
AKSHAY S	1GV17ME006

Under the Guidance of

Mr. SRINIVAS A

Assistant Professor
Department of Mechanical Engineering



Dr T Thimmaiah Institute of Technology

Oorgaum, Kolar Gold Fields – 563120

2017 – 2021

Dr T Thimmaiah Institute of Technology
Department of Mechanical Engineering
Oorgaum, Kolar Gold Fields -563120



Certified that the project work entitled **“Preparation and Characterization of Composites Made From Seed and Root Fibers With Epoxy Resin”** carried out by ABHISHEK KUMAR SHARMA M (1GV17ME002) PRADYUMNA (1GV17ME013) AKSHAY S (1GV17ME006) C NIKHIL (1GV17ME008) , a bonafide students of Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, in partial fulfillment for the award of **Bachelors Degree in MECHANICAL ENGINEERING**, of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year **2017-2021**. To the best of our knowledge, the work reported has not been submitted by me elsewhere for the award of the degree and is not the repetition of the work carried out by others.

Certified that the above declaration made by us is true to the best of our knowledge.

Signature
Professor and Head

ABSTRACT

This project involves segregation of root and seed fibers are done and separation process is carried out depending upon their thickness and length. In introduction Natural fibers in these present days has more values because of its eco-friendly nature. Objective of the project includes to determine and analyze the mechanical properties such as tensile strength, strength, abrasion, loss and hardness and to develop a new class of composites by incorporating the seed particles with root fiber in the Epoxy resin.

Detailed methodology is briefed such as explanation of selection of fiber (Palmarosa) which is also called *Cymbopogon martini* and how fiber treatment process carried out and also a detail explanation of specimen preparation and the process such as testing carried out once specimen is prepared. Outcome that we can expect from project such as obtaining the good percentage ratio of the fiber and resin enforcement and also treating the fiber to the different concentration of NaOH 5%, 10%, 15% to find the good bonding between resin and fiber and also by varying the percentage of resin and fiber reinforcement and expected to obtain a optimum ratio in fiber and resin.

Scope of the project is the further study of fiber percentage is increased to 40% and the resin percentage is decreased to 60% to check the optimum value. Based on the results of the experiment carried out conclusions are drawn such as density of root fiber of Palmarosa is found to be 0.8g/cm³. The specimen is prepared using mould box dimension 175x160 mm with the required tolerance, the mould box is made up of metal and hinged with bolts for experimental purposes. Later specimen are cut into pieces according to American Society For Testing and Materials and with a common testing standard D638 which is used for determining the tensile property of reinforced and non-reinforced plastics.

Keywords: Palmarosa root fiber, terminalarajuna root fiber, root fiber composite, universal testing machin

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
“Jnana Sangama, Belagavi-590018”**



**“EFFECTS OF THERMO HYDRAULICS PARAMETERS
ON PERFORMANCE OF HEAT EXCHANGER”**

A Project Report

Submitted in Partial Fulfillment of the Requirement for the
award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

PREM KUMAR J 1GV17ME022

MATHEW SUSIL W 1GV18ME408

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**Under the Guidance of
Dr. P D SUDERSANAN**

Professor
Department of Mechanical Engineering



Dr T Thimmaiah Institute of Technology

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Oorgaum, Kolar Gold Fields -563120



DECLARATION

We hereby declare that the project work embedded in this report entitled, **“EFFECTS OF THERMO HYDRAULICS PARAMETERS ON PERFORMANCE OF HEAT EXCHANGER”**, which is submitted for the award of the degree of **Bachelor’s in Mechanical Engineering** under the Visvesvaraya Technological University, Belagavi, has been carried out under the guidance of **Dr. P D SUDERSANAN**, A Professor, Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, KGF-563120, Karnataka India, further declare that the Thesis is based on team work, which is previously unpublished. We also declare that the results of this work have not been submitted in part or in full for the award of any diploma or degree of this or any other institution.

Place: KGF

Students Name USN

Signature

Date:

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ABSTRACT

Heat exchangers play a significant role in process industries for the efficient heat transfer between fluids when they are in direct or indirect contact. They can transfer heat between a liquid and a gas or between two gases or as a liquid to liquid heat exchanger. They, in this manner, form indispensable and inescapable equipment in an extensive variety of industries such as power generation, food processing, refrigeration, desalination, air conditioning, automobiles and electronics cooling. An extensive variety of heat exchangers are available in the market to take into account the requirements of various industries, like shell and tube heat exchangers, double pipe heat exchangers, plate type heat exchangers and spiral heat exchangers and so on. Based on the process requirements, the type of fluid, its phase, operating temperature, density, viscosity, pressure, chemical composition and various other thermodynamic properties, the appropriate type and size of the heat exchanger can be chosen. In this study an experimental setup of shell and tube heat exchanger with a rotated triangular tube layout with four baffles having 25% baffle cut is studied. The work is carried out for different mass flow rate and number of baffles. From the experimental results, the heat transfer coefficient, pressure drop, overall heat transfer coefficient is obtained. The same setup is modeled and imported to numerical analysis with the equivalent boundary conditions. The numerical simulations are carried out to identify the effects such as heat transfer coefficient and pressure drop by using commercial CFD package. The shell side heat transfer coefficient, pressure drop, overall heat transfer coefficient and performance factors are obtained from three different tube layouts and three baffle cuts among varying number of baffles along with different mass flow rates. The CFD results of heat transfer coefficient, pressure drop and overall heat transfer coefficient are observed and compared with the experimental results. The modifications are done in CAD model for further investigations. The models are simulated to know the influences of tube layout and other design parameters on thermo hydraulic parameters. These, thermo hydraulic parameters are very helpful in evaluating the performance of shell and tube heat exchangers. It is observed that the triangular tube layout is giving better results comparing to other layouts.

Keywords: *Shell and tube heat exchanger, Triangular tube layout, CFD, Numerical simulation*

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
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**“MODELLING AND ANALYSIS OF LEAF SPRING FOR
LIGHT MOTOR VEHICLE”**

A Project Report

Submitted in Partial Fulfillment of the Requirement for the
award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

SHASHI KIRAN P	- 1GV16ME054
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Under the Guidance of

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Dr T Thimmaiah Institute of Technology

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2017 – 2021

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DECLARATION

We hereby declare that the project work embedded in this report entitled, **“MODELLING AND ANALYSIS OF LEAF SPRING FOR LIGHT MOTOR VEHICLE”**, which is submitted for the award of the degree of **Bachelor’s in Mechanical Engineering** under the Visvesvaraya Technological University, Belagavi, has been carried out under the guidance of **Mr. SAMPATH.A**, A Professor, Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, KGF-563120, Karnataka India, further declare that the Thesis is based on team work, which is previously unpublished. We also declare that the results of this work have not been submitted in part or in full for the award of any diploma or degree of this or any other institution.

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ABSTRACT

Leaf springs are one of the most commonly used suspension systems in Automobiles. The advantage of leaf spring over helical spring is that the ends of the spring may be guided along a definite path as it deflects to act as a structural member in addition to energy absorbing device. The main function of leaf spring is not only to support vertical load but also to isolate road induced vibrations. It is subjected to millions of load cycles leading to fatigue failure. Finite element analysis is used to determine the safe stress and payload of the leaf spring and also to study the behavior of structures under many conditions and comparison of result with different materials. SolidWorks is used for 3D modeling of leaf spring and analysis software ANSYS 15.0 is used for FEM analysis of leaf spring as FEM is an accurate, efficient and less time-consuming method of analysis. A leaf spring configuration of light commercial vehicle is chosen for study.

Keywords: Leaf springs, solid works, ANSYS 15.0, FEM.

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
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Design and Fabrication of All-Terrain Vehicle Dumper

A Project Report

Submitted in Partial Fulfillment of the Requirement for the
award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

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DECLARATION

We hereby declare that the project work embedded in this report entitled, “*Design and Fabrication of All-Terrain Vehicle Dumper*”, which is submitted for the award of the degree of **Bachelor’s in Mechanical Engineering** under the Visvesvaraya Technological University, Belagavi, has been carried out under the guidance of **Dr. H.G SHENOY**, Associate Professor, Department of Mechanical Engineering, Dr T Thimmaiah Insitute of Technology, KGF-563120, Karnataka India, further declare that the Thesis is based on team work, which is previously unpublished. We also declare that the results of this work have not been submitted in part or in full for the award of any diploma or degree of this or any other institution.

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ABSTRACT

Material handling is an essential element in any farm land or garden. This can be done by big tractor trailers or hand carts. Small scale farmers who possess less land to operate, cannot afford expensive tractors for their small lands. Also today we don't find smaller dumpers which can help small farmers or house hold gardening. We have seen our gardeners and estate staff working hard with their hand cart to move the material in and around our college campus. Different types of All-Terrain vehicles (ATV) are available in the market which are not suitable for the farmers.

Hence we decided to develop an ATV dumper which is inspired from the idea of a dump truck. This dumper is having a removable and moveable dumper which will help farmers to move heavy material through various terrain. Our present work is aimed to design and fabricate an ATV dumper which makes a viable mode of conveyance to carry heavy material with ease around the college campus. Being an ATV dumper this can also be used further for farming. The all-terrain vehicle dumper is designed and fabricated in-house, which is at a low cost.

Primarily the design of our project is established using conceptual design strategy by using the Solid Edge, Solid Works and then it is analyzed using Ansys workbench for structural feasibility. After freezing the conceptual design, fabrication is carried out using arc welding. We have also used fasteners to mount various parts with dampers to minimize the vibrations so that the end user will not have any difficulty in operating or servicing the machine. Interchange or replacing parts is very easy and convenient as all standard fasteners are used which are readily available in the market. It is fitted with a 150 cc petrol engine for powering the rear wheels of the cart and has a single seat for the driver. 4 wheels are used for stability and safety.

Finally, the "All-terrain vehicle dumper" is tested with various loads and terrain conditions and worked satisfactorily as intended to. This will be a userfriendly cart, perfectly suitable for the all-weather and all terrain conditions. Instead of using big tractors for a small and medium farm land or agricultural land, farmers can use this ATV dumper to move or carry or transport things around their land.