

HYBRID VEHICLE
Project report submitted
In partial fulfillment of the requirements of the degree of
Bachelor of Technology
in
MECHANICAL ENGINEERING

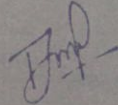
by
SACHIN [1501020010]
MOHD. TANZEEM HAIDER [1501020015]
ADITYA KUMAR MANDAL [1501020023]
VIPIN INDORIA [1501020012]

Under the Supervision of
SURENDRA KUMAR YADAV



SCHOOL OF ENGINEERING AND TECHNOLOGY
K R MANGALAM UNIVERSITY, GURUGRAM, HARYANA,
INDIA

APRIL, 2019

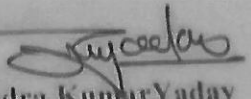

Registrar
K. R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "Hybrid Vehicle" by the following students:

Name of the Students	Roll Number
Sachin	1501020010
Mohd. Tanzeem Haider	1501020015
Aditya Kr. Mandal	1501020023
Vipin Indoria	1501020012

has been carried out under my/our supervision and this work has not been submitted elsewhere for a degree.


Mr. Surendra Kumar Yadav

Assistant Professor

School of Engineering & Technology
K R Mangalam University, Gurugram, Haryana, India

DECLARATION

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Names of the students)

Sachin

Tanzeem

Aditya

Vipin

(Roll No.)

1501020010

1501020015

1501020023

1501020012

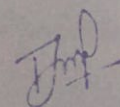
(Signature)

Sachin

Tanzeem

Aditya

Vipin

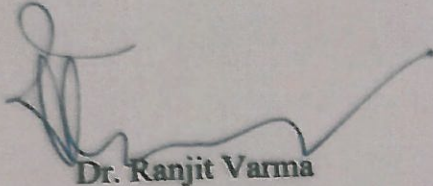


Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

APPROVAL SHEET

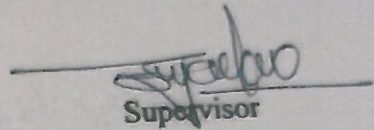
This project report entitled Hybrid Vehicle by (Aditya Kumar Mandal, Sachin, Mohd. Tanzeem Haider, Vipin Indoria) is approved for the degree of B.Tech (Mechanical Engineering), School of Engineering and Technology.



Dr. Ranjit Varma

DEAN, SOET

School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103



Supervisor


Mr. Surendra Kumar Yadav

(Assistant Professor)

Date: 20/05/2019

Place: Gurugram

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103



Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGEMENT

It gives us immense pleasure to express my deepest sense of gratitude and sincere thanks to our highly respected and esteemed guide Mr. Surendra Kumar Yadav for his valuable guidance, encouragement and help for completing this work. His useful suggestions for this whole work and co-operative behaviour are sincerely acknowledged.

We also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped us to face the challenges ahead.

At the end we would like to express our sincere thanks to all our friends and others who helped us directly or indirectly during this project work.

Place: Gurugram

Students Name

Sachin [1501020010]

Vipin [1501020012]

Aditya [1501020023]

Tanzeem [1501020015]

Date:

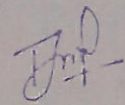


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT

The studies for hybrid electric vehicle (HEV) have attracted considerable attention because of the necessity of developing alternative methods to generate energy for vehicles due to limited fuel based energy, global warming and exhaust emission limits in the last century. HEV incorporates internal combustion engine, electric machines and power electronic equipment. In this paper, an overview of hybrid vehicle is presented. In fact, we aim to introduce the HEVs and present their history, advantages, disadvantages, classification, vehicle types, energy management strategies and some other related information. The methodology used in this paper is descriptive, library and analytical.

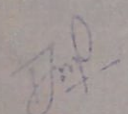
The vehicle is lighter and roomier than a purely electric vehicle, because there is less need to carry as many heavy batteries. The internal combustion engine in hybrid-electric is much smaller and lighter and more efficient than the engine in a conventional vehicle. In fact, most automobile manufacturers have announced plans to manufacture their own hybrid versions. Hybrid electric vehicles are all around us.



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

Chapter No.	Title	Page No.
	Title Page	
	Certificate	i
	Approval sheet	ii
	Declaration	iii
	Acknowledgement	iv
	Abstract	v
	Table of Contents	vi-vii
	List of Figures	viii
1.	Introduction	1-6
	1.1 Hybrid vehicle	3
	1.2 Benefits of hybrid vehicle	4
	1.3 Types by degree of hybridization	5
	1.3.1 Full hybrid	5
	1.3.1 Mild hybrid	6
2.	Literature Review	7-14
	2.1 History	7
	2.2 Technical Field	9
	2.3 Description	10
3.	Objectives and methodology	15
	3.1 Aim of project	15
	3.2 Requirements	15
	3.3 Methodology	15
4.	Design and Parts Specification	16-28
	4.1 Project description	16
	4.2 Hybrid vehicle design pathways	16
	4.3 Chassis & vehicle dynamics	18
	4.4 Design	19
	4.5 Developing key components	21
	4.5.1 Controller	21


 Registrar
 K.R. Mangalam University
 Sohna Road, Gurugram, (Haryana)

Four Wheel Electric Forklift

Project report submitted

In partial fulfillment of the requirements of the degree of

Bachelor of Technology

in

Mechanical Engineering

by

Hitin Behl (1501020004)

Vishal Sharma (1501020020)

Piyush Upadhyay (1501020028)

Under the supervision of

Mr. Arvind Kumar

Assistant Professor

(Mechanical Engineering Department)



MECHANICAL ENGINEERING DEPARTMENT

K .R. MANGALAM UNIVERSITY, GURUGRAM, HARYANA

INDIA

April, 2019

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "**Four Wheel Electric Forklift**" by the following students:

Name of the Student	Roll Number
Hitin Behl	1501020004
Vishal Sharma	1501020020
Piyush Upadhyay	1501020028

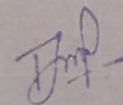
has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.



Mr. Arvind Kumar
(Assistant Professor)

Mechanical Engineering Department


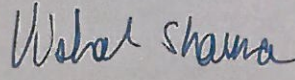
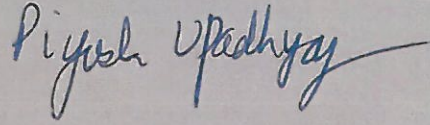
K. R. Mangalam University, Gurugram, Haryana, India



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Names of the Student	Roll No	Signature
Hitin Behl	1501020004	
Vishal Sharma	1501020020	
Piyush Upadhyay	1501020028	

Date: 29-04-2019

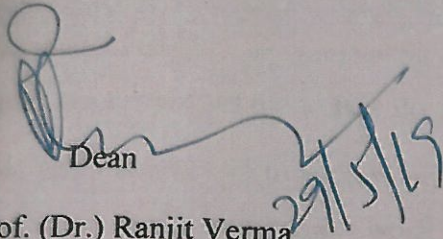


Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

APPROVAL SHEET

This project report entitled "Four Wheel Electric Forklift" by (Hitin Behl, Vishal Sharma, Piyush Upadhyay) is approved for the degree of B.Tech (Mechanical Engineering), School of Engineering and Technology.


Dean

Prof. (Dr.) Ranjit Verma
(Dean & Professor)

SOET



Supervisor

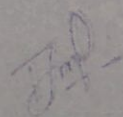
Mr. Arvind Kumar
(Assistant Professor)

(Mechanical Engineering Department)

Date : 17.5.19

Place: Gurugram

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGEMENT

It gives me immense pleasure to express my deepest sense of gratitude and sincere thanks to my highly respected and esteemed guide Mr. Arvind Kumar for his valuable guidance, encouragement and help for completing this work and his useful suggestions for this whole work and co-operative behaviour are sincerely acknowledged.

I would like to express my sincere thanks to Mr. Arvind Kumar, KRMU for giving me this opportunity to undertake this project.

I am also grateful to my teacher Mr. Arvind Kumar for their constant support and guidance.

I also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped me to face the challenges ahead.

At the end I would like to express my sincere thanks to all my friends and others who helped me directly or indirectly during this project work.

Place: Gurugram

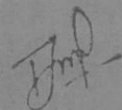
Date:

Student Names:

Hitin Behl (1501020004)

Vishal Sharma (1501020020)

Piyush Upadhyay (1501020028)



Registrar
K.B. Mangalam University
Sohna Road, Gurugram, (Haryana)

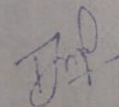
ABSTRACT

Electrical forklift is an improved and advance technology that helps brought about revolution in the mechanical industries today all heavy engineering company uses it. Widespread use of the forklift truck had revolutionized warehousing practices before the middle of the 20th century. A mixture of material handling systems is in the use, exact from that entirely physical to the ones that are semi-automatic but manually controlled. Forklifts have revolutionized warehouse work. Well-maintained and safely operated forklifts make lifting and transporting cargo infinitely easier. This is the general description of a normal forklift truck.

In the warehouses forklifts are the most expensive machines. The study pays special attention to the travelling of these machines. Factories, industries and storage go downs need forklifts and cranes for storage and moving large goods. Also there are a number of goods weighing around 20 – 40 kg that are comparatively lighter but cannot be moved around easily by human labour. To fill this need we here propose a four wheel forklift to lift and transport such medium weight goods across factories & industrial warehouse.

The four wheel drive is a fast, efficient and low power consumption vehicle that does not require much space to move around. The mini forklift will run on a dc motor and can drive small weight with pickup arrangement across small distances easily. It has a perpendicular handle ahead to hold on as well as take turns. To make the project work more realistic, much importance is given for practical orientation, therefore a prototype module is constructed for the demonstration purpose. This module simulates the real working system & based on this technology with slight changes in the structure & motor ratings, the system can be converted for real applications.

We have created a prototype model of forklift in which the frame is made up of mild steel as it is easily available and cheap to buy and also due to its physical properties as it has low tensile strength and high toughness. The fork and mast are also made up of the same material. According to the weight of the forklift after all the assembly we selected the DC motor of 400W, 150 RPM as it suited our model adequately and the power from DC motor is transmitted to the rear shaft by the means of chains and sprockets and the hydraulic piston is being used for the lifting of the load in which the hydraulic oil is being supplied from the oil tank. All the power is being supplied by battery of 12V, 28A.

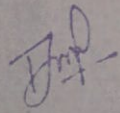


Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

S.NO	TITLE	PAGE NO.
	TITLE PAGE	
	CERTIFICATE	i
	DECLARATION	ii
	APPROVAL SHEET	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	TABLE OF CONTENTS	vi
	LIST OF FIGURES	vii
	LIST OF TABLES	viii
1.	INTRODUCTION	1-6
	1.1 Types of forklift	2-4
	1.2 Advantages	4
	1.3 Disadvantages	4
	1.4 Applications	4-6
2.	LITERATURE REVIEW	7
3.	OBJECTIVES AND METHODOLOGY	8-9
	3.1 Objectives	8
	3.2 Methodology	8-9
4.	EXPERIMENTAL DEVELOPMENT / NUMERICAL STUDY	10-19
	4.1 Key Components	10-15
	4.2 Working	17
	4.3 Specification of forklift	17
	4.4 Standard Calculation	18-19
5.	RESULTS & DISCUSSIONS	20
6.	CONCLUSIONS & FUTURE SCOPE	21


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ROCKER BOGIE SUSPENSION SYSTEM

Project report submitted

In partial fulfilment of the requirements of the degree of

Bachelor of Technology

In

Mechanical Engineering

By

Piyush Hasija (1501020011)

Md. Ansar (1501020022)

Hemant Kumar (1501020009)

Ankit Yadav (1501020003)

Under the supervision of

Dr. Ajay

(Assistant Professor, SOET)



K.R. MANGALAM UNIVERSITY

SCHOOL OF ENGINEERING & TECHNOLOGY

K.R. MANGALAM UNIVERSITY, GURUGRAM,

HARYANA, INDIA

APRIL, 2019

Registrar

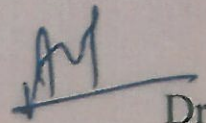
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "Rocker Bogie Suspension System" by the following students

Name of the Student	Roll Number
Md. Ansar	1501020022
Piyush Hasija	1501020011
Hemant Kumar	1501020009
Ankit Yadav	1501020003

has been carried out under our supervision and that this work has not been submitted elsewhere for a degree.

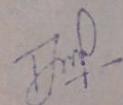


Dr. Ajay,

Assistant Professor,

School of Engineering & Technology,

K. R. Mangalam University, Gurugram, Haryana, India

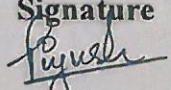



Registrar

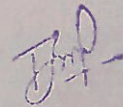
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DECLARATION

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented any idea/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken.

Name of Student	Roll Number	Signature
Piyush Hasija	1501020011	
Md. Ansar	1501020022	
Hemant Kumar	1501020009	Hemant
Ankit Yadav	1501020003	Ankit

Date: 22nd April, 2019

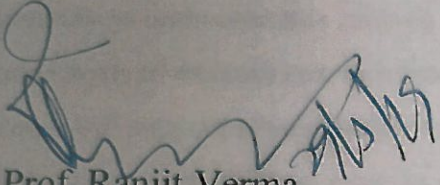


Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

APPROVAL SHEET

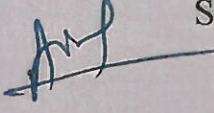
This project report entitled **Rocker Bogie** by (Ansar, Piyush, Ankit & Hemant) is approved for the degree of **B.Tech.(Mechanical Engineering)**, School of Engineering and Technology.


Dr. Prof. Ranjit Verma

DEAN, SOET

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103

Supervisor


Dr. Ajay

(Assistant Professor)

K R Mangalam University

Date: _____

Place: _____



Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGEMENT

It gives us immense pleasure to express our deepest sense of gratitude and sincere thanks to our highly respected and esteemed guide Dr. Ajay (School of Engineering and Technology), for his valuable guidance, encouragement and help for completing this work. His useful suggestions for this whole work and co-operative behaviour are sincerely acknowledged.

We would like to express my sincere thank to Dr. Prof. Ranjit Verma , KRMU for giving us this opportunity to undertake this project.

We also wish to express our indebtedness to our parents as well as our family member whose blessings and support always helped us to face the challenges ahead.

At the end we would like to express our sincere thanks to all our friends and others who helped us directly or indirectly during this project work.

Place: Gurugram

Date: 22nd April, 2019

Student Name

Roll number

Md Ansar

1501020022

Piyush Hasija


1501020011

Ankit Yadav

1501020003

Hemant Kumar

1501020009



Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT

Our project on 'Rocker Bogie' is important for conducting in scientific analysis of objectives that are separated by many meters. Current mobility designs are complex, using many wheels or legs. They are open to mechanical failure caused by the harsh environment on Mars. A four wheeled rover capable of traversing rough terrain using an efficient high degree of mobility suspension system. The primary mechanical feature of the rocker bogie design is its drive train simplicity, which is accomplished by using only two motors for mobility. Both motors are located inside the body where thermal variation is kept to a minimum, increasing reliability and efficiency. Four wheels are used because there are few obstacles on natural terrain that require both front wheels of the rover to climb simultaneously. A series of mobility experiments in the agriculture land, rough roads, inclined, stairs and obstacles surfaces concluded that rocker bogie can achieve some distance traverses on field.

The resulting design was fabricated and tested to ensure both range of motion and stiffness during testing. After analysing the stiffness in key areas, the design was tested under dynamic conditions to mimic the arena obstacles and found to meet or exceed the desired performance. This performance was repeated at campus, where the suspension allowed the operators to navigate the arena with confidence during testing.

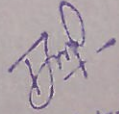
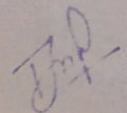

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

Ch. No.	Title	Page No.
	Certificate	i
	Declaration	ii
	Approval Sheet	iii
	Acknowledgement	iv
	Abstract	v
	Table of Contents	vi
	List of Figures	vii
1.	Introduction	1
	1.1 Theory	1
	1.2 Principle	2
2.	Literature Review	3
3.	Design and Part Specifications	4
	3.1 Project Description	3
	3.2 Components	5
	3.2.1 Dc Brushed Motor	5
	3.2.2 Dc Motor Driver	5
	3.2.3 Bluetooth	6
	3.2.4 Voltage Converter	7
	3.2.5 PVC Pipes	7
	3.2.6 Wheels	8
4.	Experimental Development	9
	4.1 Experimental Set-up	9
	4.2 Numerical Study	10
	Observation	13
	Conclusion	14
	References	15


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ELETROMAGNETIC BRAKING SYSTEM

Project report submitted

In partial fulfillment of the requirements of the degree of

Bachelor of Technology

in

Mechanical Engineering

by

SAKSHAM SHARMA (1501020024)

TANYA SHARMA (1501020025)

RAHUL JAIN (1501020031)

Under the Supervision of

Mr. Arvind Kumar

(Assistant Professor)

Mechanical Engineering Department




K.R. MANGALAM UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

**K R MANGALAM UNIVERSITY, GURUGRAM, HARYANA,
INDIA**

April 2019

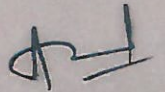

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "**Electromagnetic Braking System**" by the following students:

Name of the Student	Roll Number
Saksham Sharma	1501020024
Tanya Sharma	1501020025
Rahul Jain	1501020031

has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.

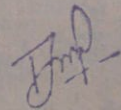


Mr. Arvind Kumar

(Assistant Professor)

Mechanical Engineering Department

K R Mangalam University, Gurugram, Haryana, India

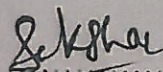
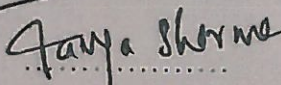
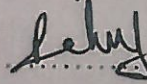


Registrar

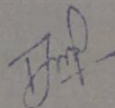
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

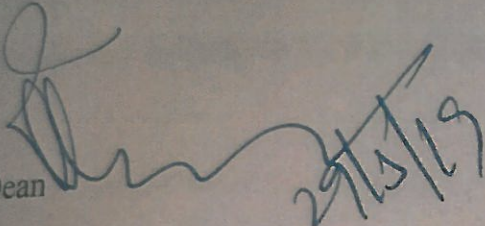
(Names of the student)	(Roll No.)	(Signature)
Saksham Sharma	1501020024	
Tanya Sharma	1501020025	
Rahul Jain	1501020031	

Date: 29-04-19


Registrar
K.S. Mangalam University
Solana Road, Gurugram, (Haryana)

APPROVAL SHEET

This project report entitled **Electromagnetic Braking System** by **Saksham Sharma, Tanya Sharma and Rahul Jain** is approved for the degree of **B.Tech (Mechanical Engineering)**, School of Engineering and Technology.

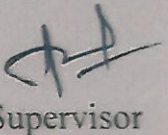

Dean

Prof. (Dr.) Ranjit Varma

(Dean & Professor)

(School of Engineering & Technology)

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103


Supervisor


Mr. Arvind Kumar

(Assistant Professor)

(Mechanical Engineering Department)

Date: 17-5-19

Place: Gurugram


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

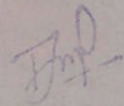
ABSTRACT

Most of railroad passenger vehicles in the world equipped with disc brake system which is mounted either on the wheel for (wheel mounted) or axle on the bogie frames for (axle mounted). A disc brake is a device which is used to stop or reduce the motion of vehicles. The braking performance of the train is one of the most important factors that affect the traffic and running safety of the vehicle. Among many factors, braking performance of trains is mainly affected by temperature and μ (between brake disc and pad).

The main purpose of this study is determination of nodal temperature and friction coefficient, considering different loading and operating conditions, necessary to verifying safety requirements for the movement of trains. Disc brake is modeled on Solid Works 13.0, then simulation was followed using Multi-physics ANSYS workbench 14.5 Version. The thermal transient analysis of disc braking system is performed to evaluate under service and emergency braking conditions independently for selected stations. A comparison between analytical determination of μ and Ansys analysis results shows that, the performance of the disc brake is highly affected during emergency braking conditions due to minimum stopping distance and delay time. The analysis result shows, compare to the 3 stations, the maximum nodal temperature is 413.88°C at station Meri/CMC 2 which is much less than from the allowable values of 800°C . The results obtained by the simulation are satisfactory compared with those of the specialized literature Hence, a good suggestion will be given on the vehicle travelling speed based on the performance on each braking conditions where if results is obtained above the allowable value.

Most of the braking systems utilize friction forces to transform the kinetic energy of a moving body into heat that is dissipated by the braking pads. The overuse of friction-type braking systems causes the temperature of the braking pads to rise, reducing the effectiveness of the system. An Electromagnetic Braking system uses Magnetic force to engage the brake, but the power required for braking is transmitted manually. The disc is connected to a shaft and the electromagnet is mounted on the frame. When electricity is applied to the coil a magnetic field is developed across the armature. The eddy-current is created by the relative motion between a magnet and a metal (or alloy) conductor. The current induces the reverse magnetic field and results in the deceleration of motion.

The proposed mechanism implements this phenomenon in developing a braking system. The potential applications of the braking system can be a decelerating system to increase the safety of an elevator or any guided rail transportation system. As a result it develops a torque and eventually the vehicle comes to rest. In this project the advantage of using the electromagnetic braking system in automobile is studied. These brakes can be incorporated in heavy vehicles as an auxiliary brake. The electromagnetic brakes can be used in commercial vehicles by controlling the current supplied to produce the magnetic flux. Making some improvements in the brakes it can be used in automobiles in future. . It also reduces the maintenance of braking system. An advantage of this system is that it can be used on any vehicle with minor modifications to the transmission and electrical systems.



Registrar

Y. P. Mangalam University
Sector Road, Gurgaon, (Haryana)

TABLE OF CONTENTS

S.NO	TITLE	PAGE NO.
	TITLE PAGE	
	CERTIFICATE	
	DECLARATION	i
	APPROVAL SHEET	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	TABLE OF CONTENTS	v-vi
	LIST OF FIGURES	vii-viii
1.	INTRODUCTION	ix
	1.1 Theory	1
	1.2 Development	1
	1.3 Advantages	2
	1.4 Applications	3
2.	LITERATURE REVIEW	3
3.	OBJECTIVES AND METHODOLOGY	4-5
	3.1 Objectives	6-7
	3.2 Requirements	6
	3.3 Methodology	6
4.	DESIGNING OF BRAKING SYSTEM	6
	4.1 AC Motor	8-10
	4.2 Electromagnet	8
	4.3 Aluminum Disk	8
	4.4 Shaft	9
	4.5 Wooden Frame	9
5.	SIMULATION AND NUMERICAL ANALYSIS OF BRAKING SYSTEM	10
	5.1 Designing of Both Braking Systems	11-17

[Signature]

Registrar

11

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

**CFD studies on Constant Rate of Kinematic Energy Change (CRKEC)
supersonic variable area nozzle**

Major project report submitted

In partial fulfillment of the requirements of the degree of

Bachelor of Technology

In

Mechanical Engineering

By

Rajat Gupta

1601020008

Under the supervision of

Mr. S.K. Yadav

(Assistant Professor)

And

Mr. Shri Ram

(Assistant Professor)



Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

Department of Mechanical Engineering

K. R. MANGALAM UNIVERSITY, GURUGRAM, HARYANA

INDIA

JUNE, 2020

CERTIFICATE

It is certified that the work contained in the project report titled "**CFD studies on Constant Rate of Kinematic Energy Change (CRKEC) supersonic variable area nozzle**" by the following student:

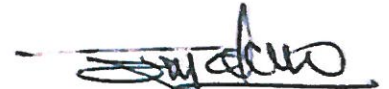
Name of the student

Roll Number

Rajat Gupta

1601020008

Has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.



Mr. S.K. Yadav

Assistant Professor

Department of Mechanical Engineering

K.R. Mangalam University, Gurugram, Haryana, India

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DECLARATION

I declare that this written submission represents my idea in my own and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be caused for disciplinary action by the institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Name of the student)

(Roll no.)

(Signature)

Rajat Gupta

161100200119



Date



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT

In this project the main objective is to investigate is to find the ways to improve the performance of the nozzle systems. This is mainly concentrated on design and analysis of CRKEC nozzle with frictional effect. Since nozzles cannot be used in low pressure head and has no diversion outlet. So we aim to design and develop one-dimensional nozzle for design of supersonic nozzle .We have optimized the geometry of nozzle using parametric analysis of one-dimensional gas dynamic model and valediction using CFD analysis and design. We have used Mach number as a property for designing and for using it to calculate analytical result.



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGMENT

I would like to express my special thanks of gratitude to my teacher Mr. S.K. Yadav as well as our Dean Mr. Vinod Dhadriya who gave me the golden opportunity to do this wonderful project on the topic CFD studies on Constant Rate of Kinetic Energy Change (CRKEC) supersonic variable area nozzle, which also helped me in doing a lot of research and I come to know about so many new things.


I'm really thankful to them.



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	TITLE PAGE	
	CERTIFICATE	i
	DECLARATION	ii
	ABSTRACT	iii
	ACKNOWLEDGEMENT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	vii
CHAPTER 1	INTRODUCTION	1
	1.1 TYPES OF NOZZLES	2
	1.2 CONDITION FOR OPERATIONS	4
	1.3 OPERATION OF NOZZLE	4
CHAPTER 2	LITERATURE REVIEW	5
	2.1 GENERAL FLOW ANALYSIS OF A NOZZLE	6
	2.2 VELOCITY IN A NOZZLE	8
	2.3 MASS FLOW RATE IN A NOZZLE	9
	2.4 DESIGN APPROACH FOR NOZZLE	11
CHAPTER 3	OBJECTIVES AND METHODOLOGY	12
	3.1 OBJECTIVES	12
	3.2 METHODOLOGY	12


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CHAPTER 4	ONE DIMENSIONAL NOZZLE DESIGN THEORY	14
	4.1 1-D GAS DYNAMICS EQUATION	14
	4.2 COMPUTATION OF PRIMARY NOZZLE THROAT	16
	4.3 CRUCIAL NOZZLE DESIGN THEORY	16
CHAPTER 5	COMPUTATIONAL MODELING	18
CHAPTER 6	RESULTS AND DISCUSSIONS	21
	6.1 MACH NUMBER	21
	6.2 STATIC PRESSURE AND TOTAL PRESSURE	22
	6.3 STATIC TEMPERATURE AND TOTAL TEMPERATURE	24
CHAPTER 7	CONCLUSIONS AND FUTURE RECOMMENDATIONS	25
	7.1 CONCLUSIONS	25
	7.2 FUTURE RECOMMENDATIONS	25
	REFERENCE	26


 Registrar
 K.P. Mangalam University
 Sohna Road, Gurugram, (Haryana)

PNEUMATIC SHEET METAL CUTTER

Major project report submitted

In partial fulfillment of the requirements of the degree of

Bachelor of Technology

in

Department of Mechanical Engineering

by

Anjeet Pal

1701020007

Raj Kumar Sharma

1701020006

Under the Supervision of

Mr. Surendra Kumar Yadav (Asstt. Prof.-ME)



DEPARTMENT OF MECHANICAL ENGINEERING

K.R. MANGALAM UNIVERSITY, GURUGRAM, HARYANA,

INDIA

July, 2021

Jyoti
Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "**Pneumatic sheet metal cutter**" by the following students:

Name of the Student	Roll Number
Raj Kumar Sharma	1701020006
Anjeet Pal	1701020007

has been carried out under my/our supervision and that this work has not been submitted elsewhere for a degree.



Mr. Surendra Kumar Yadav
Assistant Professor
Department of Mechanical Engineering,

K R Mangalam University, Gurugram, Haryana, India



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Names of the student)

(Roll No.)

(Signature)

Raj Kumar Sharma

1701020006



Anjeet Pal

1701020007

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT

The sheet metal cutting process is a main part of the all industries. Normally the sheet metal cutting machine is manually hand operated one for medium and small scale industries. In our project is “**Pneumatic Sheet Metal Cutting Machine**”.

Normally the sheet metal cutting machine is manually hand operated for medium and small scale industries. This paper gives an insight about the automatic sheet metal cutting machine. Any automatic machine aimed for economical use of man. In this paper, Pneumatic cylinder is used for cutting in easy way which can be used in small scale industries at lower cost.

The sheet metal cutting machine works with the help of pneumatic double acting cylinder. The piston is connected to the moving cutting tool which is used to cut the sheet metal. The cutting process is operated by a direction control valve by using compressor. In manual method sheet metals goes to sharp sometime because of wrong dimensions, improper cutting etc. Hydraulic machines are also used for sheet metal cutting. But these machines are used for heavy metal cutting and its cost is very high. Hence, we are using a pneumatic system for sheet metal cutting in a easy manner. The main advantage of pneumatic sheet metal cutting machine is to improve product quality, repetition of work and increasing production rate.

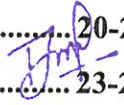


Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

Table of Contents

TITLE PAGE	i
CERTIFICATE.....	ii
DECLARATION.....	iii
ABSTRACT.....	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	vi
1. Introduction.....	1-7
1.1 Developments Of Pneumatic Sheet Metal Cutter	2-4
1.2 Description Of Equipment Pneumatic Cylinder	4-6
1.2.1 Pneumatic Cylinder	4-5
1.2.2 Cutting Blades	5
1.2.3 Compressor.....	5-6
1.2.4 Flexible Hose.....	6
1.3 Advantages.....	6-7
1.4 Disadvantages.....	7
1.5 Applications	7
2. Literature Review	8-10
2.1 Prior Concepts.....	9
2.2 Need For Automation	9-10
2.3 Pneumatic Cylinder	10
3. Parts and Components	11-25
3.1 Main Components of the System	13-16
3.1.1 Compressor.....	13-16
3.1.2 Characteristics of Double acting compressor	16
3.2 Pneumatic Cylinder	16-23
3.2.1 Classification of Cylinders	18-20
3.2.2 Parts of Pneumatic Cylinder.....	20-23
3.3 Solenoid Valve	23-25
3.3.1 Parts of a Solenoid Valve.....	24-25


Registrar
K.P. Mangalam University
Sohna Road, Gurugram, (Haryana)

4. Pneumatic System	26-27
4.1 Characteristics of Compressed Air	26-27
4.2 Advantages.....	27
5. Working Principle.....	28-31
6. Material.....	32-35
6.1 Physical Properties.....	32-33
6.2 Mild Steel	33-34
6.3 Machine Construction	34-35
6.4 Bright Material.....	35
7. Market Survey.....	36-37
8. Construction	38-39
8.1 Raw Material Used	38
8.2 Ready Items Used.....	38
8.3 Machines & Tools Used.....	38
8.4 Specifications	38-39
9. Advantages, Disadvantages & Applications	40
9.1 Advantages.....	40
9.2 Disadvantages.....	40
9.3 Applications	40
FUTURE SCOPE.....	41
CONCLUSION	42
REFERENCES.....	43


 Registrar
 K.P. Mangalam University
 Sohna Road, Gurugram, (Haryana)

**Computational Study on Constant Pressure Mixing
(CPM) Variable Area Ejector**

Project Report Submitted

**In partial fulfillment of the requirement of the degree of
Bachelor of Technology**

in

Mechanical Engineering

By

Vishal Kumar

Under the Supervision of

Mr. S. K. Yadav and Mr. Shri Ram



Department of Mechanical Engineering

K. R. Mangalam University, Gurugram, Haryana, India


June 2022




Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled " **Computational Study on Constant Pressure Mixing (CPM) Variable Area Ejector**" by the student **Vishal Kumar**, Roll Number **1801020007** has been carried out under my/our supervision and that this work has not been submitted elsewhere for a degree.


Mr. S. K. Vada
(Asst. Prof.)


Mr. Shri Ram
(Asst. Prof.)

Department of Mechanical Engineering

K R Mangalam University, Gurugram, Haryana, India



Registrar
K.R. Mangalam University
Gohna Road, Gurugram, (Haryana)

DECLARATION

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Vishal Kumar
(1801020007)

Place- Gurugram

Date- 14-5-2022


(Signature)


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

APPROVAL SHEET

This major project report entitled "Computational Study on Constant Pressure Mixing (CPM) Variable Area Ejector" by Vishal Kumar is approved for the degree of B. Tech Department of Mechanical Engineering in the School of Engineering and Technology.

Dean SOET

Dr. Vineet Dahiya

School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103

Supervisor

Mr. S. K. Yadav
(Asst. Prof.)

Mr. Shri Ra m
(Asst. Prof.)

Date: 14 June-2022

Place: Gurgaon

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGMENT

I would like to extend my sincere gratitude and appreciation to my project guide Mr. S. K. Yadav and Mr. Shri Ram who initiated me into the study of Computational Study on Constant Pressure Mixing (CPM) Variable Area Ejector. It has indeed been a great experience working under her during the project for her invaluable advice and guidance provided throughout this project.

This project report would have been incomplete without the active cooperation and guidance of Mr. S. K. Yadav and Mr. Shri Ram, He has been very kind and patient while suggesting me the outlines of this dissertation report and correcting my doubts. I thank him for his overall support.

I hope this project report will reflect my observation regarding the Title of the project.

Place: Gurugram

Date: 14-june-2022

Vishal Kumar

(1801020007)

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT


The computation of ejector geometry for a given fluid is essential and plays a crucial role in creating an ejector profile and performance analysis. The constant rate of momentum change (CRMC) approaches uses a real gas equation for ejector design. The variation in entrainment ratio for the different working fluids has also been studied on the geometry computed for water-vapor. It is observed that the entrainment ratio of the ejector significantly varies with the change in operating conditions and working fluids. Ejectors have potential applications in energy savings and environmental protection by their ability even to utilize waste/low-grade thermal energy. Generally, the system which uses incompressible working fluid is called a jet pump while for a compressible, it is an ejector. Ejectors in their conventional forms are typically low-efficiency devices



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

TITLE	PAGE No.
CERTIFICATE	I
DECLARATION	II
APPROVAL SHEET	III
ACKNOWLEDGEMENT	IV
ABSTRACT	V
LIST OF FIGURES	VII
LIST OF TABLES	VII
CHAPTER 1	
Introduction	1
1.1 Part of an ejector	2
1.2 Ejector performance	2
1.3 Application of Ejector	3
CHAPTER 2	
Literature Review	4
CHAPTER 3	
Computational Studies	12
3.1 Design data table and fluid property	12
CHAPTER 4	
Result	14
4.1 Nozzle Analysis	14
4.2 Mixing and Diffuser analysis	
CHAPTER 5	
CONCLUSION	21
REFERENCE	22


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

CHAINLESS BICYCLE

Project Report Submitted

In partial fulfillment of the requirements of the degree of

Bachelor of Technology

in

Mechanical Engineering

by

Lakshay Sethi (1801020003)

Tejasv Singh (1801020010)

Under the Supervision of

Mr. S.K. Yadav (Asst. Professor, SOET)



Department of Mechanical Engineering

K.R. Mangalam University, Gurugram, Haryana, India

June 2022

Registrar

K.R. Mangalam University
Gurugram, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "Chainless Bicycle" by the following students:

Name of the Student

Roll Number

Lakshay Sethi

1801020003

Tejasv Singh

1801020010

has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.



Mr. S.K. Yadav

(Assistant Professor, SOET)

Department of Mechanical Engineering

K R Mangalam University, Gurugram, Haryana, India



Registrar

K.R. Mangalam University
Saina Road, Gurugram, (Haryana)

DECLARATION

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Name(s) of the student)

(Roll No.)

(Signature)

Lakshay Sethi

1801020003



Tejasv Singh

1801020010



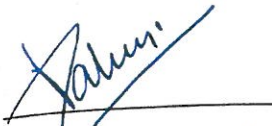
Date: 14.6.2022



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

APPROVAL SHEET

This major project report is entitled "Chainless Bicycle" by Lakshay Sethi & Tejasv Singh is approved for the degree of B.Tech (Mechanical Engineering), School of Engineering and Technology.



Dr. Vineet Dahiya
Dean (SOET)
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103



Mr. S.K. Yadav
(Assistant Professor)

Date: 14.6.2022

Place: Gurugram



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGMENT

It gives me immense pleasure to express my deepest sense of gratitude and sincere thanks to my highly respected and esteemed guide Mr. S.K. Yadav, for his valuable guidance, encouragement, and help in completing this work. His useful suggestions for this whole work and cooperative behavior are sincerely acknowledged.

I would like to express my sincere thanks to Mr. S.K. Yadav, KRMU for giving me this opportunity to undertake this project.

I also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped me to face the challenges ahead.

In the end, I would like to express my sincere thanks to all my friends and others who helped me directly or indirectly during this project work.

Place: Gurugram

Date: 14.6.2022

Student Name: - Lakshay Sethi, Tejasv Singh

Roll Number: - 1801020003, 1801020010


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT

Bicycles are one of the most popular modes of transportation since they are emission-free and accessible to anybody. Bicycles are always changing to keep up with the newest technological advancements. To bring the bicycle's form up to date, other designs have appeared. Design plays an essential role in developing new ideas to solve issues. The absence of a chain in a bicycle transmission system aims to solve the problem of chain-equipped bicycle maintenance. By changing the appropriate reduction ratio, the derailleur system on a bicycle can save time or labor for riders.

To mimic the cable force in shifting, a model of the four-bar linkage mechanism in a spatial rear derailleur is built in this work. The relationship between cable force and cable displacement is discovered and confirmed. Friction between the cable and the adjusting screw unit is discovered to be a significant problem. The cable force is then optimized using the model. We can lower not only the maximum cable force but also the force differential between the maximum and minimum by 65.5 percent by adjusting the position of the coupler point. Finally, to decrease friction, a roller design to replace sliding contact between the cable and the adjusting screw unit is proposed.



Registrar
K. P. Mangalam University
Sehna Road, Gurugram, (Haryana)

TABLE CONTENT

CHAPTER NO.	PAGE NO.
CERTIFICATE	ii
DECLARATION	iii
APPROVAL SHEET	iv
ACKNOWLEDGEMENT	v
ABSTRACT	vi
TABLE OF CONTENTS	vii
Chapter 1: Introduction	1
Chapter 2: Literature Review	6
Chapter 3: Procedure	9
Chapter 4: Design using autocad vs made up design	13
Chapter 5: Conclusion	15
REFERENCES	16


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ELECTRIC THREE-WHEEL BIKE

Project report submitted

In partial fulfillment of the requirements of the degree of

Bachelor of Technology

In

Mechanical engineering

By

SARTHAK CHAUDHARY

SAHIL KUMAR

NEHA

ANMOL KUMAR PANDEY

Under the Supervision of

DR. KAUSHAL KUMAR



Jed
Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DEPARTMENT OF MECHANICAL ENGINEERING

K R MANGALAM UNIVERSITY, GURUGRAM, HARYANA,

INDIA

May, 2022

CERTIFICATE

It is certified that the work contained in the project report titled "electric three-wheel bike,"
by the following students:

Name of the Student	Roll Number
Sarthak Chaudhary	1801020005
Sahil Kumar	1801020009
Neha	1801020008
Anmol Kumar Pandey	1801020002

has been carried out under my/our supervision and that this work has not been submitted
elsewhere for a degree.



Dr. Kaushal Kumar

Associate professor

Mechanical Engineering

K R Mangalam University, Gurugram, Haryana, India



Registrar

**K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)**

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Name(s) of the student)

(Roll No.)

(Signature)

Sarthak Chaudhary

1801020005

Sahil Kumar

1801020009

Neha

1801020008

Anmol Kumar Pandey

1801020002

Date: 30/6/22


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

APPROVAL SHEET

This project report entitled (Electric three-wheel bike) by (Sarathak Chaudhary, Sahil Kumar, Neha, Anmol Kumar Pandey) is approved for the degree of B. Tech (Mechanical Engineering), School of Engineering and Technology.

Dr. Vineet Dhaiya

Dean (SOET)

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Solana road, Gurugram
Haryana 122103

Date:

30/6/22

Place:

Gurugram



Supervisor

Dr. Kaushal Kumar (Associate Professor)



Registrar
K.R. Mangalam University
Solana Road, Gurugram, (Haryana)

ACKNOWLEDGEMENT

It gives me immense pleasure to express my deepest sense of gratitude and sincere thanks to my highly respected and esteemed guide **Dr. Kaushal Kumar (School of engineering and technology)**, for his valuable guidance, encouragement and help for completing this work. His useful suggestions for this whole work and co-operative behavior are sincerely acknowledged. I would like to express my sincere thanks to **Dr. Vineet Dhaiya, KRMU** for giving me this opportunity to undertake this project. I also wish to express my gratitude to **Dr. Kaushal Kumar (SOET)** for his kind hearted support. I am also grateful to my teachers for their constant support and guidance.

I also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped me to face the challenges ahead.

At the end I would like to express my sincere thanks to all my friends and others who helped me directly or indirectly during this project work.

Place: Gurugram

Student Name: - Sarthak Chaudhary

Date: May 2022

Sahil Kumar

Neha

Anmol Kumar Pandey

Roll Number: -

1801020005

1801020009

1801020008

1801020002


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT

Electric vehicles (EVs) are a promising technology for achieving a sustainable transport sector in the future, due to their very low to zero carbon emissions, low noise, high efficiency, and flexibility in grid operation and integration. This chapter includes an overview of electric vehicle technologies. Basically, an electric three-wheeler which is designed in such a way that two wheels are in front and one in the back. A hub motor is installed in the rear wheel which will power the vehicle.



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.	TITLE PAGE
	CERTIFICATE		ii
	DECLARATION		iii
	ACKNOWLEDGEMENT		iv
	ABSTRACT		v
	TABLE OF CONTENTS		vi
Chapter 1:			
	INTRODUCTION		1
1.1	GENERAL		1-2
1.2	HISTORY OF ELECTRIC VEHICLE		2-3
1.3	ELECTRIC THREE-WHEELER		4
1.4	PROJECT DESCRIPTION		4
Chapter 2:			
	LITERATURE REVIEW		5-8
Chapter 3:			
	OBJECTIVES AND METHODOLOGY		9-17
3.1	OBJECTIVES		
3.2	METHODOLOGY		
Chapter 4:			
	PROCEDURE AND RESULT		18-22
4.1	PROCEDURE		
4.2	RESULT		
4.3			
Chapter 5:			
	CONCLUSION		


Registrar
K.R. Meghalam University
Sohna Road, Gurugram, (Haryana)

SMART SWITCH BOARD

Project report submitted

In partial fulfillment of the requirement for the degree of

**Bachelor of Technology
In**

Mechanical Engineering

By

AVEEJEET SOOD (1901020001)

Under the guidance of

Mr. Arvind Kumar

(ASSISTANT PROFESSOR)



Department of mechanical engineering

School of Engineering and Technology

K. R. Mangalam University, Gurugram - 122003

June-2023

A handwritten signature in blue ink, appearing to be 'Jit', is written over a faint blue circular stamp.

Registrar
K. R. Mangalam University
Sector 14, Gurugram, (Haryana)

DECLARATION

We declare that this written submission represents our ideas in our own words and where other's ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed. We further declare that if any violation of the intellectual property right or copyright, my supervisor and university should not be held responsible for the same.

Name

Roll No.

(Signature)

Aveejeet Sood

1901020001



Place:- K. R. Mangalam University

Date:- 8 June 2023



Registrar
K.R. Mangalam University
Salma Road, Gurgaon, (Haryana)

CERTIFICATE

It is certified that the work contained in the project report titled "Smart Switch Board." by the following students:

Aveejeet Sood

1901020001

has been carried out under our/my supervision and that this work has not been submitted elsewhere for a degree.

Signature of Supervisors



Name of Supervisors

Mr. Arvind Kumar

Assistant Professor

School of Engineering and Technology

K. R. Mangalam University,

Gurugram, Haryana, India.

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGEMENT

It gives us immense pleasure to express my deepest sense of gratitude and sincere thanks to my highly respected and esteemed guide "Dr. Bhavesh Vyas" the Assistant Professor, School of Engineering and Technology, for his/their valuable guidance, encouragement and help for completing this work. His/Their useful suggestions for this whole work and co-operative behavior are sincerely acknowledged.

I would like to express my sincere thanks to Mr. Arvind Kumar for giving me this opportunity to undertake this project. We would also like to thank my HOD Dr. Surendra Yadav and School Coordinator (SOET) DR. PANKAJ AGGARWAL for their wholehearted support.

I also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped me to face the challenges ahead. At the end would like to express my sincere thanks to all my friends and others who helped me directly or indirectly during this project work.

Place: - K.R. Mangalam University

Date:- 08 June 2023



Name of Students

Aavejeet Sood
(1901020001)



Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ABSTRACT


Smart switch boards, highlighting their role in home automation and energy efficiency. A smart switch board is a central control hub that utilizes advanced technologies to enable remote monitoring and control of electrical devices. Through smartphone applications or voice commands, users can conveniently operate lights, fans, appliances, and more from anywhere. Smart switch boards often feature scheduling and automation capabilities, allowing users to program actions based on time or external conditions. They also offer real-time energy monitoring, empowering users to optimize energy consumption and reduce waste. Furthermore, smart switch boards can integrate with other smart home devices, creating a comprehensive ecosystem for home automation and centralized control. In conclusion, smart switch boards provide enhanced convenience, energy efficiency, and seamless integration for modern homes. To operate the household appliances both manually and automatically, we use Android devices and applications. In the future, sensors and temperature sensors will be used to improve efficiency and convenience. Different values and algorithms are found in the employed sensors, which aid in reducing power usage. Additionally, this initiative saves money and labor. By alerting the user to connections that are turned on unnecessarily, the application makes sure that power is handled effectively. This aids in cost savings and energy conservation.

Keywords:- Smart Switch Board, Smartphone, Android, Automation, Sensors.


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENTS

	Page No
Declaration	i
Certificate	ii
Acknowledgement	iii
Abstract	iv
Chapter 1: INTRODUCTION	7
Chapter 2: LITERATURE REVIEW	13
Chapter 3: PROBLEM FORMULATION AND OBJECTIVES	15
Chapter 4: METHODOLOGY OF THE PROJECT	18
Chapter 5: IMPLEMENTATION	22
Chapter 6: RESULTS	26
Chapter 7: CONCLUSION AND FUTURE SCOPE	28
REFERENCES	32


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

**Major Project Report
On
Conversion of IC engine bike into Electric bike.**

Bachelor of Technology

In

Mechanical Engineering

By

Prashant Verma (1901020002)

Under the guidance of

**Dr. Kaushal Kumar (Associate. Prof)
Dr. Surender Kumar Yadav (Asst. Prof)**



Department of SOET

School of Engineering and Technology

K. R. Mangalam University, Gurugram - 122003

6th June 2023

Registrar

K.R. Mangalam University
Sector 14, Road, Gurugram, (Haryana)

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I had adequately cited and referenced the original sources. I also declare that I have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will result in disciplinary action by the Institute and can evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed. I further declare that if any violation of the intellectual property right or copyright, my supervisor and university should not be held responsible for the same.

Prashant Verma

1901020002


(Signature)

K.R. Mangalam University
6th June 2023



Registrar

K.R. Mangalam University
Delhi Road, Gurugram, (Haryana)


CERTIFICATE

It is certified that the work contained in the project report titled "Conversion of IC engine bike into Electric bike," by the following student:

Prashant Verma

1901020002

Has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.


Dr. Surender Kumar Yadav
Dr. Kaushal Kumar
Mechanical Engineering
K.R Mangalam University,
Sohna, Gurugram, 122006,
Haryana, India

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

ACKNOWLEDGEMENT

With a deep sense of gratitude, we would like to thank all the people who have helped us with their kind guidance. I am very grateful to these intellectuals who did their best to help during our project work.

It is a proud privilege to express a deep sense of gratitude to, Dr. Kaushal Kumar (associate professor) and Dr. Surender Kumar Yadav, KR Mangalam University, Sohna, Gurgaon for giving me a such idea and kind permission to complete this project.

I remain indebted to H.O.D Dr. Surendra Kumar Yadav for their timely suggestion and valuable guidance.

The special gratitude goes to GUIDE Mr. Arvind Kumar, staff members, and technical staff members, of the Mechanical Engineering Department for their expensive, excellent, and precious guidance in the completion of this work.

I am also thankful to my parents who provide their wishful support for our project completed successfully. And lastly, I thank my all friends and the people who are directly or indirectly related to our project work.

Prashant Verma

1901020002


(Signature)

KR Mangalam University

6th June 2023


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

TABLE OF CONTENT

Contents	
DECLARATION.....	1
CERTIFICATE.....	3
ACKNOWLEDGEMENT.....	4
ABSTRACT.....	5
LIST OF FIGURES.....	7
INTRODUCTION.....	8
1. Introduction.....	8
1.1 Overview.....	8
1.2 Conversion of IC Engine bike into Electric bike:	Error! Bookmark not defined.
Literature review.....	11
PROBLEM FORMULATION AND OBJECTIVES.....	13
3. Problem Formulation.....	Error! Bookmark not defined.
3.1 Mechanical component.....	Error! Bookmark not defined.
METHODOLOGY OF THE PROJECT.....	17
IMPLEMENTATION.....	21
CONCLUSION AND FUTURE SCOPE.....	25
REFERENCES.....	27


Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)