

**PROJECT REPORT  
ON  
ELECTRIC WAGON**

**Submitted By: -**

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May 2023**

## **Introduction**

E-Rickshaw are small vehicle, with three wheels and use electric power from batteries to run. They use an electric motor as engine which draw electric from the rechargeable batteries installed in the rickshaw body. These battery-operated vehicles are perfect for small distance transport, both cargo and people; they are perfect for running on narrow streets because of their small size. But the biggest reason for their popularity is low operating cost and zero air pollution. In a nutshell you can say they are bigger version of rickshaw powered by electricity.

They are like normal rickshaws but powered by electric motor instead of petrol or diesel motor. They are perfect for a pollution free, environment friendly transport system in a short distance. Actually, they are not capable of running long distance.

E-Rickshaw are now one of the preferred modes of transport in streets because of its low maintenance cost, Eco- friendly, no noise pollution, easy to drive and last but not the least livelihood, e- rickshaw is boon to the common man. Without putting in much physical efforts and without investing much amount of money, the earning is quite good for an e- rickshaw driver and hence it is an important means of livelihood for many.

These e- rickshaw consist of 3 wheels with a differential mechanism at rear wheels. Basically, these vehicles have a mild steel tubular chassis. The motor is brush- less DC motor manufactured mostly in India and China. The electric system used in Indian version is 48VDC can run 40-50 km/full charge, top speed 25 km/hour and this electric motor power ranging from 650- 1400 Watts; the battery takes 8 -10 hours to become fully charged. Basic seating capacity is driver plus 4 passenger total 5 persons.

E-Rickshaw in India are built over tabular chassis, a body is kept a light in weight in order to increase the life of the battery, the main electronic components that make the driver are motor, controller, harness, battery and the throttle. The mismatch between any of these components is undesirable and may reduce performance.

E-Rickshaw are now fairly popular amongst Indian rickshaw driver and have create new opportunities for people, as they require a minimum investment to earn a living. They offer huge return in less time and are easy to operate and has low maintenance and running cost. A lot of variants are available these days, most of them started as low – quality products and where imported from china. These days Indian e- rickshaw have been developed offering a higher quality and better services at an equivalent cost. E-Rickshaw can provide a decent income since the battery charging cost is far lower than any other fuel, new material such as fiberglass has been introduced in them since the material provides high strength, durability and lighter than metals.

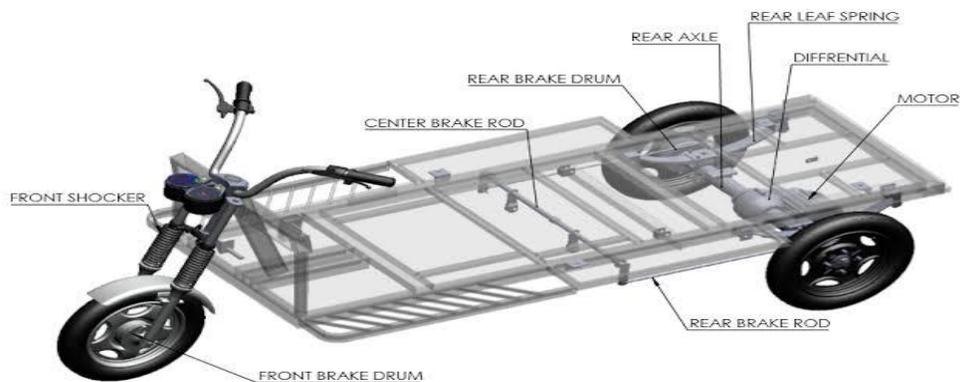


## Estimate cost of Project

Sr.no	Name of Part	Estimate Cost
1.	Battery	45000
2.	Shocket set.	2300
3.	Tyres with rim	5500
4.	Differential	2700
5.	Moter controller	5600
6.	Complete handle-T	1350
7.	Leaf spring set	2630
8.	U-bush pin	220
9.	wiring	650
10.	Ignition lock	100
11.	Accelerator throttle	250
12.	Meter	700
13.	Handle pipe	170
14.	Axle	120
15.	Brake pedal	180
16.	Raw material	6000
17.	Seat	4000
18.	Seat cover	1000
19.	Paints	1000
20.	Cutter blade	400
21.	Name stekers	1000
22.	Labour	4900
	Total cost	85470/-

## Working Principle

- The working of E-Rickshaw is based on DC motor, battery & suspension system different from conventional auto rickshaw.
- It uses a Brush less DC motor ranging from 650 – 1400 Watts with a differential mechanism at rear wheels.
- The electric system used in Indian cities is 48V.
- Some Variants made in fiber are also in use due to their strength and durability, resulting in low maintenance.
- It consists of the controller unit.
- The battery used is mostly Lead acid/Li-ion battery with a life of 6-12 months.
- Deep discharge/Cycle batteries designed for EVs are mostly used.



# **PROJECT REPORT**

**ON**

## **“IGNITION SYSTEM”**

**SUBMITTED TO HSBTE IN THE PARTIAL REQUIREMENT  
FOR THE AWARD OF  
DIPLOMA IN  
MECHANICAL ENGINEERING**

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**GOVT. POLYTECHNIC, MANDI ADAMPUR**

**SESSION: 2021-2024**

## **INTRODUCTION**

We know that in case of Internal Combustion (IC) engines, combustion of air and fuel takes place inside the engine cylinder and the products of combustion expand to produce reciprocating motion of the piston. This reciprocating motion of the piston is in turn converted into rotary motion of the crank shaft through connecting rod and crank. This rotary motion of the crank shaft is in turn used to drive the generators for generating power. We also know that there are 4-cycles of operations viz.: suction; compression; power generation and exhaust. These operations are performed either during the 2-strokes of piston or during 4-strokes of the piston and accordingly they are called as 2-stroke cycle engines and 4-stroke cycle engines. In case of petrol engines during suction operation, charge of air and petrol fuel will be taken in. During compression this charge is compressed by the upward moving piston and just before the end of compression, the charge of air and petrol fuel will be ignited by means of the spark produced by means of for spark plug. And the ignition system does the function of producing the spark in case of spark ignition engines.

It mainly consists of a central electrode and metal tongue. Central electrode is covered by means of porcelain insulating material. Through the metal screw the spark plug is fitted in the cylinder head plug. When the high tension voltage of the order of 30000 volts is applied across the spark electrodes, current jumps from one electrode to another producing a spark. Whereas in case of diesel (Compression Ignition-CI) engines only air is taken in during suction operation and in compressed during compression operation and just before the end of compression, when diesel fuel is injected, it gets ignited due to heat of compression of air. Once the charge is ignited, combustion starts and products of combustion expand, i.e. they force the piston to move downwards i.e. they produce power and after producing the power the gases are exhausted during exhaust operation.

### **Objectives**

- Explain the different types of ignition systems
- Differentiate between battery and magneto ignition system
- Know the drawbacks of conventional ignition system, and
- Appreciate the importance of ignition timing and ignition advance.

# PROJECT GALLERY



## Working

When the ignition switch is closed and engine is cranked, as soon as the contact breaker closes, a low voltage current will flow through the primary winding. It is also to be noted that the contact breaker cam opens and closes the circuit 4-times (for 4 cylinders) in one revolution. When the contact breaker opens the contact, the magnetic field begins to collapse. Because of this collapsing magnetic field, current will be induced in the secondary winding. And because of more turns (21000 turns) of secondary, voltage goes upto 28000-30000 volts.

Coil Primary winding (200 - 300 turns of 20 gauge wire)

Secondary winding (2100 turns of 40 gauge wire)

(20000 - 30000 V) Distributor contacts Ignition switch Ammeter Contact Breaker Battery (6 or 12V) Contact breaker operating cam Distributor Sparkplugs 1234 Capacitor

## Schematic Diagram of Coil/Battery Ignition System

This high voltage current is brought to centre of the distributor rotor. Distributor rotor rotates and supplies this high voltage current to proper spark plug depending upon the engine firing order. When the high voltage current jumps the spark plug gap, it produces the spark and the charge is ignited-combustion starts-products of combustion expand and produce power.

## Note

- The Function of the capacitor is to reduce arcing at the contact breaker (CB) points. Also when the CB opens the magnetic field in the primary winding begins to collapse. When the magnetic field is collapsing capacitor gets fully charged and then it starts discharging and helps in building up of voltage in secondary winding.
- Contact breaker cam and distributor rotor are mounted on the same shaft. In 2-stroke cycle engines these are motored at the same engine speed. And in 4-stroke cycle engines they are motored at half the engine speed.



**PROJECT REPORT**  
**ON**  
**“WIPER & INDICATOR SYSTEM”**

SUBMITTED TO HSBTE IN THE PARTIAL REQUIREMENT  
FOR THE AWARD OF  
DIPLOMA IN  
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**SESSION: 2022-2025**

# INTRODUCTION

## Wind Shield Wiper System

A windscreen wiper or windshield wiper is a device used to remove rain, snow, ice, washer fluid, water, debris from a vehicle's front window so the vehicle's operator can better see what's ahead of them. Almost all motor vehicles, including cars, trucks, buses, train locomotives, and watercraft with a cabin—and some aircraft—are equipped with one or more such wipers, which are usually a legal requirement.

A wiper generally consists of a metal arm; one end pivots, the other end has a long rubber blade attached to it. The arm is powered by a motor, often an electric motor, although pneumatic power is also used for some vehicles. The blade is swung back and forth over the glass, pushing water, other precipitation, or any other impediments to visibility, from its surface. On vehicles made after 1969, the speed is normally adjustable, with several continuous speeds, and often one or more intermittent settings. Most personal automobiles use two synchronized radial-type arms, while many commercial vehicles use one or more pantograph arms.

The windshield wiper system must meet the following requirements:

- Removal of water and snow.
- Removal of dirt (mineral, organic or biological).
- Operation at high and low temperatures (+80°C--30°C)
- Corrosion resistance against acids, alkalis, salts (240h) and ozone (72h).
- Service life 1.5 million wipe cycles for a passenger car.
- Stall test

## Wiper Blades

Most Wiper Blades are in lengths between 260 to 1,000 mm. They have between 4 and 10 pressure points. Most common are the Blades with 6 to 8 pressure points and a length between 430 and 700 mm. In some cases, aerodynamics deflectors are integrated in the wiper arms or blades to press the blades against the windshield.

## **Blade Geometry**

The rubber element is the most important component of the Wiper Blades. It has double micro edges that are pressed against the windshield. The micro edge has a point of contact that is only of approximate 0.01 mm. Of width. When moving across the windshield, the Wiper Blade must overcome coefficients of the Dry friction of 0.8 to 2.25 and coefficient of Wet friction of 0.6 to 1. The correct combination of the Wiper Blade profile and rubber properties must be chosen so that the wiper lip can wipe the complete wiped area of the windshield surface at an angle of 45 degrees.

## **Blade Material**

There are three different combinations of rubber compound:

- 1) Natural rubber
- 2) Synthetic rubber
- 3) 2-component with either synthetic- synthetic or natural- synthetic rubber

The rubber properties are important for the wiping quality at different temperatures. The lowest temperatures are the most difficult to get a good wiping quality because the rubber get stiff when it gets cold. Tests have shown that the natural rubber is the most effective in low temperatures.

The first windshield wiper was a rubber blade on the windshield that was rotated manually. Of course, this design had its disadvantages and it was soon replaced by a vacuum driven wiper system. However, this system was plagued by the fact that its speed of operation changed with the speed of the vehicle. This failure finally led to the attachment of an electrical driven motor to the wiper arm. This is essentially the design that is still in use. All of the latest progress with the wiper blade is about materials. The latest research is focusing on the possibility to use synthetic rubber instead of natural rubber. The following figure shows the evolution of the blade.

## **Headlight System**

Car headlights are the lighting system mounted in front of the car to provide illumination, particularly during low-visibility conditions like nighttime, fog, or heavy rain. They are sometimes called headlamps. There are various types of headlights, each with unique features and benefits. Beyond their primary function of improving driver visibility, headlights enhance vehicle safety by making the car more visible to other road users. Modern car headlights integrate advanced

technologies, offering improved efficiency, brightness, and lifespan compared to earlier models, reflecting the continuous evolution in automotive exterior lighting.

# PROJECT GALLERY



**PROJECT REPORT**  
**ON**  
**“GEARLESS POWER TRANSMISSION”**

SUBMITTED TO HSBTE IN THE PARTIAL REQUIREMENT  
FOR THE AWARD OF  
DIPLOMA IN  
MECHANICAL ENGINEERING

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**DEPARTMENT OF MECHANICAL ENGINEERING**  
**GOVT. POLYTECHNIC, MANDI ADAMPUR**  
**SESSION: 2022-2025**

# INTRODUCTION

Today we are living in the technological era. Due to the advancement in the technology various fields are developed in the sector. Therefore, to build the bridge of gap between knowledge and industry, the subject called project is included in the syllabus of Engineering. In short project can be defined as,

P: Planning before carrying out work

R: Raw material required for work

O: Organization of the work

J: Joint efforts put together in the work

E: Estimate of material required for work

C: Costing of work

T: Techniques of performing of work

Engineer is constantly confronted to the challenges of bringing ideas and design in to reality. New machine and techniques are being developed continuously to manufacture various products at cheaper rates and high quality. The project “Gearless Power Transmission by Using Elbow Mechanism” being compact and portable equipment, which is skillful and is having more practice in the transmitting power at all angle without any gears being manufactured. The parts can be easily made and price is also less. The Cylinder-piston Mechanism transmits the input power towards the output side such a way that the angular forces produced in the slacks are simply transmitted with the help of Lego coupling mechanism which takes up the I/P power and the angle drive is transferred towards the O/P slack and Cylinder-piston assembly. Hence very little friction plays while the power is being transmitted. Therefore, it is appreciated that efficiency as high 90-92% is possible in Universal Hobson Mechanism. In today’s world energy is the prime requirement in each and every field. As the world is progressing towards the 22nd century every bit of energy becomes crucial because their sources that we have for producing energy is very limited and soon will be getting finished. A Hobson's joint or Hobson's coupling is a type of right-angle constant

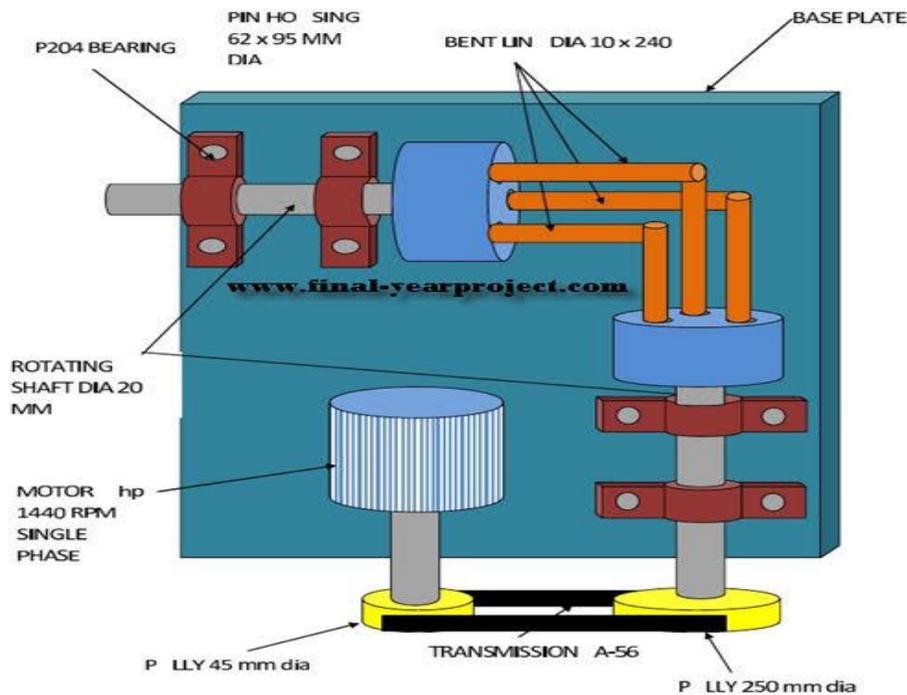
velocity joint, rods bent  $360^\circ$  are able to transmit torque around a corner because they are all free to turning their mounting holes in both legs of the coupling. Angle between in eisa piston-based engine typically fed by steam or compressed air to drive a flywheel or mechanical load. It is based on a mechanism known as a Hobson's joint. Although not commonly used today for practical purposes, it is still built by hob by is for its uniqueness. This mechanism is also termed as Gearless transmission mechanism. The purpose of this mechanism is to transmit the input power to output side at full angle ( $360^\circ$ ). This mechanism is very useful for transmitting the motion at full angles. The main feature for this mechanism is comparatively a high efficiency between input and output power shafts with regards to gear efficiency. This system demonstrates efficient gearless transmission of power at right angle. This is a ves gear manufacturing time and costs along with teeth matching and gear placement is The elbow mechanism is an efficient design of gearless transmission technique and the kinematics system that allows for efficient power/motion transmission at full angle.

# PROJECT GALLERY



## WORKING PRINCIPLE

The Gearless or El-bow transmission mechanism is an equipment for power transmission at any desired angle between the drive shaft and the impeller. The creation of this mechanism would reveal that it contains a number of connections between 3 and 8, the more links there are, the smoother the operation will be. These connections slide into the housing to form a sliding and sliding pair. This mechanism has 3 of those sliding pairs. These cylinders are placed in a hollow tube and fixed at  $60^\circ$  from each other. This experimental configuration is mounted on a wooden table. Power is supplied by an electric motor. The operation of this transmission will appear from the action of an auction during a single revolution. If the drive shaft rotates clockwise, the driven shaft will rotate counterclockwise. When the input shaft rotates through the semi-rotational bend bars shown in the innermost and most effective driving position, it flows away from the input and output shafts. Elbow mechanism with a right-angle configuration, in the same way that the configuration can be flexible to differentiate any angle ( $0^\circ$ - $90^\circ$ ). It is important to have the holes for a given rod positioned precisely in it the holes must equi-spaced in the radial and circumferential direction, being parallel to each rod must be bent at an angle with which the axis will be located.



If the punched holes at the ends of the shafts have "blind" or closed ends, there must be a small opening at the bottom of each hole in the rod for the exit of the compressed air from the pumping action of the rods. These holes are useful for greasing to avoid blind holes. Trees can have a light or an enlarged shoulder. This transmission is positioned centrally and in line with the axis of each axis and with the condition that with a circular groove in each rod or a transverse pin to allow rotation of the shaft around the rod simply active as a retaining device for the shipping and handling Purpose. was on especially multi spindle drilling machine for drilling meter cases. This transmission was used to replace universal joints consisting of forked ends. In making this transmission it is essential to have the holes for given pins located accurately in the same relative position in each slack. All holes must be equally spaced in the radial and circumferential direction. If the holes drilled in the end of the slack having blind or closed ends, they should have a small vent at end of pins. These holes are useful for oiling to avoid blinds holes. The working of the mechanism can be easily understood by the figure. Motion is transmitted from driving to drive shaft through the pins which are bent to conform the angles between the shafts. These pins are located in the cylinders equally spaced around the periphery of the supporting plate. These pins are free to slide in and out as the shaft revolve this type of drive is especially suitable for quite operations at high speed. But it is only recommended for light duty.

