AUTOMATION OF WINDSHIELD WIPER

(Electrically controlled using LCC circuit)

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ABSTRACT

The wipers are the instruments which are have been used to wipe out the rain water in the windshield of larger vehicles. Now- a-days vehicles are had been using wipers that are controlled manually by the drivers. Even though electronically controlled automatic wipers are used, they have some of the serious drawbacks. The some of the drawbacks in the electronically controlled wipers are ,Higher in cost, Life is lesser,Tedious in construction,Cannot be used for smaller vehicles.To overcome these drawbacks, it modified in the electronic devices are replaced by an electrical device called LCC (Liquid conducting coil).

PREFACE

we are the students of T.J.S engineering college,dept of mechanical engineering has done a mini project on AUTOMATIC WINDSHIELD WIPER is based on electrical conductivity through rain water. Through more efforts we have done the project successfully and made it as a delightful, unique project. Even though we got more failures during our project our willpower and encouragement by our teachers and our supporters helped us to complete the project. We heartily deliver our gratitude to Mr.T.J. Govindharajan, Chairman of T.J.S group of institutions, and all the others involved to complete this wonderful project.

OBJECTIVES:

The following are the main objectives of the project,

- To automate the working of wiper.
- To replace the electronic circuit by electrical circuit.
- To make it useful for everyone.
- To make it cost efficient.

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Need:

Low Cost Automation (LCA), the buzzword in all industrial firms generally involves pneumatic, electrical as well as electronic components. LCA is important in the automation, not only in factories but also in general oriented applications, for example, the electronic component assembly plants.

Automation saves a lot of tedious manual work and helps in improving our comfort. The automation in the daily life changes our life style.so automation is needed in every step of life.

The main objective of this project is to replace the electronically controlled wipers by electrically controlled one and makes it more useful for everyone.

The wipers are the device which are have been used to wipe out the water in the windshield during rainfall. This system is automated through an electrical system called an LCC circuit.

The motor wiper set is controlled by the LCC circuit. The speed, sensitivity, efficiency all are depends upon the construction of this controller. The automation of this system helps in improving comfort of driver. It reduces the work and helps in concentrate on roads during traffic.

Importance of wiper system:

A wiper system is an essential part in vehicles having windshield in it. During rainfall the clarity of the windshield is affected, due to spreading of rainwater over the glass surface. This may reduce the vision of driver during driving. Hence there is a chance of serious accidents.

To avoid such actions wipers are have been used. Thus a wiper plays a major role in automobile field. The automation of wipers which are using electrical devices(LCC) instead of electronic devices (temperature sensors) gave birth to new technological growth in field of Mechatronics.

Components of wiper system:

Our project consists of the following parts;

- *Power supply (from the Battery),*
- *A specified DC motor,*
- *Connecting rods*
- *Eccentricity pin,*
- *Wiper blade,*
- *LCC (Liquid conducting coil).*

Power supply

The power supply for the motor is obtained from the battery of the vehicle. The supply given is purely DC.

DC motor:

A DC motor of specified operating range (given below) has been selected for the project.

Generally, the step motors are used for operation.

specification	*values*
Current limit	*5amp*
Voltage limit	*8-12 Volt*
Max speed	*70 rpm*
Operating angle	*360 deg*
Supply mode	*DC supply*

Connecting rods & eccentricity pin:

The connecting rods are the materials which are made by cast iron that helps in transmitting energy from the motor to the wiper blades.

The eccentric pin helps in converting rotary energy into reciprocating energy.

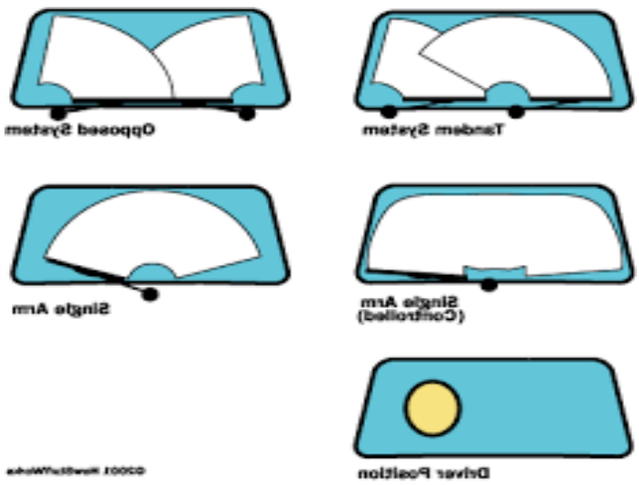
***WIPER BLADES**;*

The wiper blades are the materials which tends to wipe out the rainwater.it converts the reciprocating motion of connecting rods into oscillating motion.

Types:

Single arm, opposite system,

Tandem system, driver position.



Principle based:

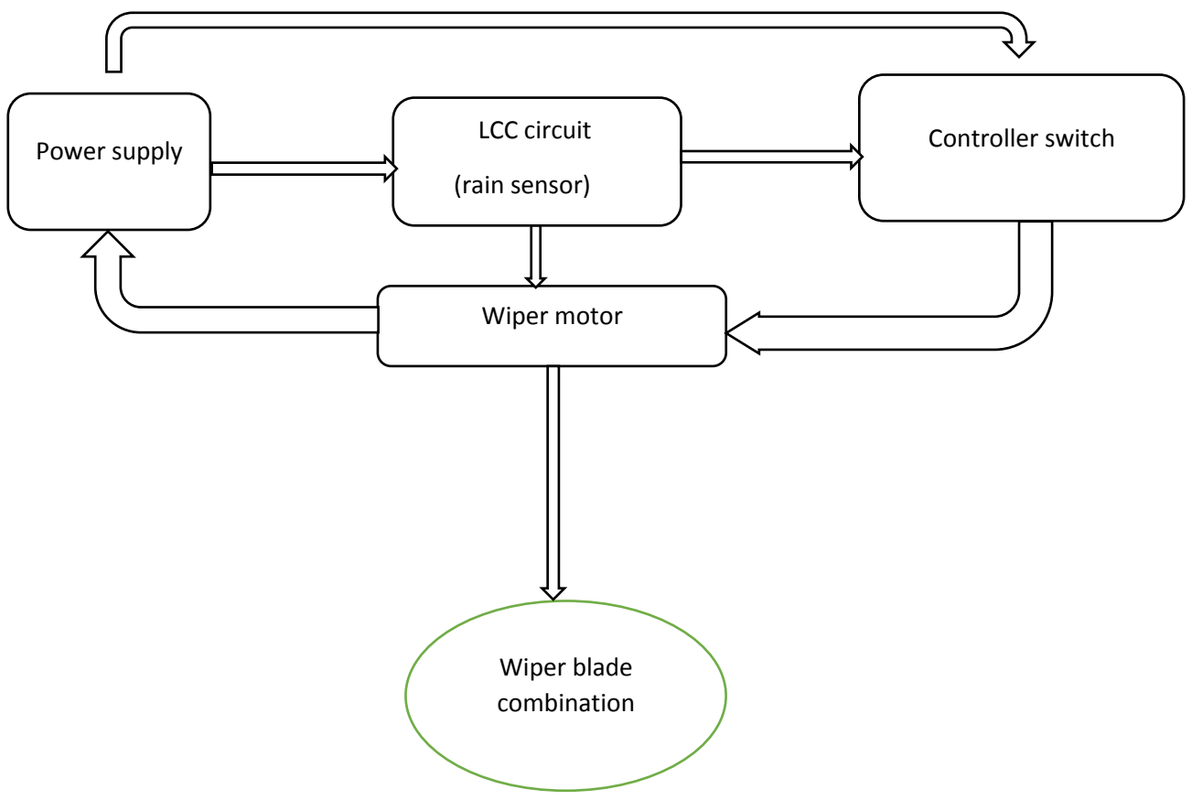
It is based on the principle of "Electrical conductivity through induction of emf by rain water".

When the electricity is passed between the two conductors which are separated by a small distance, an emf is induced between them. But it not enough to operate the motor. At that time when the rain water is dropped over it, it acts as a semiconductor. Hence current passes through it.

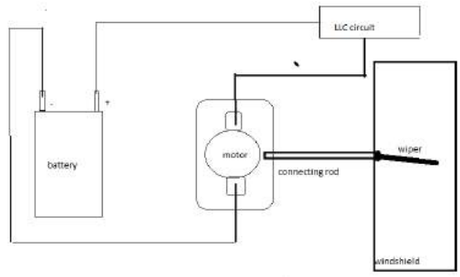
Overview of LCC circuit:

The LLC circuit is Liquid conducting coil. It is as shown in fig; it is connected between the power supply and motor. Thus it tends to open the circuit.it consist of the no. of strips of copper wire which are placed at a distance of 1mm over a PCB. the PCB consist of no. of holes for the draining of rainwater

Block diagram of automatic wiper system:



CIRCUIT diagram:



Working of Automatic wiper:

The block diagram of the automatic wiper system is shown in fig; it consists of the LCC circuit which is placed at the top of the windshield at an angle of 60-80.it is connected directly to the wiper motor.

As the DC source is fed to the LCC circuit. The live wire in the PCB board induces an emf in the dead wire. But the induced emf in the motor is not enough to run the motor. When the rain water has been drops over the PCB board, it enriches the emf induced in the motor and helps in increasing the voltage of motor. Thus the supplied voltage is enough to run the motor. when the motor is operated the wiper has been accelerated and rubs the glass surface.

As the PCB has a no. of holes in it. So the water drains out and the motor is de-energized. It brings the wiper to rest when the rain has stopped. Thus the wiper is more sensitive.

Advantages of this system:

This system has following advantages;

- *Low cost.*
- *Easy in construction.*
- *Does not need any maintenance.*
- *Long life.*
- *Helps driver to concentrate on driving.*
- *Used for low cost vehicles also.*
- *Increases quality, efficiency, usability.*

Comparison between electrical & electronic automatic wipers:

comparison	***Electronic wiper***	***Electrical wiper***
cost	*More*	*Lesser*
Working life	*lesser*	*More*
usability	*Used for only expensive vehicles*	*used for low expensive vehicles.*
Maintenance	*Needs proper Maintenance*	*Does not needsproper maintenance*

Scope in future use:

This project uses an electrical device in order to transfer electric current. Electronic circuits using now-a days are replaced by an electricalcircuit operates motor with emf induced by rainwater. This will reduce the cost of automated wiper.

The LCC circuit used in this project controls all the process. The LCC circuit made by PCB can be used for any vehicle. It is more flexible.

The alternate way is to use a thin film of a waxy material over the wind shield. As there is no wiper in it. When the raindrop falls over the surface it scatters the rain drop due to velocity of running vehicle.

CONCLUSION:

Thus a low cost automation project has been designed in the automobile wiper. The main aim of this project is to reduce the cost and increase the usability of project for everyone. The project reduces the work of driver and increases the life of device. The project enhances the application of mechanical and electrical based components, to achieve a good product. The LCC circuitbased on electrical induction will never result in failure of (mechanical + electrical device) LCC circuit. The process is completely an automated one.

Alternate application of lcc;

This method can also be implemented in water treatment plants and in power plants for automatic tank filling by means of magnetostatic induction system.

(in magnetostatic mechanism two connections are made in connection1,the current passes to operate the pump, the lcc is placed at the filling level of the tank,an electro magnet is placed in the connection2.A ferro magnetic material tends to close connection1 is parallel to the electro magnet,now when the tank is filed the current passes through LCC energise electro magnet it pulls the ferromagnetic material and opens the circuit,so the pump is off)

cost estimation;

- *Dc motor=RS 2500*
- *Wiper blade= RS 1000*
- *Stand = RS 1000*
- *Pcb board = RS 300*
- *Silverstrips& copper powder= RS 500*
- *Total = RS 5300*

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