

360 DEGREE ROTATING WHEEL VEHICLE

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ABSTRACT The aim of this paper is to foster a zero turning vehicle. Rather than working by gear framework, we are involving automatic framework for activity of this vehicle. Supplanting two wheel drives by four wheel drive makes more advantageous for the vehicle to proceed. Traditional controlling includes either the Ackerman or Davis directing framework which has significant weakness that it can't take least sweep turn. We attempt to take care of the issue of turning span by new idea of zero turning vehicles with mechanical linkages and automatic shifting. The primary reason for this venture is to lessen the turning sweep and turning space by pivoting at same spot without leaving its focal point of gravity. In this framework, the wheels associated with the front axles are gone inverse to each other, as are the wheels associated with the back hub. The wheels on the one left half vehicle pivot in one bearing and the ones on the right 50% of the vehicle. To conquer issue like vehicle moving on tight streets and during leaving this framework has been proposed.

- ✚ Hence it is easy to take the car from the parking area if any object is placed at front and back side of the car and also avoid the traffic in road.
- ✚ The vehicle can able to turn at difficult bends.

BLOCK DIAGRAM

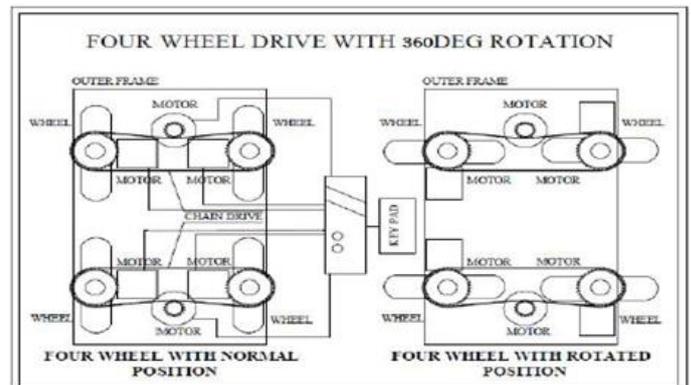


Figure1. Block diagram related to 360° rotating vehicle

Key Words: Turning Radius, Zero Turning Mechanism, Four Wheel Steering, 360° Rotation

INTRODUCTION

As referenced over, this task is about plan of 360 degree turning vehicle to move toward all path. This plan will give better solace and furthermore saves the hour of clients that is the reason it is additionally the dependable for the client. As it is additionally battery worked vehicle hence no fuel is required. Consequently it is affordable to the climate. This will likewise diminish the expense of the vehicle. The brief about this task and subtleties of plan, materials, its assessment and so forth portrayed in resulting segment. The majority of individuals use vehicle in their regular routine, However more often than not, they need to confront the issues like stopping, taking U-turns and so forth So here we have planned a 360 degree turning vehicle to decrease and dispensed with issues to keep up with the traffic. A car producer is an organization that produces vehicles.

PROJECT OBJECTIVE

- ✚ In this vehicle, the wheel of the car is turn to 360 degree angle.

PARTS REQUIREMENTS

- ✚ Dc motor
- ✚ Gears & sprockets
- ✚ Frame
- ✚ Switches
- ✚ Wheels
- ✚ Connecting wires

DC MOTOR

In this vehicle one DC motor are give in each wheel to push ahead and in reverse bearing. The particular of motor utilized is 12 V. At the point when power supply from electric charger to DC motor then DC motor turn in clockwise course and when switch current stock from electric charger to DC motor then DC motor will anticlockwise bearing. Which will advance and in reverse development of vehicle. The DC motor is additionally used to turn the wheel at 360 degree an electric motor utilizes electrical energy to create mechanical energy machine that

changes over DC electrical power into mechanical power is known as an Immediate Flow engine. DC motor working depends on the rule that when a current conveying guide is put in an attractive field, the guide encounters a mechanical power. The course of this power is given by Fleming's left-hand rule and greatness is given by;

$$F = BIL \text{ Newton}$$

As per Flemings left-hand rule when an electric flow goes through a curl in an attractive field, the attractive force creates a force which turns the DC motor. The course of this power is opposite to both the wire and the attractive field.



Figure no.2

GEARS DRIVE & SPROCKETS

A gears drive is utilized for transmission of mechanical power between two sprockets. Gear drive is an approach to communicating mechanical power starting with one spot then onto the next. It is regularly used to pass power on to the wheels of a vehicle, especially bikes and cruisers. It is likewise utilized in a wide assortment of machines other than vehicles. Most regularly, the power is conveyed by a gear, known as the drive gear or transmission gear, ignoring a sprocket gear, with the teeth of the stuff coinciding with the openings in the connections of the gear. The stuff is turned, and this pulls the gear placing mechanical power into the framework. This has transformed teeth. Here and there the power is yield by just pivoting the gear, which can be utilized to lift or drag objects. In different circumstances, a subsequent stuff is put and the power is recuperated by appending shafts or centers to this stuff. However drive gear are regularly straightforward oval circles, they can likewise circumvent corners by setting multiple cog wheels along the gear; equips that don't put power into the framework or send it out are for the most part known as idler-wheels. By differing the distance across of the information furthermore, yield gears regarding one another, the stuff proportion can be modified. For instance, when the bike pedals gear pivot once, it makes the stuff that drives the wheels turn more than one transformation. A sprocket is a profiled wheel with teeth, gear-teeth, or even sprockets that cross section with a chain. The sprockets are utilized for the power transmission among directing and wheel through the roller chain drive. A

sprocket[1] or sprocket wheel [2] is a profiled wheel with teeth, or cogs,[3][4] that lattice with a chain, track or other punctured or indented material.[5][6] The name "sprocket" applies by and large to any wheel whereupon spiral projections draw in a chain disregarding it. It is recognized from stuff in that sprockets are never fit together straightforwardly, and contrasts from a pulley in that sprockets have teeth and pulleys are smooth.



Figure.3

FRAME

The fixed frame forms the base of the 360 degree wheel rotation vehicle. This frame is made of Mild Steel (MS).All parts are attached with the frame.



Figure.4

WIRES

A wire is a single, usually cylindrical, flexible strand or rod of metal. Wires are used to bear. Wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. The term *wire* is also used more loosely to refer to a bundle of such strands, as in "multistranded wire", which is more correctly termed a wire rope in mechanics, or a cable in electricity. Wire comes in solid core, stranded, or braided forms. Although usually circular in

cross-section, wire can be made in square, hexagonal, flattened rectangular or other cross-sections, either for decorative purposes, or for technical purposes such as high-efficiency voice coils in loudspeakers. Edge-wound [1] coil springs, such as the Slinky toy, are made of special flattened wire.

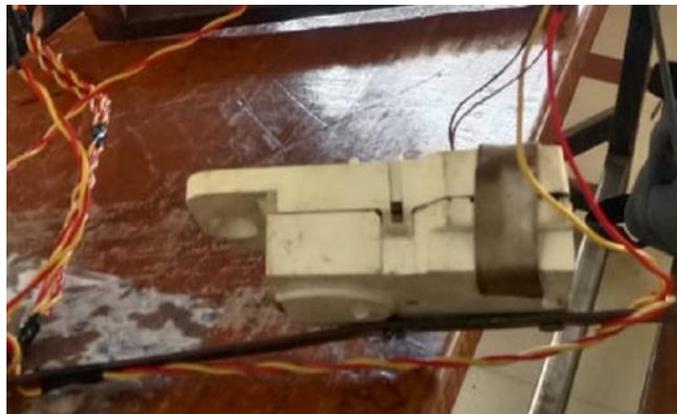


Figure. 5

WHEELS

The wheel bearing help the wheels in turning without a hitch. Fundamentally, the capacity of the wheel center point is to keep the wheel turning unreservedly on the bearing while at the same time keeping it appended to the vehicle. Rolling is a productive method for lessening contact. At the point when you slide a square across a smooth surface, it will slide for a brief distance and afterward halt. At the point when you roll a ball across that surface, it will move far. There are two fundamental pieces of wheels; the haggler hub. The actual wheel is a round plate. The hub is a shaft situated in the focal point of the circle. Here and there the plate itself turns on the pivot. Regularly the hub is fixed to the circle and the haggler turn together. Whenever a wheel is moving along the ground, a small portion of the surface contacts the ground. However this surface doesn't need to slide on the ground. Contact chiefly happens in the pivot and is extraordinarily decreased. Moving erosion is a lot more fragile than sliding erosion. By rolling, wheels make it simpler to move things from one spot to another.



Figure.6

WORKING PRINCIPLE

In this project battery gives the power supply to the control unit. The gear contains absolutely six engines, two engines are combined with the vehicle's left and right wheels of the front side, the following two engines are associated with the vehicle's left and right half of the rear. The four engines are utilized to run the vehicle. Another two engines are associated with turn the vehicle wheel 360 degree by the chain drive plans. The keypad in the control unit has six keys they are left, right, forward, switch, park left, and park right. We press the left key in the keypad the vehicle turns left side in an expected point, we press the right key in the keypad the vehicle turns at right side in a required point, also the forward and switch movement of the vehicle are constrained by the forward and turn around key in the keypad. We need to leave the vehicle in left side by press the recreation area left key then the engine associated in the chain drive is turns the wheel left side 360 degree consequently, then the vehicle is left in the left side, this process is same as right side. Utilizing this we can undoubtedly leave the vehicle in different regions.

COMPONENT NAME AND DIMENSION

S.NO	COMPONENT NAME	PART OF PIECE	DIMENSION
1	Frame Pipe	4	L=385mm , W=270mm
2	Motor	4	60 rpm
3	Big Motor	1	10rpm
4	Pipe	1	210 mm
5	Gear	2	D=50mm
6	Wheel	4	D=65mm
7	Disk	1	D=155mm
8	White Motor	1	Volt=24V, Current=0.45Amp
9	Strip	1	L=490mm
10	Joy stick	4	L=344mm
11	Long bolt	1	L=170mm
12	Screw	4	Pitch=0.2mm
12	Weight		4kg

If load apply on the vehicle is 4 kg and length 385mm width of vehicle 270 mm.

Find the reaction developed by each wheel and find the torque of each Wheel.

Weight=4 kg
Length=385 mm
Width=270 mm

To find the reaction force on each wheel (r)

$$R = \sqrt{\left(\frac{l}{2}\right)^2 + \left(\frac{b}{2}\right)^2}$$

$$R = \sqrt{\left(\frac{385}{2}\right)^2 + \left(\frac{270}{2}\right)^2}$$

R=235.11
R=236 mm

Reaction per wheel = $W/4 = 4/4 = 1$

Weight = $Mg = 1 \times 9.81$
= 9.81 N

Torque on each wheel (T)

$T = R \times r$
 $T = 9.81 \times 236$

T=2.315 N.m

Calculation of Motor

Specification and calculation

N=10rpm
Voltage=12 volt
I=2 Amp
Power = $V \times I$
Power= 12×2 VA

Speed ratio

$N_1 = 10$ rpm, $T_1 = 15$
 $N_2 = ?$, $T_2 = 38$

$N_1/N_2 = T_2/T_1$

$10/N_2 = 38/15$
 $N_2 = 3.94$ rpm

$P = 2\pi NT/60$
 $24 = 2\pi 4T/60$

T=57.29Nm

T=57.29 × 10³ N.mm

COST ESTIMATION

S.NO	NAME OF COMPONENT USED	QUANTITY	COST OF COMPONENT
1	Wheel	4	280 Rs
2	DC Motor 60rpm	4	800 Rs
3	DC Motor 10rpm	1	200 Rs
4	White Motor	1	350 Rs
5	Small Gear	1	50 Rs
6	Big Gear	1	150 Rs
7	Clamp	4	200 Rs
8	Joy Stick	4	200 Rs
9	Long bolt	1	100 Rs
10	Pipe	1	100 Rs
11	Big Pipe	1	250 Rs
12	PCB	1	100 Rs
13	Strip	1	150 Rs
14	Disk	1	200 Rs
15	Adopter	1	200 Rs
		Total	3330 Rs

ADVANTAGES

- ✚ Eco Friendly
- ✚ Less Noise Operation
- ✚ Battery Operated thus No Fuel Required
- ✚ Non Toxic And No Hazardous
- ✚ Less Costly
- ✚ Less Maintenance except battery requirement
- ✚ More Efficient
- ✚ Car Can Easily Parked

APPLICATION

- ✚ It is used in Automated Guided Vehicle
- ✚ In Automobiles Application
- ✚ In industries For Transportation of Raw Material

CONCLUSION

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and Economical. This project “fabrication of 360 degree rotating wheel in vehicle” is designed with the hope that it is very much economical and help full to vehicles for parking and other purpose. This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

FUTURE DEVELOPMENT

- ✦ In our project, we use two motors for rotating 360deg for the four wheels. Hence the single motor can be used to rotate 360deg for the four wheels in future development.
- ✦ The separate motor is used to run the wheel for movement. Hence single motor can be used to run the wheel for movement in future development.



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