

Design and Fabrication of Steer by Wire System

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ABSTRACT

The automotive industry has already implemented many advanced computer systems in an attempt to increase safety and comfort of drivers. In parallel with these advancements we see a big shift from mechanical systems to electrical systems and steerless car is another implementation that is very promising in terms of safety and functionality. Already, there are some commercial prototypes of such 'steerless car' systems. Steering operated by rack and pinion mechanism is operated by using electronics circuit. The motor attached to the pinion is rotated by using motor.

Keywords: Arduino, Steer by Wire, Rack and Pinion

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I. INTRODUCTION

With the world's energy crisis and the worsening environment, research of electric vehicle is emphasized more and more, and steerless car system of electric vehicle has been put on the agenda. Steer less car system is one in which conventional mechanical links between the steering wheel and the front wheels are removed, and is operated by electrical actors. Due to the importance of vehicle safety, such electrical systems must satisfy both stringent real-time performance and reliability requirements. However, so far, quantitative standards for automotive steerless car reliability do not exist. As the references show, standards developed for aircraft can be applied, which quantify a rate of one failure occurring in one billion operating hours, or 10^{-9} failures per . Based on this standard, the papers present some steerless car system architectures which use the centralized ECUs. However, they don't apply the bus technology, and don't take into account the delays of communication networks for the reliability of systems. In fact, when the communication delay increases, the reliability of the system will decline inevitably. If the delay exceeds the maximum tolerable response time of the system,

the reliability of the system will fall, and the car can not guarantees the security any more.

II. PROBLEM STATEMENT

Problem statement for the project is to design and fabricate the prototype model of the steer by wire.

Also fabricate the model of the same which will show the working desired by steer by wire.

OBJECTIVES

- To reduce the weight of the vehicle.
- To improve the aesthetics of the vehicle.
- To improve the durability of the vehicle.
- To develop an efficient energy storage system.
- To improve the aerodynamic efficiency.

III. CONSTRUCTION

The waste heat recovery system consists of following components

- Electronic circuit
- Chassis

- Motor
- Wheel
- Rack and Pinion

The working of the system depends on the electronics system.

Motor is used to steer the wheels with particular angle.

Pinion is assembled to the motor in order to move rack according to the rotation of the motor shaft.

Wheels are connected to the rack in order to prove the concept.

When the shaft of the Motor is rotated with some angle it will rotate pinion.

Rotation of the pinion is converted into linear motion.

Wheels are connected to the rack with hinge link.

The linear motion of the rack causes rotation of wheels.

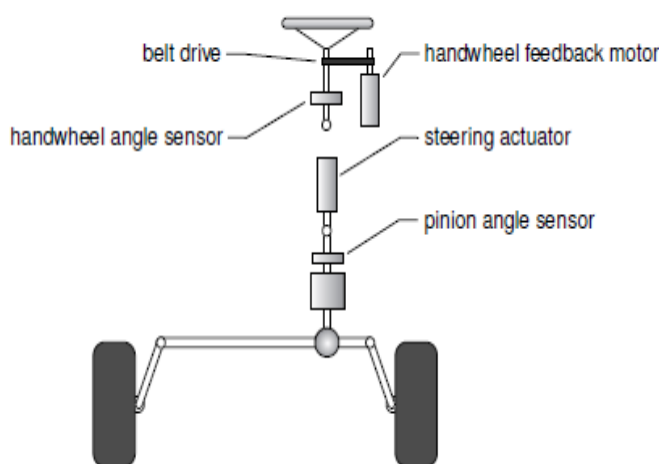
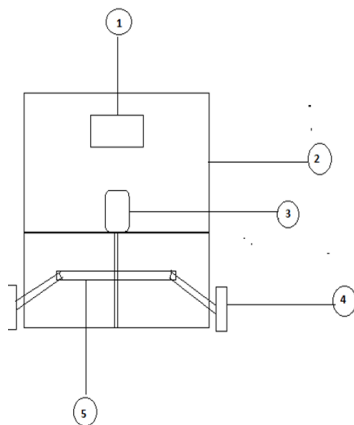


Fig 1. Steer by wire system

IV. SPECIFICATIONS

Serial Number	Component	Values
1	Arduino	Atmega 328 Op. voltage=5V In. Voltage=6-20V SRAM=2KB Clock speed=16MHz
2	Wiper Motor	RPM=10 Torque=25kg-cm I=800mA W=300gm
3	Rack & Pinion	Rack length=5” D=27mm Module=1.5mm Pressure Angle=20
4	Battery	Capacity=7.6Ah V=12v Type=Lead Acid
5	Dimmer	PWM=240Hz Supply=10-32V

V. CONCLUSION

Hence we conclude that in a typical mechanical steering system the driver’s steering input is transmitted by a steering shaft through some type of gear reduction mechanism to generate steering motion at the front wheels. And it will easy foe driver for drive a car. The absence of steering shaft, column and gear reduction mechanism allows much better space utilization in the engine compartment. In future this could be the next generation in steering mechanism.

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