

VEHICLE INTEGRATED WHEEL ALIGNMENT ALERT SYSTEM

BALAKRISHNAN.T¹, HARIRAMAN.R², JAYACHANDRAN.R³, JAYASRI MEENACHI.V⁴

⁽¹⁾Asst. Professor, depart of Mechanical Engineering, Knowledge Institute of Technology, Salem, 637 504,India

^(2, 3, 4)Depart of Mechanical Engineering, Knowledge Institute of technology, Salem,Tamil Nadu-637 504, India

(tbmech@kiot.ac.in¹,hariraman07@gmail.com²hcsjaichandran@gmail.com³, jayasrimeenachi@gmail.com⁴)

Abstract: In automobile, there are lots of reasons for road accidents. One among them is losing stability or control of the vehicle. The key reason for this is the change in wheel alignment of the vehicle that makes the vehicle to lose control. If there is a change in wheel alignment with its physical fittings or if the tire direction or Normal degree changes immediately the sensor placed near the wheel will sense and this is sent to the embedded circuit to indicate the error threshold. Our ultimate idea will help us in maintaining the wheel alignment by indicating an alert signal in the dashboard of the driver, when it

senses the change in the alignment of the wheel. By maintaining the wheel alignment not only avoids collision of vehicles, it also increases the fuel efficiency of the vehicle and reduces the tire wear & bolt wear of the vehicle. This paper presents unique and innovative use of vehicle dashboard for the measurement of automobile wheel parameters, such as camber and toe. The hardware and software realizations are also explored in this paper. The system practical application shows that its performance meets the design requirements.

1.1 INTRODUCTION

Wheel Alignment should be checked whenever a new tire is installed, suspension component installed, when the vehicle has encountered a major road hazard any time unusual tire wear patterns may appear. Wheel Alignment measure complex suspension angles and the adjustment of a variety of suspension components. It is a suspension-tuning tool which greatly influences the vehicle's handling and tire wear. Wheel alignment means adjusting the angles of the wheels so that they are parallel to each other and perpendicular to the ground, thus maximizing tire life and ensures straight and true tracking along a straight and level road. The primary static suspension angles that need to be measured and adjusted are caster, camber, and toe and thrust angle. The following are definitions Conditions and Possible Causes of each angle and its influence on a vehicle and its tires.

Problem Identification

For many, wheel alignment is seen as one of those pesky problems that come along with car ownership. Wheel misalignment can occur naturally overtime, it's more, likely that there is a specific reason behind wonky tires. When your tires are out of alignment, basically means they are not pointing in

the right direction you may notice your vehicle pulling to one direction or vibrating as the wheels pull against each other, or that your steering wheel is crooked even though you are driving straight. This all negatively affects your steering, suspension and tires, but more importantly, it comprises your safety on the road. And that's never a good thing. Just like getting an oil change, wheel alignment should be a part of your standard auto maintenance.



Fig.1 TIRE WEAR

METHODOLOGY

In our project we are monitoring the alignment of the wheel by using accelerometer sensor

which is fixed in the rear axle. The fixed value for the angle of wheel alignment is feed in the microprocessor. When there is alignment change in the wheel due to some external forces the variation in the value is noted in microprocessor and alignment change is indicated. The change in alignment of the wheel is indicated in the LCD display and displayed in the dashboard. Another process is that the value of the wheel alignment is noted using Bluetooth module which is connected with the microprocessor. LMBT TERMINAL is an application which used to connect our mobile with the Bluetooth module which helps us to monitor the variations easily. Thus in our project the causes and effects of improper wheel alignment by traditional methods are analyzed. In this system wireless transmission techniques are adopted to transmit data between measuring unit and computer. This makes the measurement operation much easier.

RESULT DISCUSSION:

We have achieved our output successfully by continuously monitoring the alignment of the wheel through the accelerometer sensor.

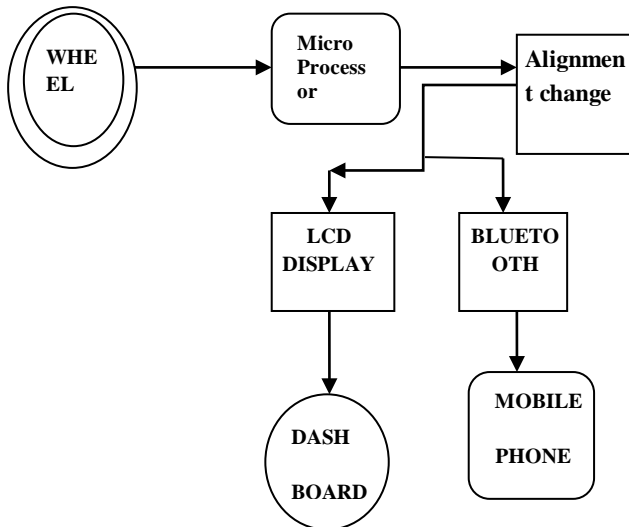


Fig.2 PROCESS

FABRICATED MODEL



Fig. 3 FINAL IMAGE OF FABRICATED MODEL

CONCLUSION

The wheel alignment angles have great influences to automobile operational performance, such as travelling safety and driving stability. In order to maintain automobile performance, regular examination and adjustment of wheel alignment angles are need by means of wheel alignment system. In this paper some correction factors are also introduced in the calculations to obtain the actual angles from the angles with respect to gravity, it is observed during the practical implementations of the alignment system. Wireless communication method is adopted to transmit the data between measuring unit and computer this makes the system operation much easier. The system practical inspection shows that its performance meets the design requirements. This system can be implemented for almost all types of four wheelers where the wheel alignment is required. The another advantage of this method is that it is less time consuming hence it can also be implemented in formula 1 racings where there is least time available for tire change over in between two laps.

REFERENCES:

- [1] *Dynamic alignment control using depth imagery for automated wheel assembly* VinayakAPrabhu, AshutoshTiwaria, Procedia CIRP 25 (2014) 161 – 168
- [2] *Implementation of Machine Vision System for finding Defects in Wheel Alignment* AkshayPadegaonkar, MadhuraBrahme, MohitBangale, International Journal of Computing and Technology,
- [3] C.G. He, Y.B. Huang, "Experimental investigation on the effect of tangential force on wear and rolling contact fatigue behaviors of wheel material"
- [4] <http://www.anewtoronto.com/wheel%20alignment.html>
- [5] <https://www.testingautos.com/when-should-wheel-alignment-be-done>
- [6] <https://www.searlesauto.ca/20105/02/alignment-out-of-whack/>
- [7] <https://www.arrivealive.co.za/wheel-balance-and-Safe-driving>