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DESIGN AND DEVELOPMENT OF AN AUTOMATIC HEAD LAMP LEVELING SYSTEMS FOR AUTOMOBILES

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ABSTRACT

A head lamp is usually attached to the front of a vehicle such as a car, with the purpose of illuminating the road ahead during periods of low visibility, such as night or precipitation. Headlight to be used in informal discussion interchangeably, headlamp is the correct technical term for the day to-day device itself, while headlight properly refers to the beam of light produced and distributed by the device. A headlamp can also be mounted on a bicycle with a battery or small electrical generator, and most other vehicles from trains to airplanes tend to have their own headlamps. A head lamp auto-leveling system can be used inexpensively and for a long term by reducing the unpleasant feeling in the driver. An implementation of the head-lamp leveling system includes head lamps whose axis is tilted horizontally/vertically with respect to a vehicle turning movement

Key words Automobiles, Head Lamp, Safety, Sensors

1. INTRODUCTION

A headlamp usually attached to the car or bike front to illuminate the road ahead in case of low visibility, usually at night or precipitation and to be used in informal discussion interchangeably. Headlight properly is the beam of light producing and distributing device. It can be mounted in any sort of vehicles such as car, bike, train, even flight to bicycle.

1.1 Mechanics: The introduction was first started in late 1980s and the first electric headlamp was introduced in 1898. The use of electric headlamps was limited by two factors: the difficulty of producing dynamos small enough, yet powerful enough to produce sufficient current and the short life of filaments in the harsh automotive environment. In 1904, a number of manufacturers as standard equipment offered "Prest-O-Lite" acetylene lights, and in 1908. Cadillac modified their vehicle in 1912 in the Delco electrical ignition and lighting system for the new path in modern electrical work system in vehicles. In 1915, "Dipping" (low beam) headlamps were introduced by the Guide Lamp Company, but nevertheless to stop and get out of the car by driver. The 1917-24 there were two more invents and modification came in the market Cadillac system and bulb which gives dipped light along the lever in car and serves both low and high beams in a single bulb in the headlamp emitting. The foot-operated dimmer switch in 1927 became standard for much of the century. In 1991's BMW 7-series, High-intensity discharge systems were introduced. HID headlamps were began to preferred by European and Japanese markets , with almost 50% market share in those markets, but it was slow in adopting North America.

2. MATERIALS AND METHODS

2.1 Headlamp: To keep the headlamps correctly aimed regardless of vehicle load in mid 1950s to the vehicle's suspension system, an automatic headlamp leveling system was introduced by Cibie. 1,2,3,0 are the switches for the giving the heights of the beam (Aleksanteri et al., 2008). Internationalized ECE Regulation 48, in force in most of the world outside North America, currently requires such systems on all vehicles. The various factors which determine the choice of material are discussed below (Vinoth et al., 2016). The various physical properties concerned are melting point, thermal Conductivity, specific heat, coefficient of thermal expansion, specific gravity, electrical conductivity, magnetic purposes etc (Chandrasekaran et al., 2013). The various Mechanical Properties Concerned are strength in tensile, compressive shear, bending, torsion and buckling load, fatigue resistance, impact resistance, elastic limit, endurance limit, and modulus of elasticity, hardness, wear resistance and sliding properties (Yoganandam et al., 2016, Ganeshan et al., 2016). The various properties concerned from the manufacturing point of view are, Cast ability, weld ability, surface properties, shrinkage and deep drawing etc.

2.2 Manufacturing case: Sometimes the demand for lowest possible manufacturing cost or surface qualities obtainable by the application of suitable coating substances may demand the use of special materials.

2.3 Quality Required: This generally affects the manufacturing process and ultimately the material. For example, it would never be desirable to go casting of a less number of components which can be fabricated much more economically by welding or hand forging the steel.

2.4 Space consideration: Sometimes high strength materials have to be selected because the forces involved are high and space limitations are there.

2.5 Cost: As in any other problem, in selection of material the cost of material plays an important part and should not be ignored. Sometimes factors like scrap utilization, appearance, and non-maintenance of the designed part are involved in the selection of proper materials.

3 RESULT AND DISCUSSION

3.1 Components: The head lamp leveling system is consists of the following components, to full fill the requirements of complete operation of the machine (Martinez et al. 2004, Senthilrajan et al., 2014). Figure 1 indicates the setup for the rack and pinion steering gear mechanism and figure 2 indicates the Steering System with movable headlights

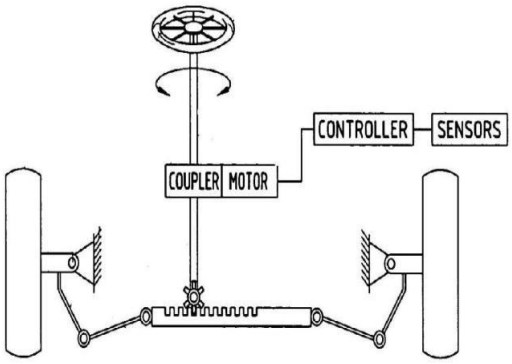

Figure 1: Rack and pinion steering gear

Figure 2: Steering System with movable headlights

Table 1: Automotive system data for left and right side turn (Fazzalaro 2003)

SI No.	Angle of turning of Steering wheel		Steering Ratio	Angle of turning of headlight on left side (°)	Angle of turning of headlight on Right side (°)
	X°	Y°			
1.	--200	-11	18.18	-8	-5
2.	-400	-22	18.18	-16	-10
3.	-600	-33	18.18	-25	-15
4.	0	0	0	0	0
5.	200	11	18.18	5	8
6.	400	22	18.18	10	16
7.	600	33	18.18	15	25

(-^{ive} indicates Left Turning) (+^{ive} indicates Right)

Table 1 represent the data for the automotive system for the left and right side turn and this research defines to an auto head-lamp leveling system for vehicle headlamp that adjusts by tilting automatically of an optical axis of a headlamp based on a longitudinal direction inclination of a vehicle and, more particularly, this is more effective for the vehicle driver as it works automatically (Dharmalingam et al., 2014). Adjustment of the lamp is position done by finding the direction of inclination of vehicle tyre. It is all done automatically which ease the work of driver. Some of the advantage of the automatic alignment for the head is low cost and efficient output, highly secure and reducing the unpleasant feeling of driver (Okrah et al., 2016).

4 CONCLUSIONS

This research carried out by us made an impressing task in the field of automobile. It is very useful for having the four-wheeler, because they need not over strain while drive the vehicle at night time in hill side. This research will reduce the cost involved in the concern. This research has been designed to perform the entire requirement task at the shortest time available.

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