



Automobile Cornering Lights Using Steering Mechanism

Kona BalaBhanu¹, Bongu Bhavani², Mukkamala Girish Kumar³, Sheik Khasim⁴, Dilip Kumar Choudhary⁵, Dr. S. Ramana Babu⁶

1, 2, 3, 4, 5 Department of Mechanical Engineering, Final Year B.Tech Students,

⁶Head of the Department, Guide of our project
Sanketika Vidya Parishad Engineering College

ABSTRACT

The aim is to design and develop a “AUTOMOBILE CORNERING LIGHTS USING STEERING MECHANISM” which acts as directional headlights. This is done by connecting headlights and steering. Present day automobiles don't have effective lighting system. Due to this many accidents are taking place during night times especially in ghat sections. The accidents can be avoided by incorporating Steering Control Headlight Mechanism. The rack and pinion steering gear mechanism is used for this project. When the steering wheel is rotated and rotary motion is converted to translator motion through the rack and pinion mechanism. The system can be adopted in any type of four wheel vehicles/trucks or trailers etc. without being an economic burden on the end user. The notion of steering controlled headlight is not new, but its adaptability according to the steering turning angle is its novel part. A lot of companies have developed technologies that incorporate turn able headlight to better illuminate the path, but these technologies are quite expensive and continue to be distant from the majority of car owners. So we felt the need of developing a mechanism that incorporates few simple components like gears, linkages etc. and can be readily fitted onto any steering column without much of a design variations. When the front wheels are steered, the headlights follows the same path and the light is focused on more divergent area. In the present project, it is planned to design “Steering Controlled Headlight Mechanism” and a live model unit is fabricated. Keyword: Steering Control Headlight Mechanism, The rack and pinion steering gear mechanism.

1 INTRODUCTION

The topic of this project is steering controlled (or directional) headlights, that are usually a separate set of headlights fitted to road vehicles beside the usual low beam/high beam headlights and their feature is that they turn with the steering, so that the driver of the vehicle can see the bend, what he is actually turning into.

These type of headlights appeared on production cars in the 1920's and are still around now a days, but not very popular, although they make night time driving safer. The most famous car which featured these lights was the Citroen DS (1955-1975), introduced on the 1968 Paris Motor Show.

The headlights can be connected to the steering linkage by means of rods or cables, operated hydraulically by the power steering or now a day's electronically adjusted, even controlled by satellite navigation system. Our project is to make new and modern Directional Headlights in efficient manner by increasing the light angle.

Directional headlights are those headlights that provide improved lighting especially for cornering. There are automobiles that have their headlights directly connected to the steering mechanism so that its lights will follow the movement of the front wheels.

Our project comprises Gear mechanism. Gear mechanism is used to transmit motion and to reduce the no of rotations from steering rod to cam shaft. According to our project, when the steering steers to the right, the light bracket at right alone steers to right using spur and bevel gear mechanism and reduction gears & vice versa. The reduction gears are used to turn the brackets to the required angle respective to the steering rotation.

Our project will be useful for vehicles, which are been used in hill areas The 1968 Citroen DS featuring directional-headlights Keywords: Directional headlights, Steering mechanism, Steering control headlight, Rack and Pinion.

2 OBJECTIVES

- The cornering lamp function is activated when turning.
- Depending on the steering angle, the fog lights swivel left or right.

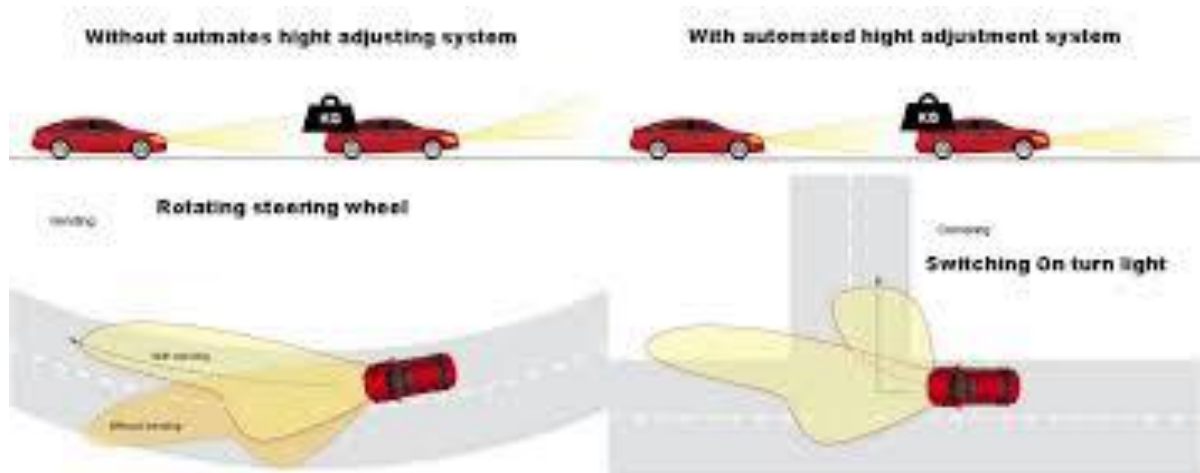
- They illuminate the area to the side of car, considerably increasing safety in the dark or while driving in poor lighting conditions.

3 SAMPLES OF EXISTING METHODS

- Existing methods that mean circuit kit available in market.
- This consists of control unit, circuits, and fog lights.
- ECU is a device that controls all the electronic features in a car. This may range from fuel injection to maintaining perfect cabin temperature to controlling braking and suspension. Some vehicles have multiple.

ECU controlling different features while some have a single one controlling everything.

- A retrofit kit for the cornering light usually consists of two additional headlights, each intended for the left and right front.
- The headlights, for example, have a diameter of 90 millimeters and are held in a specific design (clear glass).
- The set is usually supplied with a control unit that must be installed in the car (engine compartment).
- Control unit is connected to car ECU and get calibrated automatically in recent cars if not car ECU cornering lights functioning to be programmed.
- These existing methods in market.



PROPOSED - METHOD / PRODUCT

- The cornering lights are placed below headlights on bumper / engine compartment is activated(Switch-on) by steering mechanism where setting the push button switch spring near to the steering rod turning movement.
- Lights turn slightly when steering turn to desired rotation either left or right movement where lights angle is connected to the tie rod end with plate rod connected to the both ends of lights fixed frame and tie rod.

STEERING SYSTEM

- **Primary function** of the steering system is to achieve angular motion of the front wheels to negotiate a turn.
- This is done through linkage and steering gear which convert the rotary motion of the steering wheel into angular motion of the front road wheels.
- **Secondary functions** of steering system are:
 - To provide directional stability of the vehicle when going straight ahead.
 - To provide perfect steering condition, i.e., perfect rolling motion of the road wheels at all times.
 - To facilitate straight ahead recovery after completing a turn.
 - To minimize tyre wear.

CONSTRUCTION

- The implementation of the steering controlled headlight mechanism requires simple construction and it is very easy process the following are the four steps that have to be followed in the arrangement of steering controlled mechanism:
 - **Step: 1** Construction of frame.
 - **Step: 2** Fixing of headlights.
 - **Step: 3** Imparting rotational movement to the headlights.
 - **Step: 4** Connecting headlight and steering. The above four steps include the building of steering controlled headlight mechanism.

MAKING PREPARATION OF FRAME

- We took a UPVC pipe of 1.1/4" diameter, frame length 3'6"x width 2' .3".
- Frame ends are joined with elbow bends of 1.1/4".
- 5" wheels are connected on four sides of the frame using aluminium plate 15mm width, 3mm thickness L – shaped plate.

STEERING MECHANISM MAKING

Steering rod connected to front wheels with tie rods (aluminium plates) where lights are fixed tie rod with the help of aluminium plate where wheel base cannot be disturbed as shown in project photo.

WORKING OF CORNERING LIGHTS AND EXPERIMENTAL SETUP

- Here cornering lights are operated by rotating steering left and right , end of the steering rod they are 2 switches are fixed to the chassis body with separate plate fixed to it and protruding switch pressing button fixed to steering pipe.
- So that when steering rotated, bottom pressing button touched to switch and it gets operated/switch-on.
- Cornering lights are placed parallel to the chassis front part.
- Where while rotating steering left or right it turns to 15degree perpendicular to the chassis front angle.
- Here only either one cornering light will be activated when turn left or right.
- Cornering lights are placed 120mm above ground level as per our project size and dimensions.
- Our cornering lights covers maximum corners illumination with a range of 5-10metres.
- Here we used water proof lights.

PROCEDURE

Switch on cornering light button.

Turn the steering either left or right direction.

While turning left side of steering left side of cornering will be switched on.

While turning right side of steering right side of cornering will be switched on.

Check the process for 5-10times of turning left and right note down the reading how many seconds it took to switch-on cornering light while turning.

And note down the reading number of turns, steering took per hour.

Note down the average turns required to turn while travelling to your experiment example road location.

USES OF CORNERING LIGHTS

- Provides Smooth and safety ride in curved roads especially in ghat roads.

- Provides mind free ride for the motorist.
- Provides the nation with accident free roads.
- It requires simple maintenance cares.
- This is the improved safety measure introduced in the automobile.
- Easy to operate.
- Manual power required is less.
- Repairing is easy.

APPLICATION

- The steering controlled head light mechanism can be applied in heavy vehicles such as buses, trucks which ride maximum in the ghat roads.
- Specially designed for installing in buses riding in ghat roads.
- This mechanism can also installed in all types of commercial vehicles such as:
- BMW, Volkwagon, Fiat, Mahindra.

ADVANTAGES

- Provides Smooth and safety ride in curved roads especially in ghat roads.
- Provides mind free ride for the motorist.
- Provides the nation with accident free roads.
- It requires simple maintenance cares.
- This is the improved safety measure introduced in the automobile.
- Easy to operate.
- Manual power required is less.
- Repairing is easy.
- Replacing parts is easy.

CONCLUSION

Before we undertook this project our knowledge about directional headlights was limited. After doing an extensive research for this project we have a wider knowledge of this field in automotive technology, learnt useful information about different types of directional headlights. We have searched the library of the college for relevant books and the internet for additional information. During the build of an experimental model of directional headlights on a vehicle we have improved our DIY skills and technical problem solving ability. Carrying out test with the project vehicle has proved that this concept works and although such lights are not widely used even nowadays, it does support the driver's vision during night-time driving, helps to reduce black spots while cornering and therefore reduces the risk of accidents, by helping to notice persons or objects hidden in a bend earlier in advance. We are looking forward to see more road vehicles equipped with directional headlights in serial production.

REFERENCES

- Shreyas S1, Kirthanaa Raghuraman1, Padmavathy AP1, S Arun Prasad2, G.Devaradjane3Madras Institute of Technology, Anna University Chennai, Adaptive Headlight System for Accident Prevention, April 2014.
- India Meftah Hrairi and Anwar B. Abu Bakar Department of Mechanical Engineering International Islamic University Malaysia Kuala Lumpur, Development of an Adaptive Headlamp Systems, volume 11-13, May 2010.
- Pengfei Song, Yang Zhang, Xianglong Wu and Yufan LanSchool of Instrument Science and Opto-electronics Engineering Hefei University of Technology Hefei, China, Design and Implementation of the Adaptive Control System for Automotive Headlights Based on CAN/LIN Network, 2013.
- Jiae Youn, Meng Di Yin, Jeonghun Cho, and Daejin Park*School of Electronics Engineering, Kyungpook National University Daehakro, Bukgu, Daegu, 702-701, Republic of Korea*boltanut@knu.ac.krJiae Youn, Meng Di Yin, Jeonghun Cho, and Daejin

APPENDIX

PROJECT GUIDE



PROJECT GROUP MEMBERS



K. BALABHANU
317132920035



B. BHAVANI
317132920023



M.GIRISH KUMAR
317132920040



SK. KHASIM
317132920058



DILIP KUMAR .CH
317132920004