

## **A Review Paper On Intelligent Headlight System**

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**Abstract :** 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 days 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.

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### **I. Introduction**

The present invention relates to headlights of an automobile, more particularly to a direction turning device for headlights of an automobile which enables to turn direction synchronously with the rotation of the steering and hence increasing the safety for driving at night or in the darkness. In the known technology of the prior art, a headlight of an automobile has a fixed line of emission which is aligned with the front direction of the automobile. Although the effects of "high beam" or "low the present invention is to provide a direction turning device for a headlight of an automobile which renders to emission direction of a headlight of an automobile in synchronization with steering and thus increases the illuminated area upon changes of direction of the automobile when the automobile makes turns. In ancient Directional headlights, when the steering steers to right or left direction, then both the right and left headlights will steer to the perspective directions. It results in altering the optical axis of the head light to the vehicle speed and the front road-shape. But according to our project, when the steering steers to right then the right side of the headlight bracket steers to right side and the left side headlight bracket remains stationery by cam mechanism and it is similar for the other side also. Because of this, the optical axis of the headlight is widened and it is useful for the drivers for safety ride. The aim is to design and develop a "Steering Controlled Headlight 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 hilly areas. 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. 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. Beam can be achieved by adjusting the angle of elevation of the headlight, the direction of emission is not adjustable as to the left or right. When the road curves or turns, the corner on time when the car turns, thereby creating a dead angle of illumination and such lack of visibility poses danger in driving at night or in darkness. Therefore, it is highly desirable to invent a device to solve this problem and such device is of high utility.

## **II. Problem Identified**

The general problem is to design a system which can analyse road conditions to identify situations, in which adaptive road illumination system could enhance visibility, and thereby substantially improve safety and/or comfort for road users. The main goal of this proposed project is to discuss ways in which the present, static vehicle illumination systems could be improved by making them dynamic more adaptable to the ever changing road conditions.

## **III. Methodology**

The paper here is all about Front wheel steering system with moveable headlights with latest technology. The most conventional steering arrangement is to turn the front wheels using a hand-operated steering wheel which is positioned in front of the driver, via the steering column, which may contain universal joints to allow it to deviate somewhat from a straight line. Rack and pinion steering gear mechanism where the steering wheel turns the pinion. The pinion moves the rack, which is a linear gear that meshes with the pinion, converting circular motion into linear motion along the transverse axis of the car (side to side motion).

## **IV. Literature Review**

Kobayashi, discussed the new standard for cornering light system allows not only the conventionally approved ON-OFF control mode interlocked with operation of the turn signal switch but also an automatic ON-OFF control according to steering wheel angle. The active cornering light system (ACL System) on the new DELICA D:5 have a dedicated ECU to control the operation of lamps. In addition, the light distribution of the ACL System is co-ordinated with that of the high intensity discharge headlights to offer higher night time visibility of road shoulders at intersections. In recent years, global harmonization of automotive regulations has led to changes in Japanese vehicle equipment and design. This paper also introduced change in regulatory requirements regarding lighting equipments and the accommodation of such changes by the vehicle design. [1] Chi on-Dong lin, proposed by car light piloting system objective of the present invention is to provide a steering wheel controlled car light piloting system which automatically turns the lights of the motor car to coincide the projections of the lights with the steering direction of the motor car. The present invention comprises an electric contact mechanism consisted of electric brushes and metal contacts dispose around the steering column of the steering wheel of a motor car, a motor drive consisted of at least one servomotor, a control circuit connected between the motor drive and the electric contact mechanism to control the revolving direction to the turning direction of the steering wheel, and a transmission mechanism consisted of at least one hydraulic cylinder systems and controlled by the motor drive to turn the light of motor car causing them to coincide with the steering direction of the motor car. [2]

Ken Chi Nishimura, suggested that the apparatus for automatically adjusting a direction of a light axis of the vehicle headlight includes a steering angle sensor detecting a steering angle of steering wheel of a vehicle and swivel control unit performing swivel control by which the direction of the light axis of the vehicle headlight is adjusted to the target directioning accordance with the steering angle detected by steering angle sensor. The swivel control unit varies sensitivity or responsiveness of the swivel control depending on a value of steering angle detected by the steering angle sensor. The direction of the optical axis of each swivel light is adjusted based on a swivel control angle obtained upon the application of filter. A filter is changed to change a response in swivel adjustment of a direction of an optical axis of each swivel light based on steering angle variation of a steering angle of steering wheel measured with a steering angle sensor. A weaker filter is selected if the steering wheel quickly steered and a stronger filter is selected if the steering wheel is slowly steered. By this filtering operation the direction of the optical axis of each swivel light is adjusted in response to the steering operation of the steering wheel without causing an uncomfortable feeling to a driver. [3]

Hiroaki Okuchi, proposed automatic optical axis adjusting device for automatically adjusting direction of optical axes of front lights with respect to steering angle of steering wheel. An electronic control for automobile headlight using spherical sensor comprised of a metal ball surrounding by a fluid encapsulated in a spherical sensor which is connected to the spherical sensor system. Computer controlled unit is positioned on and close behind the headlight so that the metal ball cooperate with sensor within the spherical sensor system to make the headlight go so as to follow the car during turns. [4]

Heather Steiner brown, electric control for automobile headlights output of each sensor arrangement is supplied to an ECU through a communication bus line. A value of a turning radius of a vehicle which is used for adjusting direction of optical axes of swivel lights is 12 computed based on the output of each sensor arrangement is obtained. An optical axis control angle is computed based on the normal computed values and is used to drive actuators to adjust the direction of the optical axes of the swivel lights. [5]

Masonori Kondo, suggested the automatic optical axis adjusting device for automatically adjusting direction of optical axis of from lights headlight control apparatus and method controls an irradiation direction of headlight. This apparatus uses a navigation based swivel angle calculated based upon the shape of a road in a navigation based control period and a steering based swivel angle calculated based upon a steering angle in a steering based control period. When the control period to the steering based control period this apparatus uses a value between the navigation based swivel angle and the steering based swivel angle as a present control swivel angle for controlling the irradiation direction of the headlight. [6]

## V. Construction and working

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:

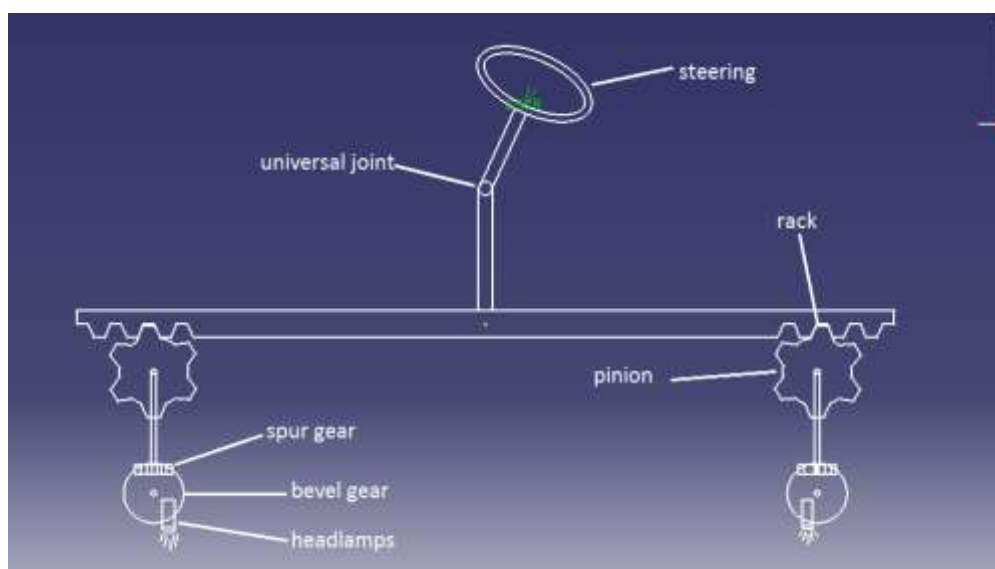
Step: 1 Construction of frame

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.



### 5.1 Rack and Pinion Gear:

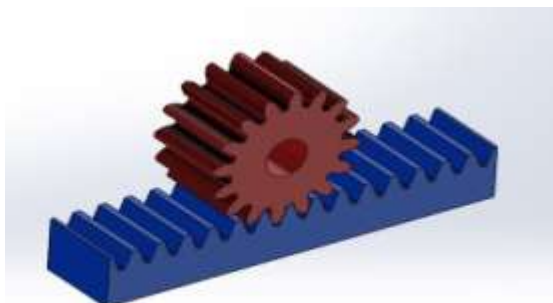
A rack and pinion is a type of linear actuator that comprise a pair of gear which convert rotational motion into linear motion. A circular gear called “the pinion” engages teeth on a linear “gear” bar called “the rack”; rotational motion applied to the pinion causes the rack to move, thereby translating the rotational motion of the pinion into the linear motion of the rack. Pinion is common spur gear and rack is portion of spur gear with an infinite radius.

### 5.2 Rack and Pinion Seteering:

Rack-and-pinion steering is quickly becoming the most common type of steering on cars, small trucks and SUVs. It is actually a pretty simple mechanism. A rack-and-pinion gear set is enclosed in a metal tube, with each end of the rack protruding from the tube. A rod, called a tie rod, connects to each end of the rack. The pinion gear is attached to the steering shaft. When you turn the steering wheel, the gear spins, moving the rack. The tie rod at each end of the rack connects to the steering arm on the spindle.

The rack-and-pinion gear set does two things:-

- (i) It converts the rotational motion of the steering wheel into the linear motion needed to turn the wheels.
- (ii) It provides a gear reduction, making it easier to turn the wheels. On most cars, it takes three to four complete revolutions of the steering wheel to make the wheels turn from lock to lock (from far left to far right).



## **VI. 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.

## **VII. 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:
  - Maruti
  - Ambassador
  - Fiat
  - Mahindra
  - Tata

## **VIII. 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.

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