AN EXPERIMENTAL APPROACH OF CONVERTIBLE BIKE

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Abstract:

Two wheelers manufactured by the different manufacturers throughout the globe are trying to standardized their vehicles to provide maximum driving comfort to suit to irrespective of any particular human race are the people those who are living in the particular region of the world. But in practical usage many two wheelers are available in the commercial market among them few are having some practical difficulties, while driving on the road. When a particular brand of the bike has been comfortably handled by one is being handled by the other person having some difficulties based on different physical standards. So in order to suit the bike for all the human races of the globe, it is required to provide some convertible features in with the vehicle in order to outfit the requirement of different users ergonomic comforts. A maiden attempt has been made in order to some minor adjustments have been made in the existing two wheeler to shoot with their human with the different physical standards. The vehicle Riders comfort based on ergonomic requirements and road safety is taken into main consideration while designing a bike of this particular type.

Key words: convertible bike, hybrid vehicle, riders ergonomy.

Introduction:

It is obvious that numerous varieties of two wheelers are available in the market, in order to satisfy the requirements of vehicle riders, all the requirements of riders such as mileage, speed, ergonomic requirements all cannot be satisfied by a single vehicle. Also it is well aware fact that a particular vehicle with a set of design features cannot be possible to handled by two different person having different physical standards such as height (tall or short), stout or lean, good physic or physical disorder etc. Many road accidents are happening due to mismatches in comfort level in riding of the two wheeler rider and ergonomic standard and design of the two wheeler. In order to satisfy few parameters, some minor adjustments have been made in a two wheeler can be made. Various designs have been proposed for the adjustment of the steering position we have made an attempt to combine the steering adjustment position in addition with
adjustment of the seat position which can give more comfort to the riders. The above mentioned adjustments are permitted in a conventional two wheeler available in the market, by incorporating special design features. So that, some adjustments are possible to improve the comfort level of the two wheeler rider.

**Literature review:**

John D. Hill et al., (2006), in their publication stressed on “the safety implications of vehicle seat adjustments”. The goal of this study was to gather information on the preferred front seat position of vehicle occupants and to determine the impact of variation in seat position on safety during crashes. Method: The study evaluated the relationship between seat position and occupant size using the chi-square test and compared the risk of severe injury for small females and large males with regard to forward and rearward seat position using logistic regression. Results: While smaller drivers sat closer to the steering wheel than larger drivers, front passengers of all sizes used similar seat positions. Additionally, the risk of injury was higher for small, unbelted females in rearward seat positions and large males (belted and unbelted) in forward seat positions. Conclusions: Occupants who adjust their seats to positions that are not consistent with required federal tests are at a greater risk for severe injury in a crash.

Avesta Goodarzi et al., (2007), stressed the need of ‘handling improvement of motorcycles using active seats’. In this work mainly, the design of a control law for an active seat system to improve the motorcycle handling and stability is proposed. Active seats can automatically control the rider and the seat lean angle during every specific manoeuvre, which makes the driving of motorcycles much easier and safer. Initially, the linear and nonlinear motorcycle handling models are introduced and, using the optimal control theory, a seat control strategy that is based on the systems. State variables feedback and the input feed forward are developed. The controller can control the applied moment to the seat about its longitudinal axis and consequently can control the seat/driver lean angle. The simulation results indicate considerable improvements of a motorcycle equipped with an active seat system when compared with a conventional one without an active seat.

**Design improvements:**

In a commercially available conventional vehicle following few adjustments have been provided, in such a way that some features such as seat height & position, as well as the handbar height can be adjusted.

The frame shape has been modified in order to accommodate the seat to be positioned in two different locations on a rigid sliding support. The modified frame structural shape is clearly indicated in Fig. 1. The
improved two seat positions for comfort riding, namely ‘café racer position’ and ‘chopper position’ are well illustrated in the

Fig. 1 Modified Frame Structure of a two wheeler

![Fig. 1 Modified Frame Structure of a two wheeler](image)

Fig. 2 Two different seat positions. (a) Café racer position and (b) Chopper position

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Further, the two adjustable steering (handle-bar) positions are well demonstrated in Fig. 3

Fig. 2 (a) and (b). The seat position is adjusted using a linear electric actuator in two different positions.

(a) and (b). The Fig. 3 (a) indicates the handle bar raised position, whereas the Fig. 3 (b) illustrates the handle bar lowered position, for ergonomic comforts of different riders. The same is carried out for the steering position with the help of the linear actuator provided along the fork mechanism of the vehicle.

Fig. 3 Two different handle-bar positions. (a) handle bar raised position and (b) handle bar lowered position

![Fig. 3 Two different handle-bar positions. (a) handle bar raised position and (b) handle bar lowered position](image)
Conclusion:

A vehicle with adjustable design have been made with adjustable steering and seat position which give a great comfort to the riders based on the different trials made on the road with different road traffic. The vehicle is trialed on different road conditions such as light traffic roads, heavy traffic roads, long distance driving, off-the road driving etc., by the different drivers with different physical standards. Based on the out-come of the experiments, it has been well observed that the adjustable featured vehicle is a highly essential current requirement for the safe driving on all road conditions by different riders with varying physical standards.

References:


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