

Design and Development of Driving Mechanism for Armless People

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ABSTRACT

In gearless vehicles such as two wheeler bikes, the available technology is to operate the bike using the steering handle at the shoulder level. Hence some form of steering attachment at the foot space is necessary for the most effective utilization of the changing the direction for armless people. Now the steering attachment at the foot space converts angular twist of the disc into linear direction change. The objective of the present work is to design and fabricate a Steering mechanism unit to transfer the twisting force applied on the attachment to linearly show effect on the direction and utilization of such an attachment on a social cause for armless people. Pairs of connecting shafts are fixed on circular plate by means of using ball bearings and the rods are free to rotate according to the angle 45 degree left and right. Here the conversion of movement is happen which means from twisting movement to linear movement. This pair of rods is connected to the front frame exactly above the suspension by means of welding. This mechanism can be attached in any kind of gearless vehicle.

KEY WORDS: Gearless vehicle, Steering mechanism, Armless people.

1. INTRODUCTION

In two wheeler bikes, the available technology is to operate the bike using the steering handle at the shoulder level. Hence some form of steering attachment at the foot space is necessary for the most effective utilization of the changing the direction for armless people. Now the steering attachment at the foot space converts angular twist of the disc into linear direction change. The objective of the present work is to design and fabricate a Steering mechanism unit to transfer the twisting force applied on the attachment to linearly show effect on the direction and utilization of such an attachment on a social cause for armless people. Pairs of connecting shafts is fixed on circular plate by means of using ball bearings and the rods are free to rotate according to the angle 45 degree left and right. Here the conversion of movement is happen which means from twisting movement to linear movement. This pair of rods is connected to the front frame exactly above the suspension by means of welding.

Necessity of steering attachment: Increasing societal energy demands, shortages of fossil fuels, and concerns over environmental impact are providing impetus to the development of new steering attachment technology. Because of their intermittent nature, effective utilization of this attachment independent on the availability of efficient and effective steering systems. In particular, for armless people, there should be an attachment in the foot space to facilitate the turning action using the leg. Though there are many advantages, an important factor is that usage of bearing has provided easier turning action which is time independent with an intermittent character. The energy needs for a wide variety of applications are sometimes dependent on the amount of force applied on the turning disc as it may cause deformation on the plate and also the torsional force on the shaft connecting the disc and the ball bearing. Hence the commercial acceptance and economics of directional control system is tied to the design and development of steering attachment system. Similarly there are many applications where there is a mismatch between efficient material's availability and demand. In such applications steering systems are of great importance. The other application is that it provides easy turning at maximum speed of 45kmph

Steering mechanism: Increasing societal energy demands, shortages of fossil fuels, and concerns over environmental impact are providing impetus to the development of new steering attachment technology. Because of their intermittent nature, effective utilization of this attachment independent on the availability of efficient and effective steering systems. In particular, for armless people, there should be an attachment in the foot space to facilitate the turning action using the leg. Though there are many advantages, an important factor is that usage of bearing has provide easier turning action which is time independent with an intermittent character. The energy needs for a wide variety of applications are sometimes dependent on the amount of force applied on the turning disc as it may cause deformation on the plate and also the torsional force on the shaft connecting the disc and the ball bearing. Hence the commercial acceptance and economics of directional control system is tied to the design and development of steering attachment system. Similarly there are many applications where there is a mismatch between efficient material's availability and demand. In such applications steering systems are of great importance. The other application is that it provides easy turning at maximum speed of 45kmph. (Bansal, 2010; Gupta, 2009; Rattan, 2009).

2. DESIGN OF DRIVING MECHANISM

The driving mechanism is shown in figure.1. Applying a simple mechanism and here simple force is enough to make turning. Little force used to push the pedal so the chain will make the steering system tilt easily. When a person placed his leg on the steering pedal which is located in front of the boot space in the vehicle which can be accessed easily by the person. By giving the pushing force the pedal will move towards front side and the chain

located on the circular plate will move the front stem which is located on the above suspension system. To many designs are made temporary by the people to steer the vehicle. In China there was a design found by a person name Liu. When we applied that mechanism on the vehicle mostly we won't get sufficient tilting radius and there is no any safety in existing model. The result of this mechanism not satisfied by the government and rejected because it doesn't seem like a proper mechanism

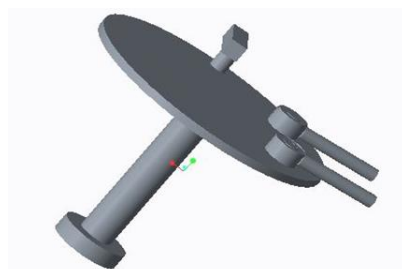


Figure.1. Design of driving mechanism

Fabrication Process:

Mild steel: Since mild steel is of low cost and easily available, it is chosen. And also the machinability and weldability of mild steel is good. So it is efficient to use mild steel. It is ductile whereas we can increase its hardness by carburizing.

Selection of joints:

Welded joint: Welded joint is a type of permanent joint. Here we join two metal components with the help of high heat and a joining metal.

Fasteners: In general, fasteners are used to create non-permanent joints. It is a joint that can be removed or dismantled without damaging the joining components

Fabrication:

- Two wheeler: a two wheeler is brought to working condition, so that we can attach the driving mechanism
- Bearing: We bought ball bearing according to the dimension needed. Thus the ball bearing can fit the shaft.
- Rods: The rods are welded to the frame in a manner that the wheels can be fitted to the rods. These are to provide the balancing of the vehicle.
- Wheels: We bought two wheels in addition to those with the vehicle. These wheel are to provide balancing while driving with the foot.

Working of Driving Mechanism: The steering pedal which is located in front of the boot space in the vehicle which can be accessed easily by the person. By giving the pushing force the pedal will move towards front side and the chain located on the circular plate will move the front stem which is located on the above suspension system. By applying pushing and pulling force the person can tilt the vehicle easily and the kinematic chain will loosen and tighten respective to the forces given.

Thus the mechanical advantage is a product of two factors: Bolt is used to adjust the kinematic chain location, by changing the kinematic chain location radius of tilting is adjusted by using this mechanism tilting is very effective and forces which we are giving to the pedals are less. After the assembling of all the parts the vehicle is taken for a test drive. The driving mechanism worked correctly and we were able to control the steering efficiently. Thus this mechanism will be useful to armless people.



Figure.2. Prototype of driving mechanism for armless people

3. RESULTS

Steering mechanism for armless people was fabricated and the following parameters were considered to study the performance of the steering mechanism: degree of rotation, leg force required for the steering, comfort of foot resting on the disc and the bike speed. From the analysis, it is known that the steering mechanism is very comfortable for the rider and it requires less leg force to rotate the steering wheel from 30 degrees to 50 degrees. Since disc is attached with rubber material the foot rests comfortably on the disc. The driving mechanism performs very well up to the bike speed of 45 kmph.

4. CONCLUSION

A Steering mechanism was designed and fabricated with the help of a flat disc, bearing, chain and bolt to meet the needs of the attachment to work. The required were made to measure the degree of free rotation and the force required for imparting the change. A tensile test was mathematically conducted to check the withstanding capacity of the rod when force is applied longitudinally. The rod was fitted to the ball bearing which is welded to the top portion of the foot space area. The disc which is welded to the rod for rotation of the wheels is made up of iron material. It is planned to cover the plate with rubber material in the shape of a foot so as to provide grip for the driver. So far, from what we have analysed, this mechanism is supported for steering in the speed ranging from 0 to 45 kmph. Much force would not be required in the turning process as the bearing facilitated enough easy access to turn. It is concluded that the fabricated Steering attachment system is working successfully to turn the vehicle and produce the benefit of the design purpose.

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