

# Gear System for E-Bike

<sup>[1]</sup> Durai J , <sup>[2]</sup> Mahesha M N , <sup>[3]</sup> Vinod Kumar K , <sup>[4]</sup> Venkatesh V , <sup>[5]</sup> Mahesh Kumar K

<sup>[1]</sup> Assistant professor, <sup>[2][3][4][5]</sup> UG Scholar

Department Of Mechanical Engineering  
 Sri Sai Ram College of Engineering, Anekal, Bengaluru

**Abstract:** -- Engineering is not all about study but also completion of things in real life. The Idea based on Think Green, Go Green and Ride E-Bike..!! According to this statement the CAD model of the E-Bike is made and tested the vehicle frame for various load conditions in Solid works software and numerical simulation of flow over the E-Bike is analyzed in STARCCM+ software for the diminution of drag in the vehicle. After the design of the vehicle, it is fabricated and tested the vehicle for specification of 60 KMPH maximum discharge time of 3 hours with the endurance range of 120 km etc. Considering these limitations we are modifying the existing design of an electric bike which will give a better performance with better ergonomics. The main disadvantage of this e-bike the speed is minimum around 60kmph and load carrying capacity is less. To overcome the above drawbacks we are implementing the gear box system in the e-bike.

## I. INTRODUCTION

To provide the high torque at the time of starting, hill climbing, accelerating and pulling a load since high tractive effort is needed. It permits engine crankshaft to revolve at high speed, while the wheels turn at slower speeds. Variable torque by set of gears. Vehicle speed can be changed keeping engine speed same with certain limit. The transmission also provides a neutral position so that the engine and the road wheels are disconnected even with the clutch in the engaged position. A means to back the car by reversing the direction of rotation of the drive is also provided by the transmission. Variation of resistance to the vehicle motion at various speeds. Variation of tractive effort of the vehicle available at various speeds . Most manual transmission two-wheelers use a sequential gearbox. Most modern motorcycles (except scooters) change gears (of which they increasingly have five or six) by foot lever. On a typical motorcycle either first or second gear can be directly selected from neutral, but higher gears may only be accessed in order – it is not possible to shift from second gear to fourth gear without shifting through third gear. A five-speed of this configuration would be known as "one down, four up" because of the placement of the gears with relation to neutral. Neutral is to be found "half a click" away from first and second gears, so shifting directly between the two gears can be made in a single movement.

## II. THE CLUTCH

The clutch in a manual-shift motorcycle transmission is typically an arrangement of plates stacked in alternating fashion, one geared on the inside to the engine and the next geared on the outside to the transmission input shaft. Whether wet (rotating in engine oil) or dry, the plates are squeezed together by a spring, causing friction build up between the

plates until they rotate as a single unit, driving the transmission directly. A lever on the handlebar exploits mechanical advantage through a cable or hydraulic arrangement to release the clutch spring(s), allowing the engine to freewheel with respect to the transmission. Automatic and semi-automatics typically use a centrifugal clutch which operates in a different fashion. At idle, the engine is disconnected from the gearbox input shaft, allowing both it and the bike to freewheel (unlike torque converter automatics, there is no "idle creep" with a properly adjusted centrifugal clutch). As the throttle is opened and engine speed rises, counterweights attached to movable inner friction surfaces (connected to the engine shaft) within the clutch assembly are thrown gradually further outwards, until they start to make contact with the inside of the outer housing (connected to the gearbox shaft) and transmit an increasing amount of engine power. The effective "bite point" is found automatically by equilibrium where the power being transmitted through the (still-slipping) clutch is equal to what the engine can provide. This allows relatively fast full-throttle takeoffs (with the clutch adjusted so the engine will be turning near its maximum-torque rpm) without the engine slowing or bogging down, as well as more relaxed starts and low-speed maneuvers at lower throttle settings and rpms.

## III. ADVANTAGES

Gearbox is necessary to deliver the correct amount of torque to the wheels of your motorbike, which cannot be transmitted directly by the engine.

Draw backs in present electric scooters

- Speed is limited(max 30kmph)
- Load carrying capacity is low(about100kg)
- Travel distance per charge is limited(40-50km)
- Re-Charging time is more.

#### IV. TRANSMISSION

A transmission is a machine in a power transmission system, which provides controlled application of the power. Often the term transmission refers simply to the gearbox that uses gears and gear trains to provide speed and torque conversions from a rotating power source to another device.[1][2]

In British English, the term transmission refers to the whole drivetrain, including clutch, gearbox, prop shaft (for rear-wheel drive), differential, and final drive shafts. In American English, however, the term refers more specifically to the gearbox alone, and detailed usage differs.[note 1]

The most common use is in motor vehicles, where the transmission adapts the output of the internal combustion engine to the drive wheels. Such engines need to operate at a relatively high rotational speed, which is inappropriate for starting, stopping, and slower travel. The transmission reduces the higher engine speed to the slower wheel speed, increasing torque in the process. Transmissions are also used on pedal bicycles, fixed machines, and where different rotational speeds and torques are adapted.

Often, a transmission has multiple gear ratios (or simply "gears") with the ability to switch between them as speed varies. This switching may be done manually (by the operator) or automatically. Directional (forward and reverse) control may also be provided. Single-ratio transmissions also exist, which simply change the speed and torque (and sometimes direction) of motor output.

#### V. CONCLUSION

- By using gear system overall efficiency of e-bike can be increased.
- Load carrying capacity is high.
- Speed will be increased.

