

# Pneumatic Gear Shifting Mechanism

Prof. Prajakta Gharge<sup>1</sup>, Mr. Sanket Shinde<sup>2</sup>, Mr. Vishal Ranjille<sup>3</sup>, Mr. Rushikesh Mugle<sup>4</sup>, Mr. Yogesh Kasabe<sup>5</sup>

Assistant Professor, Mechanical Engineering, NBSSOE, Pune, India<sup>1</sup>

UG Student, Mechanical Engineering, NBSSOE, Pune, India<sup>2,3,4,5</sup>

**Abstract:** *At present due to the extended difficulties in manual operations, the technology has shifted from manual to automatic; few of them include ABS system, active steering system etc., in order to increase passenger safety and comfort. Increasing demands on performance, quality and cost are the main challenges for today's automotive industry, in an environment where movement, components and every assembly operation must be immediately and automatically recorded, checked and documented for maximum efficiency. One of the automatic applications includes a pneumatic gear changer. This study describes in detail in an understandable way how to convert the traditional manually gear shifting mechanism by using Pneumatic cylinders.*

**Keywords:** Pneumatic Cylinders, Pneumatic Gear Changer, Active Steering System, ABS, etc.

## I. INTRODUCTION

In this project we have designed pneumatic gear shifting mechanism for two-wheeler using two pneumatic cylinders so as to make gear transmission easy for people.

## II. LITERATURE SURVEY

S. Vijay Kumar, P. Nithesh Reddy was discussed about a gear shifting mechanism was designed and applied to make the shifting process faster and less destructible for the driver to improve gear shifting process using devices as: a manual four speed gear box, two pneumatic double acting cylinders, Programmable Logic Controller (PLC), an electrical motor, limit switches, push buttons, bulbs, a table (holder) and power supply. According to suggested gear\_ shifting method the control unit chooses optimum gear shifting ratio for an automobile without operating it manually (using relays). Using this method leaves to the driver the excitement of choosing the shifting moment.

Muntaser Momani (2010) was discussed about a gear shifting mechanism was designed new device must be reliable, has a small dimensions, low construction and maintenance cost. This paper aims to improve gear shifting process using devices as: a manual four speed gear box, four pneumatic double acting cylinders, four pneumatic two position five ways directional control valves, Programmable Logic Controller (PLC) LOGO unit, an electrical motor, an electrical clutch, a belt, two pulleys, limit switches, push buttons, bulbs, a table (holder) and power supply.

P. Alexander M.E. (2012) was discussed about a gear shifting mechanism was designed and applied on an auto clutch featured bike to make the gear transmission process faster and less destructible for the diver using Embedded System design. The present automatic transmission is fully mechanically controlled and costs very high and it is not suitable for small displacement engines. But the gear transmission mechanism designed makes driving easier and to achieve efficient driving. This new device must be reliable, has small dimensions, economical and low maintenance cost.

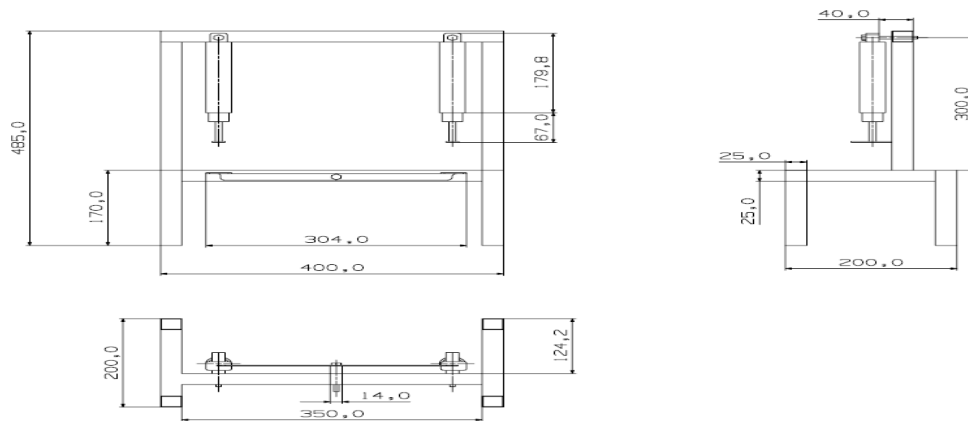
P. Amuthakkannan (2015) was discussed about a gear shifting mechanism was designed and applied to make the shifting process faster and less destructible for the driver. The main objective of this concept is used to apply the gear by using automation system in automobile vehicles. This is the new innovative model mainly used to control

the vehicle. Here, we are concentrating to design the automatic gear changing mechanism in two wheeler vehicles by using the electronic devices. This is very useful for the gear changing mechanism in automobile vehicles. By using this we can easily control the vehicle and improve the performance of the vehicle also we can avoid the wear and tear of the gears.

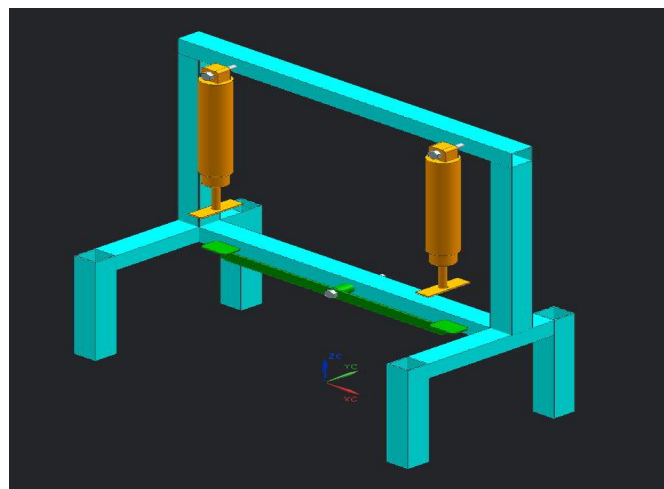
**III. METHODOLOGY**

In order to reach our goal of making an automatic gear transmission motor bike, different types of systems and components are used. According to this customization and fabrication of the components, proper placement and fitting of components is carried out. The design basically consists of pneumatic cylinder which fitted to the gear pedal. We have two pneumatic cylinders arrangements, which are arranged on either side of vehicle pedal rest for applying gears.

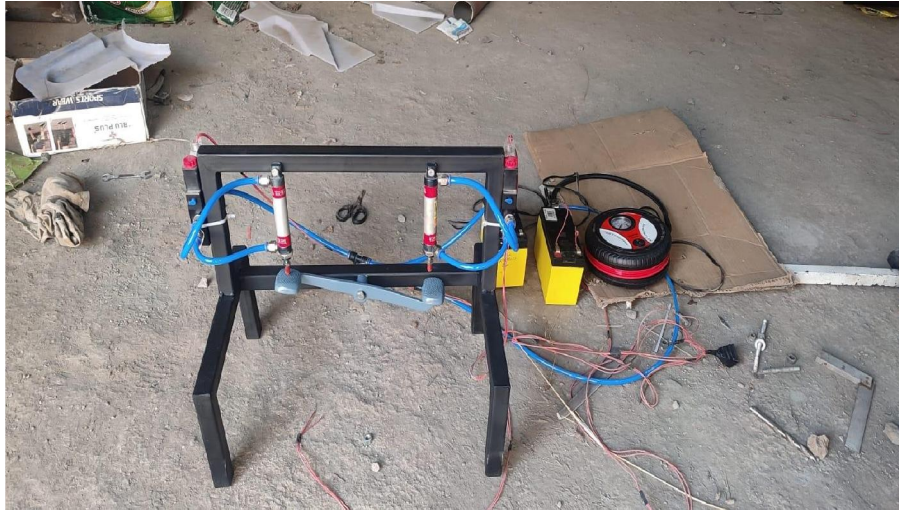
The pneumatic cylinders are operated with the help of electric power supply. One of the cylinders is used to apply the gears and another to reduce the gear. Two buttons are provided on the handle, which used by the driver according to requirement. As the button press, the compressed air from the compressor will comes with commands given by the solenoid valve after the solenoid valve, the flow will be controlled by the flow control valve. Hence the gears will change.



**Figure 1: Pneumatic Gear Shifting Mechanism**



**Figure 2: CAD Model**



**Figure 3: Actual Model**

#### REFERENCES

- [1] R. Hembree, "Semi-Automatic Electric Gear Shifting Apparatus for A Motorcycle". United States 15 July 1975.
- [2] U. M. Friedrich Raff, "Shifting Arrangement,, For an Automatic Transmission of a Motor Vehicle". United States 3 Sep 1991.
- [3] David G. Funk, "Pushbutton Solenoid Shifter". United States of America Patent 6070485, 6 Jun 2000.
- [4] P. Alexander M.E, "Automatic Gear Transmission in Two Wheelers," Vol. 3, No. 2, 2012.
- [5] Oliver J. Tysver, "Automatic Gear Shifting Mechanism for Multispeed Manually Powered Vehicles". United States 28 Dec 1999.
- [6] Francis G. King, "Automated Manual Transmission Shifter with Electronic Control Actuators External of The Vehicle". United States of America Patent 4554824, 26 Nov 1985.
- [7] Robert E. Lawrie, "Automated Manual Transmission Shift Sequence Controller". United States 1 Feb 2000.
- [8] Pierre A. G. Lepelletier, "Multispeed Automatic Transmission for Automobile Vehicles". United States 21 April 1992.
- [9] Luigi Glielmo, "Gearshift Control for Automated Manual Transmissions," Ieee /Asme, Vol. 1, P. 11, 2006.
- [10] Y. Huang, "Hybrid Intelligent Gearshift Control of Technical Vehicles Based on Agann," International Journal of Control and Automation, Vol. 6, No. 4, P. 14, 2013.
- [11] C. X. Zhenyu Zhu, "Experimental Study on Intelligent Gear Shifting Control System of Construction Vehicle Based on Chaotic Neural Network". China 29 Jun 2000.