

# Design, analysis and development of Pneumatic steering system

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**Abstract:** This project deals with the details of two wheel steering system which based on pneumatic system. With help of this front wheels can be turned to any direction using the pneumatic steering system. Thus the vehicle can be controlled more effectively & reliability especially during cornering and parking. This system contains couple of cylinder and rack & pinion for steer the front wheels.

## Introduction

In the 21<sup>st</sup> century vehicle are used broadly and the steering system is like heart of the vehicle. As we can see there was many changes came into steering system firstly the basic system is available for steering and than the power steering system comes for relief & reliability of driver. This system is very useful but it is costly for assembled vehicle.

so , here we are presenting the pneumatic based steering system it easy to operate & this system is zero maintenance

## Working

- ⊙ Pneumatic cylinders are pressurized by pneumatic pressure and get their power for the Pneumatic air under pressure . They transform the air's energy to linear work. A Pneumatic cylinders works in a Pneumatic system is the motor side of this system.
- ⊙ The generator side of the air Pneumatic system is the pump or compressor that brings a fixed or regulated air flow into the system. The pneumatic cylinders initiates the pressure of the air, which can never be larger than the pressure that is asked by the load.
- ⊙ The cylinder consists of a cylinder barrel, in which a piston connected to a piston rod is moving. The barrel is closed by the cylinder bottom at the bottom side and by the cylinder head at the side where the piston rod comes out of the cylinder.
- ⊙ The piston has sliding rings and seals. The piston divides the inside of the cylinder in two chambers, the bottom chamber and the piston rod side chamber.

- ⦿ By pumping pneumatic air to the bottom side of the pneumatic cylinder, the piston rod starts moving out. The pneumatic pushes the air in the other chamber back to the air reservoir. If we assume that the air pressure in the piston rod chamber is zero, the pressure in the cylinder is now force/piston area.
- ⦿ If the air is pumped into the piston rod side chamber and the air from the piston area flows back to the air reservoir without pressure, the pressure in the piston rod area chamber is load (piston area-piston rod area). In such a way the pneumatic cylinder can push and pull.
- ⦿ when the vehicle weight increases, the power required to steer the vehicle also increases. Most of the vehicles are have fluid power for steering.
- ⦿ In this project pneumatic power (compressed air) is used in place of Mechanical power.

## ADVANTAGES

1. Very easy to drive vehicle than fluid power.
2. Use of Simple Mechanism (Rack & pinion mechanism)
3. Less steering ratio
4. Easy to drive during cornering & parking in less space also reliable in traffic
5. Zero maintenance.
6. No separate drive is required to drive the compressor as the brake system has the compressed air for operation.