

Compressed Air Vehicle Using Linear Actuator

¹Harish Babu L, ²Ravi P, ³Supreeth A, ⁴Rakesh Naik, ⁵Syed Abubaker,

¹ Assistant Professor, Department of Mechanical Engineering,

^{2,3,4,5} UG Scholars, Department of Mechanical Engineering,

^{1,2,3,4,5} Sri Sairam College of Engineering Bangalore

Abstract

The latest trend in the automotive industry is to develop light weight, eco-friendly and low-cost vehicle to reduce pollution. The heavy vehicles are known for producing a large amount of harmful gases like CO₂, SO₂ etc which act as the major source for global warming. When emissions go down the pace of global warming slows. Hence this paper deals with the study of compressed air as a fuel for running a 4-wheeler vehicle where in the compressed air is stored in tank & supplied to the pneumatic linear actuator which is internally connected to the sprocket of rear wheel of the vehicle.

1. Introduction

In the past few decades, energy conservation and carbon reduction have become very crucial issues worldwide. Global warming is one of the problems which are affecting the man. The temperature of the earth is drastically increasing and this is causing climatic changes. The fossil fuels are depleting slowly and are used as a source of energy in different fields like power plants, IC engine as a heat source in many manufacturing industries. But its stock is very limited due to its tremendous use of fossil fuels are diminishing at a faster rate. So, in this world of energy crisis it is necessary to develop alternative technology to renewable energy sources so that fossil fuels are

conserved.

2. Design of Vehicle

The 3D CAD models of the vehicles and the various views like Front view, Side view, Top view and Bottom view are shown in Figures.



3. Material

- **AISI 4130** chrome alloy steel has excellent weld ability and produces a uniform and
- Harder case and it is considered as the best steel for our frame.
- It offers a good balance of toughness, strength and ductility. Provided with higher mechanical properties.
- It develops a supreme quality product that is suited to fabrication processes such as welding, forging, drilling, machining and heat treating.

3.1.Comparison of Material

Material	AISI 4130	AISI 304	AISI 1018
Outer diameter	25.4mm	25.4mm	31.75mm
Wall thickness	1.5mm	1.3mm	1.6mm

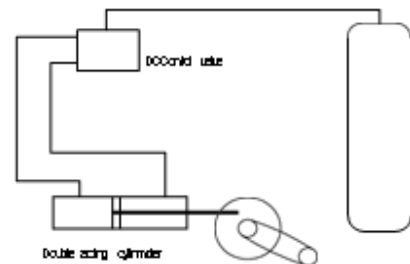
4. Working

Vehicle works on the compressed air which helps in reduction of the global warming. In our project air tank is used to fill the compressed air and this compressed air is used as the fuel for this vehicle and the air tank is connected to the 5/2 solenoid valve which has five port, two position valve that will put a fluid or air into one end of a double acting device as well as allowing the other end vent to exhaust. The outlet of this valve is connected to the double acting cylinder and these **Double acting cylinders** have a port at each end and move the piston forward and back by alternating the port that receives the high- pressure air, necessary when a load must be moved in both directions such as opening and closing a gate. Air pressure is applied alternately to the opposite ends of the piston. This piston is connected through the slider crank mechanism, which intern connected to sprocket of rear driveshaft

4.1.Components of Pneumatic System

- Compressed Airtank
- 5/2 solenoid valve
- Double acting cylinder
- Eclectic switch
- Slider crank mechanism

Yield strength	467Mpa	205Mpa	386Mpa
Bending stiffness	2791.1Nm ²	3631.6Nm ²	3626.5Nm ²
Weight per meter	0.889kg	1.545kg	1.2kg
Poisson's ratio	0.28	0.29	0.27
Mass density	7850kg/m ³	8000kg/m ³	7700-8030kg/m ³



Schematic Representation of Pneumatic System

5. Conclusion

The compressed air linear actuator vehicle will provide eco friendly & economical way of transportation which can replace present IC engine vehicles. These can also be an alternative mode of transportation in metro cities and industrial sectors. In future we can increase the seating capacity and also provide refilling of compressed air using recycling process.

6. References:

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