

# Compressed Air Production Using Vehicle Suspension

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**Abstract:** Generally compressed air is produced using different types of air compressors, which consumes lot of electric energy and is noisy. In this paper, an innovative idea is put forth for production of compressed air using movement of vehicle suspension which normal is wasted. The conversion of the force energy into the compressed air is carried out by the mechanism which consists of the vehicle suspension system, hydraulic cylinder, Non-return valve, air compressor and air receiver. We are collecting air in the cylinder and store this energy into the tank by simply driving the vehicle. This method is non-conventional as no fuel input is required and is least polluting.

**INDEX WORDS:** Suspension system, Hydraulic cylinder, Non-return valve, Air compressor, Air receiver.

## 1. INTRODUCTION

In the automobile, the wasted energies are exhausted flue gases, wheel rotations & suspension travel. From above exhaust flue gas energy is used to increase the efficiency of engine with the help of Turbo charger and also the wheel rotations are used in Dynamo. In this project we are going to utilize the wasted energy in suspension travel to generate compressed Air. This can be achieved by conversion of displacement of damper of suspension system into force with the help of hydraulic lines.

## 2. CONCEPTUALIZATION

The input force i.e. the weight of unsprung mass of vehicle is given with help of lever arrangement. That force is transfer to cylinder-1 with the help of piston cylinder arrangement. Cylinder-1 is partially filled with hydraulic fluid. Input force is transmitted from cylinder-1 to cylinder-2 by hydraulic fluid. Cylinder-2 is partially pneumatic & partially hydraulic. In cylinder-2 air is sucked from atmosphere, where it gets compressed during extension stroke of cylinder-2. That compressed air can be stored in Air Receiver. Two NRV's are used at the inlet & exhaust of Air. For force transmission from cylinder-1 to cylinder-2, the hydraulic lines are selected.

- **Advantages of using hydraulic lines**

1. Damping of vibration.
2. Less wear & tear.
3. Multiplication of force can be possible.

- **Disadvantages**

1. Leakage problem.
2. Expensive.

Since, the advantages suppresses the disadvantages in our case, we select hydraulic lines over mechanical arrangement.



## 3. Conclusion

At the outset of the project, the system was chosen as the most suitable conceptual design for satisfying the problem statement. Consequently, the main objective module was to develop a mechanism for compressed air production using vehicle suspension. The module was concluded successfully and the result was a suitable design satisfying the earlier demands. The mechanism was developed on the basis of the Rule of Thumb and ease of manufacturing, availability of components at short lead times. This innovation can be more desirable and economical with certain improvements. This project "Compressed air production using vehicle suspension" is designed with the hope that it is very much economical and helpful to all vehicles to produce the compressed air and provide dual suspension. Thus, the project was concluded to be successful and beneficial for the overall development of both the society and the students.

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