

Review of Low Temperature Air Generation from Vehicle Suspension System



Mr. Tejas Tharkude, Poster Advisor: Dr. Jeremy (Zheng) Li
Department of Mechanical Engineering
University of Bridgeport, Bridgeport, CT

Abstract :

The idea is to harvest the kinetic energy generated in the suspension by to and fro motion of suspension and use it to generate the cold air which can be used for Air-Conditioning system as back-up unit. This will allow to reduce the fuel usage and create environment friendly system.

Objective:

1. To recover the waste energy of suspension system.
2. To save fuel which is, burnt for working of A.C.
3. To run A.C. on waste energy of suspension system.
4. To increase the mileage of vehicle.
5. To use the linear motion of suspension system for electricity generation

Working :

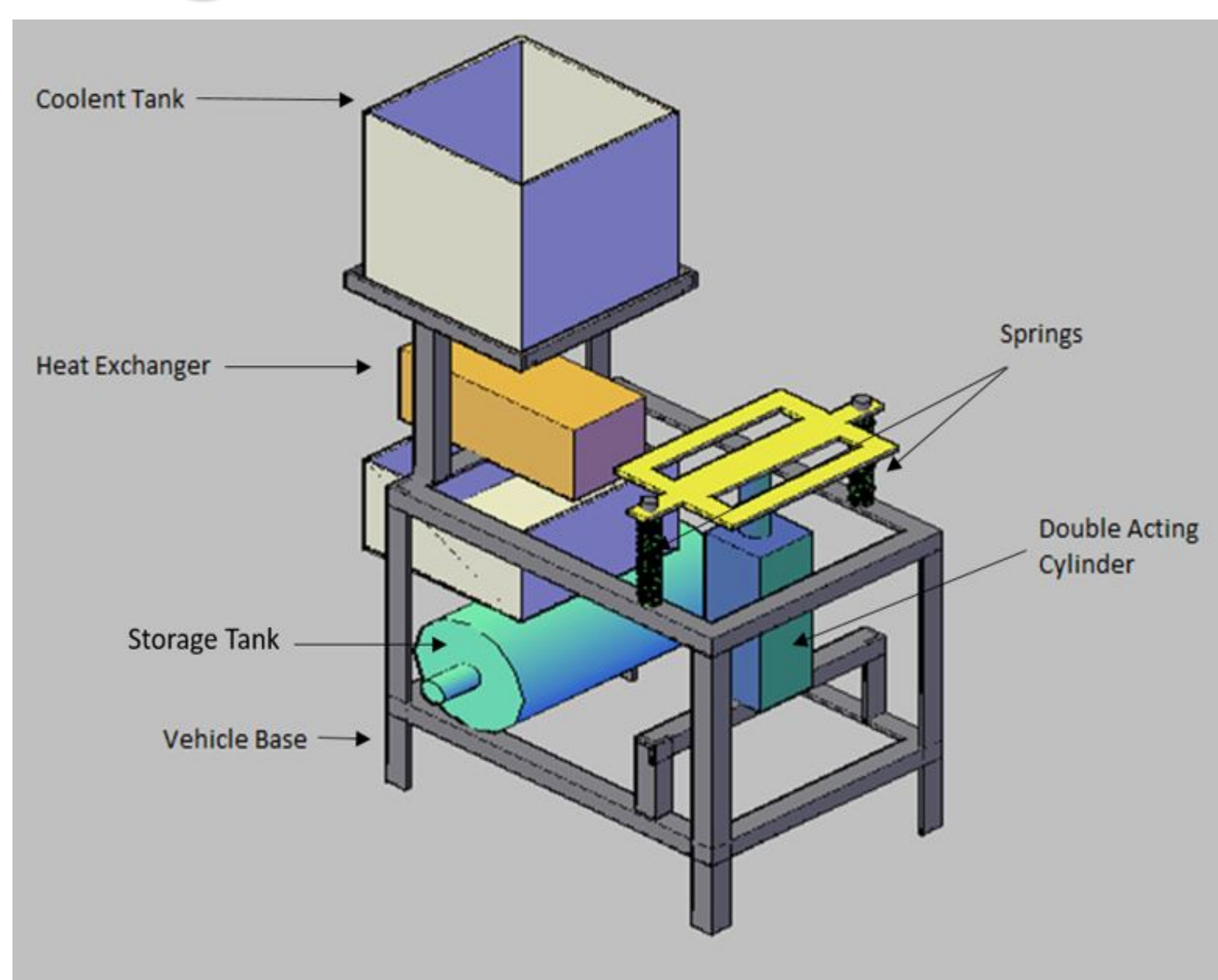


Fig. Construction of the system

The construction of Vehicle suspension Air Conditioning system is very simple & compact. Basically it is assembly of Base frame Wheel, Piston-Cylinder, and Air reservoir. The complete diagram of the compressed air production using vehicle suspension is given above. The pushing power is converted into compressed air energy by proper driving arrangement. The pneumatic double acting Cylinder is used for this project. The spring arrangement is fixed at the outside of the pneumatic cylinder. The spring is used to return the inclined L-angle window in same position by releasing the load. The temperature of the output air is digitally displayed by the temperature sensors while the pressure will be displayed on the pressure gauge.

List of the components used :

Sr. No.	Name	Quantity
1	Double acting cylinder	1
2	Spring	2
3	Non return valve	1
4	Air tank	1
5	Heat exchanger	1
6	Thermo-couples	2
7	Pressure Gauge	1
8	Nozzle	Aprox.6

Advantages:

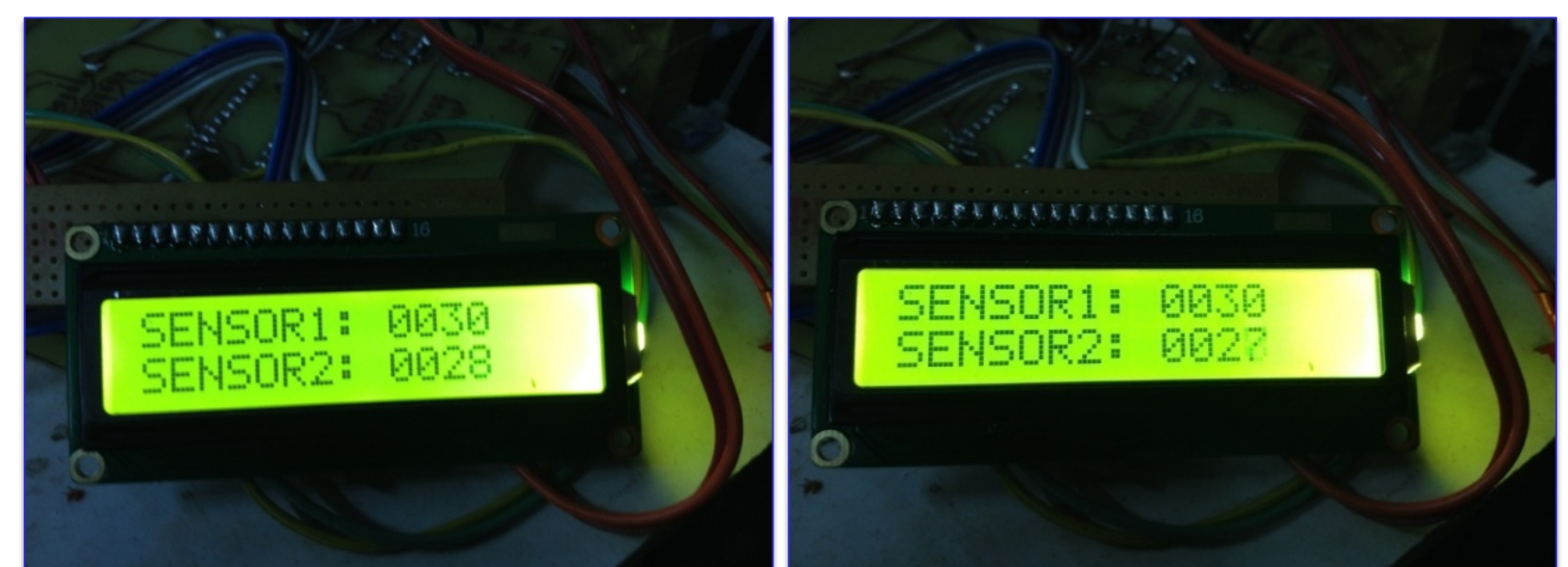
1. Pollution free system.
2. It is cheap and its maintenance is low.
3. External power supply is not required.
4. Immediate results are obtained.

Disadvantages:

1. There might be some leakage problems.
2. Thermal stresses might affect the system.

Results and Conclusion :

Below are the results obtained by the system. The expected temperature difference was around 4°C while the maximum temperature difference obtained was 3°C . Hence we can say that the harvesting of waste kinetic energy is possible.



Results showing the temperature difference of the air

This project was designed with a vision of saving energy to its maximum level and develops an economical and helpful system. The results are proof that cold air for Air Conditioning system can be generated by kinetic energy of suspension system. System uses the linear motion of suspension system for electricity generation. We can recover the waste energy of suspension system by using pneumatic cylinders and display it using temperature sensors and pressure gauge for the safety purposes which were not used earlier.