

Suspension Operated Air Conditioning System

Pradip K. Ingale¹

Student

Department of Mechanical Engineering
A.I.E.T.P College
Shrirampur, India
pradipingale98@gmail.com

Anant R. Chavan²

Student

Department of Mechanical Engineering
A.I.E.T.P College
Shrirampur, India
anant.chavan911@rediffmail.com

Akshya V. Chaudhari³

Student

Department of Mechanical Engineering
A.I.E.T.P College
Shrirampur, India
akshychaudhari8617@gmail.com

Kadushaha I. Shaha⁴

Student

Department of Mechanical Engineering
A.I.E.T.P College
Shrirampur, India
kadushaha.shaha@rediffmail.com

Abstract— In this paper, designing a Suspension operated AC system in automobile cars. This idea comes out as efficiency of vehicle reduces because of compressor. After implementing this idea the efficiency of vehicle will increase by reducing compressor specification. The main concept is that the air conditioning effect will get on the basis of suspension system in vehicle. As a team, we designed the suspension operated AC system. This system runs on the suspension of vehicle and will make the air is compress that store in receiver. We began to the project by first attempting to come up with an original idea to fit the problem. After coming up with an idea, to increase the efficiency of vehicle. We followed the various design process to finalize our project. Vehicle air-conditioning can significantly impact fuel economy and tailpipe emissions of conventional and hybrid electric vehicles (HEV) and reduce electric vehicle (EV) range. In addition current air-conditioning systems can reduce the fuel economy of high fuel-economy vehicles by about 50% and reduce the fuel economy of today is mid-sized vehicles by more than 20% while increasing NOx by nearly 80% and CO by 70%.

Keywords- Suspension system, compressor, fuel economy

I. INTRODUCTION

In the past around 4000 years from now, people in India and Egypt are known porous pots outside the home during the night period. The evaporation of water in almost cool dry air and radioactive heat to produce ice by keeping water in the transfer between the water and the deep sky that is at a very low temperature (much below the freezing point of ice) caused the formation of ice even though the surrounding air was at a higher temperature than the freezing point of water. There are a few accounts in China about the use of ice around 1000 BC for cooling the beverages. In 4th century A.D., East Indians were producing ice by dissolving salt in water.

For specific applications, efficiencies of both living and non-living beings depend to a great extent on the physical environment. The nature keeps conditions in the physical environment in the dynamic state ranging from one extreme to the other. Temperature, humidity, pressure and air motion are some of the important environment variables that at any location keep changing throughout the year. Adaptation to these many a times unpredictable variations is not possible and thus working efficiently is not feasible either for the living beings or the non-living ones. Thus for any specific purpose, control of the environment is essential. Refrigeration and air-

conditioning is the subject which deals with the techniques to control the environments of the living and non-living subjects and thus provide them comforts to enable them to perform better and have longer lives. [1 & 2]

II. OBJECTIVES

1. To reduce the specification of compressor.
2. To increase the efficiency of vehicle.
3. To utilize the suspension energy into compressed air, which can be utilize various purpose.

III. CONSTRUCTION AND WORKING

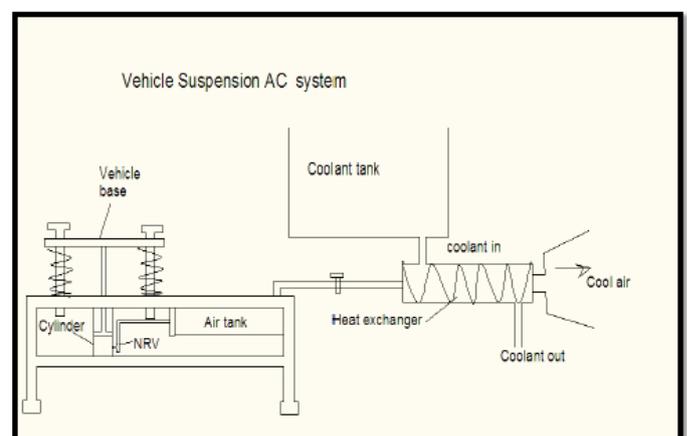


Fig. 1.1 SUSPENSION OPERATED AIR CONDITIONING (AC) SYSTEM

A. **Construction:-** . It consist of following component of air conditioning system.[1]

1. **Pneumatic cylinder:-** - It is a mechanical device which used the power of compressed gas to produce a force in reciprocating linear motion. In this project single acting cylinder is used.
2. **Pressure vessel:-** It is known as air receiver it is closed container design to hold gasses or liquid at a pressure substantially different from the ambient pressure.
3. **Pressure gauge:-** It is device used to measure the pressure at point of closed vessel. In this project the mechanical type bourdon tube pressure gauge is used.
4. **Condenser:-** When saturated vapour comes in contact with a surface having a temperature below the saturation temperature, condensation occurs.
5. **Pneumatic non-return valve:-** Multiple check valves can be connected in series. For example, a double check valve is often used as a backflow prevention device to keep potentially contaminated water from siphoning back into municipal water supply lines. There are also double ball check valves in which there are two ball/seat combinations sequentially in the same body to ensure positive leak-tight shutoff when blocking reverse flow; and piston check valves, wafer check valves, and ball-and-cone check valves.
6. **Water tank:-** In this project the water tank is used to storage this water for supplying to the condenser for the purpose of cooling of air.
7. **T- connector:-** In our project the T-Connector that connect three port together. it is usually shape of capital T. tee connectors can be used to transfer of fluid from one port from into two port.
8. **Hoses:-** Hose is a flexible hollow tube design to carry fluid from one location to another. Hoses are also sometimes called pipes.

B. **Working:-** - The vehicle frame is bounce according to suspension of vehicle. In figure the vehicle frame is push by manually this connect the piston rod end and move the piston inside the cylinder mounted on axle of the vehicle and this movement of piston the atmospheric air is suck from piston moves from BDC

to TDC and compressed the air from piston moves to TDC to BDC.



FIG.1.2 PRESSING THE PNEUMATIC CYLINDER

- The outlet port of cylinder is connected the T connector this connector two port is connect the non-return valve one valve is open to atmosphere and another is connect the hoses pipe and supply the compressed air in air receiver. This air receiver is connect the pressure gage to indicate the pressure inside the receiver. The other side of receiver the regulating valve is fitted to regulate the pressure of air. This valve is connected the hoses and air is supplied to condenser.



Fig. 1. 3 Connection of Receiver to Condenser

- The condenser is used in tube and tube type. The air is supplied inside tube and cooling liquid is supplied in outside of tube for the purpose to produce cooling effect.

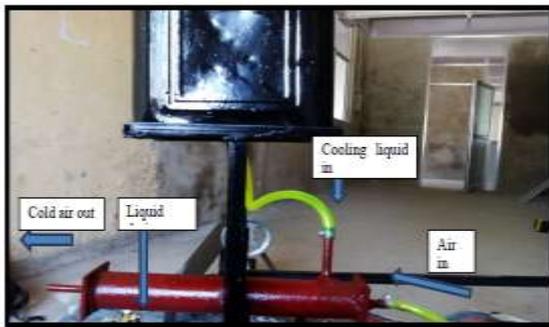


Fig. 1.4 Water Tank to Condenser.

- This cooling liquid is store in air tank and supply the cooling liquid in inlet port of condenser. Then hot water is drain to condenser from outlet port and the cool of air also cooling effect is produced. This cooling air is pass to vehicle cabin for the purpose of comfort air conditioning.[1 & 2]



Fig. 1.5 Suspension Operated Ac System

IV. MERITS , DEMERITS AND APPLICATIONS

A. Merits:-

1. Less fuel consumption.
2. To reduce the cost of compressor.
3. Used to have cleaning as well as breaking.
4. Air Freely available from the atmosphere.
5. Explosive proof. No protection against explosion required.
6. Easily transportable in the vessels and pipes.
7. No return lines are required.
8. Clean system. It has self-cleaning properties.
9. Simple construction and ease of handling.
10. Unduplicated exhaust clear air which escapes through leaking pipe or components don't cause contamination.
11. Overload safety- Pneumatic tools and operating components can be loaded to the point of stopping and are therefore overload safe.
12. Air enables high working speed to be obtained.

B. Demerits:-

1. Initial cost is high.
2. Increase weight of vehicle.

C. Applications:-

1. To operate pneumatic tools
2. Spray Painting
3. Refrigeration and air conditioning systems
4. Gas turbine power plants
5. Supercharging of I.C Engines
6. Conveying materials like sand and concrete, coal mixtures etc. in pipe line
7. Pumping of Water
8. Driving the mining machinery
9. In Blast furnaces
10. Robotics

V. CONCLUSION

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and economical. This project —USING VEHICLE SUSPENSION AC SYSTEM is designed with the hope that it is very much economical and help full to all vehicles to produce the compressed air.

This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully. It has been a great experience while competing our project we come across lot many practical knowledge as well as experience. We had an opportunity to learn how project are been done. We received a lot of practical experience while working on this project as well as got enough freedom to our ideas for the improvement in our assigned project and check whether ideas are fruitful. Therefore the design must be as perfect as possible and special attention is given during each manufacturing activity. Special attention during each & every manufacturing process that was carried out. In the manufacturing we come to know how theoretical aspects are implemented in actual practice, we got to learn about different manufacturing processes, welding, gear, cutting etc.

REFERENCES

- [1] Automobile Engg. :- Kripal Singh.
- [2] Strength of Material : - Sunil S. Deo.
- [3] Engineering Manufacturing Process: - D. Malslov. & Danilevsky