



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 5, May 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Compressed Air Vehicle

Venkatesh K C¹, Manjunath M H², Manikanta³, Pavankumar Reddy M⁴, Parash Chand⁵

Assistant Professor, Department of Mechanical Engineering, Ballari Institute of Technology and Management,
Ballari, Karnataka, India¹

U.G. Students, Department of Mechanical Engineering, Ballari Institute of Technology and Management, Ballari,
Karnataka, India^{2,3,4,5}

ABSTRACT: Practical knowledge is of great importance, especially if the field is concerned with science and technology. Project work undertaken in addition to theoretical study greatly facilitates the understanding of theory itself. This report contains a description of our project work. During the period of one year, we have got the chance to study engine parts very deeply. We have also learned the method of developing camshaft and the valve timing techniques. We consider ourselves lucky enough to have been working with such rare and expensive setups and equipment and to under the guidance of our project mentor who have guided us at every step of our work.

KEYWORDS: Compressed air, Engine, hybrid, Power system, vehicle

I. INTRODUCTION

At first glance the idea of running an engine on air seems to be too good to be true. Actually, if we can make use of air as an aid for running an engine it is a fantastic idea.

As we all know, air is all around us, it never runs out, it is non-polluting, and it is Air Driven Engine makes use of Compressed Air Technology for its operation. Compressed Air Technology is now widely preferred for research by different industries for developing different drives for different purposes. The Compressed Air Technology is quite simple. If we compress normal air into a cylinder the air would hold some energy within it. This energy can be utilized for useful purposes. When this compressed air expands, the energy is released to do work.

So this energy in compressed air can also be utilized to displace a piston. This is the basic working principle of the Air Driven Engine. It uses the expansion of compressed air to drive the pistons of the engine. So an Air Driven Engine is basically a pneumatic actuator that creates useful work by expanding compressed air. This work provided by the air is utilized to supply power to the crankshaft of the engine.

In the case of an Air Driven Engine, there is no combustion taking place within the engine. So it is non-polluting and less dangerous. It requires lighter metal only since it does not have to withstand elevated temperatures.

As there is no combustion taking place, there is no need for mixing fuel and air. Here compressed air is the fuel and it is directly fed into the piston cylinder arrangement. It simply expands inside the cylinder and does useful work on the piston. This work done on the piston provides sufficient power to the crankshaft.

II. RELATED WORK

1. *Energy Storage Systems*: Research focuses on improving the efficiency and capacity of compressed air storage tanks and systems, exploring materials and designs that enhance energy density and reduce leakage.
2. *Vehicle Design and Performance Optimization*: Studies delve into optimizing CAV design for efficiency, range, and practicality, considering factors such as aerodynamics, weight distribution, and drivetrain configurations.
3. *Environmental Impact Assessment*: Research examines the environmental benefits of CAVs, including their potential to reduce greenhouse gas emissions and air pollution compared to conventional vehicles.
4. *Infrastructure Development*: Investigations explore the infrastructure requirements for widespread adoption of CAVs, including refueling stations, distribution networks, and compatibility with existing transportation systems.

5. ***Market Analysis and Economic Viability***: Studies assess the market potential and economic feasibility of CAVs, considering factors such as manufacturing costs, consumer acceptance, and regulatory frameworks.
6. ***Prototype Development and Testing***: Projects involve building and testing CAV prototypes to evaluate performance, reliability, and real-world feasibility.
7. ***Policy and Regulation***: Research examines policy interventions and regulatory frameworks to support the development and deployment of CAVs, addressing issues such as safety standards, emissions regulations, and incentives for adoption.

III. EXPERIMENTAL RESULT

1. ***Compressing the air***: The first step in the process is to compress the air. This is typically done using an external compressor that forces air into the storage tank at high pressure. The air is compressed to a high pressure, usually between 200 and 300 bars, depending on the design of the system.
2. ***Storing the compressed air***: The compressed air is stored in a high-pressure tank on the vehicle. The tank is designed to withstand the high pressure and is usually made of materials like carbon fiber or high-strength steel.
3. ***Expanding the compressed air***: When the vehicle needs power, the compressed air is released from the tank and allowed to expand. As the air expands, it cools down, which can be a challenge in maintaining the efficiency of the system.
4. ***Driving the motor***: The expanding air is used to drive a motor, typically a pneumatic motor, which generates mechanical power to drive the vehicle. The motor can be connected directly to the wheels or to a transmission system, depending on the design of the vehicle.
5. ***Regulating the system***: The system needs to be carefully regulated to ensure that the air pressure is maintained at the right level for optimal performance. This may involve the use of valves and control systems to manage the flow of air and ensure that the system operates efficiently.
6. ***Range and refueling***: Compressed air vehicles have limited range compared to traditional internal combustion engine vehicles. Refueling the vehicle involves recharging the compressed air tank, which can be done at special refueling stations equipped with high-pressure air compressors.
7. ***Environmental impact***: Compressed air vehicles are often touted as environmentally friendly due to zero tailpipe emissions. However, the energy used to compress the air may come from non-renewable sources, so the overall environmental impact of these vehicles depends on the source of the electricity used to compress the air.

Overall, compressed air vehicles are an interesting alternative to traditional internal combustion engine vehicles, offering the potential for reduced emissions and dependence on fossil fuels. However, there are challenges to overcome in terms of range, efficiency, and infrastructure to support widespread adoption

IV. CONCLUSION

The technology of compressed air vehicles is not new. In fact, it has been around for years. Compressed air technology allows for engines that are both non-polluting and economical. After ten years of research and development, the compressed air vehicle will be introduced worldwide. Unlike electric or hydrogen powered vehicles, compressed air vehicles are not expensive and do not have a limited driving range. Compressed air vehicles are affordable and have a performance rate that stands up to current standards.

To sum up, they are non-expensive cars that do not pollute and are easy to get around in cities. The emission benefits of introducing this zero emission technology are obvious.

At the same time the well to wheels efficiency of these vehicles need to be improved.

This is a revolutionary engine design which is not only eco-friendly, pollution free, but also very economical. This

addresses both the Problems of fuel crises and pollution.

However excessive research is needed to completely prove the technology for both its commercial and technical viability.

REFERENCES

1. AnirudhAddala& SrinivasuGangada,ViswanadhaInstitute of Technology and Management; Global journal INC. (USA); Year-2013.
2. Vehicle Operating on Compressed Air by Inversion of Slider Crank Mechanism”; A.A.
3. Keste, S.B. Vise, A.N. Adik, P.R. Borase; IOSR Journal of Mechanical and CivilEngineering (IOSR-JMCE); Year-2013.
4. Latest Developments of a Compressed Air Vehicle: A Status Report”; S.S.Verma,S.L.I.E.T., Longowal; Global journal INC. (USA); Year-2013.
5. Compressed air car”; Dr. S.S Thipse; Tech Monitor.
6. R. Kumar and AnandM.G, Simulation and construction of Single-stage reciprocating pneumatic transmission system Engine,



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details