

## COMPRESSED AIR ENGINE FOR TWO WHEELER: A REVIEW

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**Abstract:** As the world is hard pressed with the energy and fuel crises, compounded by pollution of all kinds, any technologies that bring out the solutions to this problem is considered as a bounty. In one of such new technologies, is the development of a new engine called as compressed air engine which does not require any of the known fuels like diesel, petrol, CNG, LPG, hydrogen etc. this works using only compressed air. This replaces all types of to-date known fuels and also permanently solves the problems of pollution as its exhaust is clean and cool. Since this engine runs only on high pressure compressed air, the exhaust of which is undoubtedly only air, making it a zero pollution engine. No heat is generated because there is no combustion of fuel, hence this engine needs no cooling system and it result in reduced cost, weight, volume and vibration. Early cost analysis shows that it's very cost effective and the operational cost is ten times less than that of petrol or diesel.

All automobile engines consume the petroleum fuel. Considering the demand of fuel and cost of fuel, other resources of energy is required to operate the vehicle. So that we are go for other type of energy like electric power, solar power etc... It may be noted that the air energy is readily available with free of cost. So we are considering that air engine in our project.

### I. INTRODUCTION

FOSSIL fuels (i.e., petroleum, diesel, natural gas and coal) which meet most of the world's energy demand today are being depleted rapidly. Also, their combustion products are causing global problems, such as the greenhouse effect, ozone layer depletion acid rains and pollution which are posing great danger for environment and eventually for the total life on planet. These factors are leading automobile manufactures to develop cars fueled by alternatives energies. Hybrid cars, Fuel cell powered cars, Hydrogen fueled cars will be soon in the market as a result of it. One possible alternative is the air powered car.

Air, which is abundantly available and is free from pollution, can be compressed to higher pressure at a very low cost, is one of the prime option since atmospheric pollution can be permanently eradicated. Whereas so far all the attempts made to eliminate the pollution has however to reduce it, but complete eradication is still rigorously pursued. Compressed air utilization in the pneumatic application has been long

proven. Air motors, pneumatic actuators and others various such pneumatic equipment's are in use.

Compressed air was also used in some of vehicle for boosting the initial torque. Turbo charging has become one of the popular techniques to enhance power and improve the efficiencies of the automotive engine that completely runs on compressed air. There are at two ongoing projects that are developing a new type of car that will run only on compressed air. Similar attempt has been made but to modify the existing engine and to test on compressed air.

### II. LITERATURE REVIEW

[1]The environmental pollution in the metropolitan cities is increasing rapidly mostly because of the increased number of fossil fuel powered vehicles. Many alternative options are now being studied throughout the world. One of the alternative solutions can be a compressed air powered vehicle. Main advantage of this engine is that no hydrocarbon fuel is required which means no combustion process is taking place. In this project, an SI engine is converted into a compressed air engine. A four stroke single cylinder SI engine is

converted to two stroke engine which operates using compressed air because of its design simplicity. As we converted the already existing conventional engine into an air powered one, this new technology is easy to adapt. Another benefit is that it uses air as fuel which is available abundantly in atmosphere.

[2] Compressed air as a source of energy in different uses in general and as non-polluting fuel in compressed air vehicles has attracted scientists and engineers for centuries. Efforts are being made by many developers and manufacturers to master the compressed air vehicle technology in all respects for its earliest use by the mankind. The present paper gives a brief introduction to the latest developments of a compressed-air vehicle along with an introduction to various problems associated with the technology and their solution. While developing of compressed air vehicle, control of compressed air parameters like temperature, energy density, requirement of input power, energy release and emission control have to be mastered for the development of a safe, light and cost effective compressed air vehicle in near future.

[3] In his century, it is believed that petroleum and crude oil products will become very scare and costly and fossil fuels are rapidly depleting. The problem of global warming is largely contributed by conventional engine technology. Any alternative technology solve this problem will considered as a bounty and compressed air engine (C.A.E.) is one of them. It is environment friendly, cheaper as well as easily available. It can run only with highly pressurized air as input energy source. Another reason motivating the development of alternate fuel for (IC) engine is the concern over the emission problem of (conventional) gasoline and diesel engines. This technology solves the problem of hot and harmful exhaust unlike diesel or gasoline engine because of no combustion process is done here.

**III. PROBLEM IDENTIFICATION**

• Nowadays we are using IC engines rapidly in the field of automobiles.

- The IC engines works in the cycle of suction, compression, power and exhaust In order to obtain the power, the process carried out is very much complicated.
- Also that the exhaust from this engines leads to many environmental disasters like Global Warming, Green House effect, ozone depletion directly and indirectly.
- Here due to complicated design and assembly of IC engines more friction and power losses occurs which result in reduction of mechanical efficiency.

**IV. WORKING METHODOLOGY**

- The air engine is similar to an ordinary engine where the working medium only differs.
- The fuel supply is not given to the engine whereas pressurized air is given as the input.
- The pressurized air is obtained from the compressor and then it is directed towards the engine for the work to place.
- The inlet valve is open and the pressurized air is allowed to flow inside the engine.
- The high pressure air will force the piston move downwards and then exhaust valve will open.

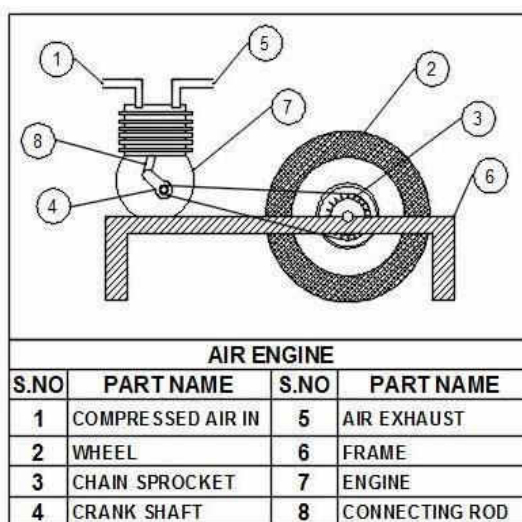


Fig 1: Working Principle

- The air from the combustion chamber will flow out of the engine through the exhaust valve.

- The process will repeat periodically until the pressurized air is allowed to flow inside the engine.
- Thus the air engine will function without any combustion of fuels.
- The crank is used to change the linear motion into rotary motion.
- The crank sprocket is connected to the wheel sprocket through chain, so the wheel will rotate.



Fig 3: Prototype of compressed air-engine

## V. CONCLUSION

The model designed by us is a small scale working model of the compressed air engine. When scaled to higher level it can be used for driving automobiles

independently or combined (hybrid) with other engines like I.C. engines.

Main advantages of Compressed Air Engine (C.A.E.) are:

1. Zero emission.
2. Use of renewable fuel.
3. Zero fuel cost (the cost is involved only in the compression of air).

But the Compressed Air Engine (C.A.E.) has some disadvantages, which are:

1. Less power output.
2. High pressure of compressed air may lead to bursting of storage tank.
3. Probability of air leakage.

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