

## FABRICATION OF COMPRESSED AIR VEHICLE (CAV)

### 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 measured practically as low as 5°C. A proto type, a horizontal, single cylinder low speed engine was modified to run on compressed air. 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. Experimental analysis were carried out on this modified engine to find out its performance characteristics like brake power, mechanical efficiency, overall efficiency, air to Air ratio, volumetric efficiency, cost analysis etc. Though the efficiencies were low as the frictional forces were high for the proto designed engine, however the concept can be applied on a professionally designed engine to improve its performance.

### Introduction

Gasoline is already the fuel of past and also main reason behind global warming. But here we have the solution. A compressed air vehicle (CAV) is powered by an air engine, using compressed air, which is stored in a tank. Instead of mixing fuel with air and burning it in the engine to drive pistons with hot expanding gases, compressed-air vehicles use the expansion of compressed air to drive their pistons. One manufacturer claims to have designed an engine that is 90 percent efficient.

## History:

Gotthardbahn: Pneumatic Locomotive with attached pressure container. Compressed air has been used since the 19th century to power mine locomotives and trams in cities such as Paris (via a central, city-level, compressed air energy distribution system), and was previously the basis of naval torpedo propulsion.

During the construction of the Gotthardbahn from 1872 to 1882, pneumatic locomotives were used in the construction of the Goatherd Rail Tunnel and other tunnels of the Gotthardbahn. In 1903, the Liquid Air Company located in London England manufactured a number of compressed-air and liquefied-air cars. The major problem with these cars and all compressed-air cars is the lack of torque produced by the "engines" and the cost of compressing the air. Recently several companies have started to develop compressed air cars, although none have been released to the public, or have been tested by third parties.

## ADVANTAGES

Compressed-air vehicles are comparable in many ways to electric vehicles, but use compressed air to store the energy instead of batteries. Their potential advantages over other vehicles include:

- Much like electrical vehicles, air powered vehicles would ultimately be powered through the electrical grid. This makes it easier to focus on reducing pollution from one source, as opposed to the millions of vehicles on the road.
- Transportation of the fuel would not be required due to drawing power off the electrical grid. This presents significant cost benefits. Pollution created during fuel transportation would be eliminated.
- Compressed air technology reduces the cost of vehicle production by about 20%, because there is no need to build a cooling system, fuel tank, Ignition Systems or silencers.
- Air, on its own, is non-flammable.
- High torque for minimum volume.
- The mechanical design of the engine is simple and robust.
- Low manufacture and maintenance costs as well as easy maintenance.
- Compressed-air tanks can be disposed of or recycled with less pollution than batteries.

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- Compressed-air vehicles are unconstrained by the degradation problems associated with current battery systems.
- The tank may be able to be refilled more often and in less time than batteries can be recharged, with re-fueling rates comparable to liquid fuels.
- Lighter vehicles would mean less abuse on roads. Resulting in longer lasting roads. The price of fueling air-powered vehicles will be significantly cheaper than current fuels.

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