

AIR POWERED VEHICLES

**Shevkar Roshan .¹, Shelke Ganesh B², Pandit Shivam S³, Prof.Ganeshraj
A. Devore⁴**

*^{1,2,3}Scholar Te Mech, ⁴Assistant Prof. Mech Engg. Department, B.V.C.O.Engg & Reaserch Institute
Nashik, Pune University, (India)*

ABSTRACT

Light utility vehicles are getting very fashionable means that of freelance transportation for brief distances. value and pollution with hydrocarbon and diesel area unit leading vehicle makers to develop vehicles burning by various energies. Engineers area unit guiding their efforts to form use of air as AN energy supply to run the sunshine utility vehicles. the employment of compressed gas for storing energy may be a technique that's not solely economical and clean, however additionally economical. the foremost downside with compressed gas cars was the shortage of torsion made by the "engines" and also the value of pressure the air. Recently many corporations have began to develop compressed gas vehicles with several benefits and still several serious bottlenecks to tackle. This paper in brief summarize the principle of technology, latest developments, benefits and issues in victimization compressed gas as a supply of energy to run vehicles

I. INTRODUCTION

We reside in a {very} very mobile thereforeciety so light-weight utility vehicles (LUV) like bikes and cars have become extremely popular means that of freelance transportation for brief distances. gas and diesel that are the most sources of fuel within the history of transportation, have become dearer associated impractical (especially from an environmental standpoint). Such factors square measure leading vehicle makers [1-9] to develop vehicles burning by various energies. once nowadays level of technological development fuel-less flying (like birds) i.e., flying supported the employment of bio-energy and aviation within the atmosphere appears to be nearly not possible for human Beings then engineers square measure fascinated a minimum of with the big power related to the human friendly further as tested supply of energy (i.e., air) to form air-powered vehicles collectively doable various. Engineers [1-9] square measure guiding their sincere efforts build|to form|to create} use of air as associate energy supply to run the LUVs which is able to make future bikes and light/small cars running with aviation for daily routine distances and therefore the travel are going to be free from pollution and price effective.

II. TECHNOLOGY

Mankind has been creating use of uncompressed airpower from centuries in several application viz., windmills, sailing, balloon automotive, hot air balloon flying and sailplaning etc. the employment of compressed gas for storing energy [3] could be a technique that's not solely economical and clean, however additionally economical and has been used since the nineteenth century to power mine locomotives, and was antecedently the idea of military service torpedo propulsion. In 1903, the air Company placed in London factory-made

variety of compressed gas and liquified air cars. the main drawback with compressed gas cars was the shortage of force made by the "engines" and also the price of press the air. Recently many corporations [1-5] have began to develop compressed gas vehicles, though none has been free to the general public thus far. compressed gas tanks store power very well however ar lacking on power density. They tie or beat batteries within the charge / recharge potency and all kill them on time period. Higher pressures ar their huge drawback of compressed gas vehicles whereas potency, cost, deadly chemicals, and time period ar the huge issues related to chemical batteries. The principle of compressed-air propulsion [6] is to pressurize the tank so connect it to one thing terribly sort of a reciprocatory external-combustion engine of the vehicle. rather than commixture fuel with air and burning it within the engine to drive pistons with hot increasing gases, compressed gas vehicles (CAV) use the growth of compressed gas to drive their pistons. Thus, creating the technology free from difficulties, each technical and medical, of mistreatment ammonia, petrol, or carbon disulphide because the operating fluid. makers [5-9] claim to possess designed engine that's ninety p.c economical. The air is compressed at pressure concerning a hundred and fifty times the speed the air is pressurised into automotive tyres or bicycle. The tanks should be designed to safety standards acceptable for a pressure vessel. The tank could also be fabricated from steel, aluminium, carbon fiber, kevlar or alternative materials, or combos of the on top of. The fiber materials ar significantly lighter than metals however typically dearer. Metal tanks will Withstand an oversized range of pressure cycles, however should be checked for corrosion sporadically. an organization has expressed to store air in tanks at four,500 pounds per square measure (about thirty MPa) and hold nearly three,200 solid feet (around ninety solid metres) of air. The tanks could also be refilled at a station equipped with heat exchangers, or during a few hours reception or in parking tons, plugging the vehicle into Associate in Nursing on-board mechanical device. the value of driving such a automotive is usually projected to be around Rs. sixty per one hundred klick, with an entire refill at the "tank-station" at concerning Rs. 120 only

III. VEHICLE PARTS

A. compressed air tank

One of the foremost commonly asked queries is concerning the security of the compressed gas storage tanks. These tanks hold ninety cubelike meters of air compressed to three hundred bars. many of us raise whether or not this technique is dangerous just in case of associate degree accident and if there's a risk of explosion. the solution is not any. Why? as a result of these area unit identical tanks wont to carry the liquid gas utilized by buses for transport. The tanks relish identical technology developed to contain fossil fuel. they're designed associate degree formally approved to hold an explosive product: methane series gas. within the case of a significant accident, wherever the tanks area unit busted, they might not explode since they're not metal. Instead they might crack, as they're fabricated from carbon fiber. associate degree elongated crack would seem within the tank, while not exploding, and also the air would merely escape, manufacturing a loud however harmless noise. Of course, since this technology is accredited to move associate degree combustible and explosive gas (Natural gas), it's absolutely capable inoffensive and non-flammable air. It is fitting, therefore, that Markaz-ud-Dawa-wal-Irshad has reached associate degree agreement with the ecu leader in region technology airliner Industries for the manufacture of the compressed gas storage tanks. With a distant oversight arrangement,

airliner Industries oversees the creating of the storage tanks at every Markaz-ud-Dawa-wal-Irshad industrial plant. The whorled carbon fibre technology utilized in the development of the tanks is complicated and needs a considerable internal control method that the transnational company, home of the airliner craft, can offer for our vehicles.

B. The body:-

The Markaz-ud-Dawa-wal Irshad automotive body is constructed with fibre and injected foam, as area unit most of the cars on the market these days. This technology has 2 main advantages: value and weight. today the utilization of sheet steel for automotive bodies is just owing to value - it's cheaper to serially turn out sheet steel bodies than fibre ones. However, fibre is safer (it doesn't cut like steel), is less complicated to repair (it is glued), doesn't rust etc. Markaz-ud-Dawa-wal-Irshad is presently wanting into mistreatment hemp fibre to exchange fibre-glass, and natural varnishes, to provide 100% non-contaminating bodywork.

C. The Air Filter:-

The Markaz-ud-Dawa-wal-Irshad engine works with each air taken from the atmosphere and air pre-compressed in tanks. Air is compressed by the on-board mechanical device or at service stations equipped with a hard-hitting mechanical device. Before compression, the air should be filtered to induce eliminate any impurities that might injury the engine. Carbon filters area unit wont to eliminate dirt, dust, wetness and alternative particles, that sadly, area unit found within the air in our cities. This represents a real revolution in vehicles - it's the primary time that a automotive has made minus pollution, i.e. it eliminates and reduces existing pollution instead of emitting dirt and harmful gases. The piping on the Markaz-ud-Dawa-wal-Irshad cars produces clean air, that is cold on exit (between -15° and 0°) and is harmless to human life. With this technique the air that comes out of the automotive is cleaner than the air that went in.

D. The chassis:-

supported its expertise in astronautics, Markaz-ud-Dawa-wal-Irshad has place along extremely resistant, yet light, chasses, metallic element rods affixed along. mistreatment rods permits U.S.A. to create a a lot of shock-resistant chassis than regular chasses. in addition, the rods area unit affixed within the same method as craft, permitting fast assembly and a safer be a part of than with fastening. this technique helps to scale back manufacture time.

E. Electrical system:-

Guy Nègre, creator of the Markaz-ud-Dawa-wal-Irshad Air automotive, nonheritable the patent for a motivating invention for putting in electrics in an exceedingly vehicle. employing a radio transmission, every electrical element receives signals with a microcontroller. so just one cable is required for the total automotive. So, rather than wiring every element (headlights, dashboard lights, lights within the automotive, etc), one cable connects all electrical elements within the automotive. the foremost obvious blessings area unit the convenience of installation and repair and also the removal of the about twenty two weight unit of wires not necessary. Whats more, the whole system becomes associate degree anti-theft alarm as before long because the key's off from the automotive.

IV. DEVELOPMENTS

Jem Stansfield [8], associate degree English artificer has been ready to convert an everyday scooter to a compressed gas minibike. Air supercharged minibike.

This has been done by arming the scooter with a compressed gas engine and air tank. Jaish-e-Muhammad Stansfield created the bike by beefy 2 aggressive tanks onto the aspect of his Puch minibike. The tanks are essentially breathing apparatus tanks. He uses the electricity from his house to fill the tanks. The ability is then "stored" there, very similar to battery, prepared to be used. The tanks used are carbon-fiber tanks of the type employed by firefighters for O₂. But still, they are so much cheaper than even the lead acid battery utilized in automobiles currently. Of course, the mechanical device works on electricity, therefore that is not continually a clean power supply however recharging choices in the dark or off peak can enhance the probabilities to use the ability that will be wasted otherwise. The highest speed is regarding eighteen mph, and it will solely go seven miles before the atmospheric pressure runs out and lots of power may in all probability be forced by tweaking his configuration. A little gear on the top of the air drill, connected to the chain of the bike would create a far a lot of elegant answer. Many firms [1-9] are working and manufacturing prototypes, and they decide to supply air supercharged cars, buses and trucks. The compressed gas is kept in carbon-fiber tanks that are designed into the chassis. Because the air is discharged, the pressure drives pistons that power the engine and move the automobile, and also the pistons compress the air into a reservoir in order that the method continues. Once creating a revolution by manufacturing the world's most cost-effective car-Tata nano, India's largest carmaker (Tata Motors) is about to begin manufacturing the world's 1st industrial air-powered vehicle. The "Air Car" can create use of compressed gas, as against the gas-oxygen explosions of internal-combustion models, to push its engine's pistons. Zero Pollution Motors (ZPM) (USA) [1] conjointly expects to provide the world's 1st air-powered automobile for the US by 2010. Associate degree earlier version of the automobile is clattering and slow, and a small bit cumbersome then again this vehicle won't be competitive with a Ferrari or Rolls Royce and also the makers also are not seeking to develop a Formula One version of the vehicle. The aim of air supercharged vehicles is that the urban motorist: delivery vehicles, taxi drivers, and people UN agency simply use their vehicles to nip dead set the outlets. The newest air automobile is alleged to possess come back on leaps and bounds from the first model. It's same to be a lot of quieter, a high speed of one hundred ten km/h (65 mph), and a spread of around two hundred kilometre before you would like to fill the tanks up with air.

V. ADVANTAGES

In comparison to petrol or diesel powered vehicles "air powered vehicles" have following advantages:

- Air, on its own, is non-flammable, abundant, economical, mobile, storable and, most importantly, nonpolluting.
- compressed gas technology reduces the price of car production by concerning two hundredth, as a result of there's no have to be compelled to build a cooling system, fuel tank, spark plugs or silencers.
- High torsion for minimum volume.
- The mechanical style of the engine is easy and strong.
- Low manufacture and maintenance prices furthermore as straightforward maintenance.

- Lighter vehicles would mean less abuse on roads, thus, leading to longer lasting roads.
- the worth of supply air battery-powered vehicles are going to be considerably cheaper than current fuels.
- once the air is being compressed at cheap speeds, it heats up. the warmth given off throughout compression may well be rescued for house heating or water heating, or utilized in a stirling engine.
- Transportation of the fuel wouldn't be needed as a result of attractiveness off the electrical grid. This presents transportation would be eliminated. Compressed-air vehicles square measure comparable in many ways even to electrical vehicles and their potential benefits over electrical vehicles embrace.
- Compressed-air vehicles square measure free by the degradation issues related to current battery systems.
- very like electrical vehicles, air battery-powered vehicles would ultimately be battery-powered through the electrical grid that makes it easier to specialise in reducing pollution from one supply, as critical the a lot of vehicles on the road.
- Compressed-air tanks will be disposed of or recycled with less pollution than batteries.
- The tank is also able to be refilled additional usually and in less time than batteries will be recharged, with supplying rates corresponding to liquid fuels.
- The tanks utilized in a compressed gas motor have a extended period as compared with batteries, which, when a minute suffer from a discount in performance.

VI. DISADVANTAGES

Disadvantages of compressed-air vehicles square measure less accepted, since the vehicles square measure presently at the pre-production stage and haven't been extensively tested by freelance observers. Some bottlenecks of technology is also summarized as:

- little or no is understood regarding air power-driven vehicles so far.
- compressed gas vehicles seemingly are going to be less strong than typical vehicles of these days. that poses a danger to users of compressed gas vehicles sharing the road with larger, heavier and a lot of rigid vehicles.
- compressed gas features a low energy density reminiscent of the values of chemistry lead-acid batteries. whereas batteries will somewhat maintain their voltage throughout their discharge and chemical fuel tanks offer an equivalent power densities from the primary to the last l, the pressure of compressed gas tanks falls as air is drawn off.
- once the air is distended within the engine, it'll quiet down via adiabatic cooling and lose pressure therefore its ability to try to to work colder temperatures. it's troublesome to take care of or restore the air temperature by merely employing a device with close heat at the high flow rates employed in a vehicle, therefore the best isogram energy capability of the tank won't be complete. Cold temperatures also will encourage the engine to ice over.

VII. CONCLUSION

Compressed air for vehicle is already being explored and currently air power-driven vehicles ar being developed as a additional fuel-efficient means that of transportation. Some automobile corporations ar any exploring compressed gas hybrids and compressed fluids to store energy for vehicles which could purpose the manner for

International Conference On Emerging Trends in Engineering and Management Research

NGSPM's Brahma Valley College of Engineering & Research Institute, Anjaneri, Nashik(MS)

(ICETEMR-16)

23rd March 2016, www.conferenceworld.in

ISBN: 978-81-932074-7-5

the event of a value effective air power-driven vehicles style. sadly there ar still serious issues to be sorted out before air power-driven vehicles become a reality for common use however there's a hope that with the event in science & technology well supported by the environmental aware perspective and wish to switch pricey transportation ways, air-powered vehicles will certainly see the sunshine of the day.

REFERENCES

- [1] Sullivan, M. World's initial Air-Powered Car: Zero Emissions by Next Summer, fashionable Mechanics http://www.popularmechanics.com/automotive/new_cars/4217016.html (June 2008 issue),
- [2] Harley, M.; Ford, G.M. Considering Joint Engine Development, <http://www.autoblog.com/2008/08/04/ford-gm-considering-jointengine-development>, (accessed Aug 2008).
- [3] From Wikipedia, the Free reference book. Compressed-Air automobile, http://en.wikipedia.org/wiki/Air_car (accessed June 2008).
- [4] Russell, C. The Air automobile becomes a Reality, <http://cambrown.wordpress.com/2007/03/27/the-air-car-becomes-a-reality/> (accessed might 2007).
- [5] Hamilton, T. Technology Review, The Air automobile Preps for Market, <http://www.technologyreview.com/Energy/20071> (accessed Gregorian calendar month 2008).
- [6] Bonser, K., HowStuffWorks, however Air-Powered Cars can Work, <http://auto.howstuffworks.com/air-car.htm> (accessed June, 2008).
- [7] Haliburton, M.-S. Pure Energy Systems News, Engineair's Ultra- economical Rotary Compressed-Air Motor, http://pesn.com/2006/05/11/9500269_Engineair_Compressed-Air_Motor/ (accessed June, 2008).
- [8] Richard, M.G. The Air-Powered bike by Jaish-e-Muhammad Stansfield, <http://www.instructables.com/id/Air-powered-bicycle> (accessed Gregorian calendar month 2008).
- [9] Chen, P.X. Researchers Develop Air-powered bike, <http://blog.wired.com/gadgets/2008/08/air-powered-mot.html> (accessed August 2008).