DOWNLOAD PDF AIR DRIVEN ENGINE PROJECT

Chapter 1 : How the Air Car Works | HowStuffWorks

This Air Driven Engine project introduces the Air Driven Engine which is an engine that monitors with compressed air. It is an eco-friendly which makes use of expansion of compressed air to control the engine pistons.

The invention has the capacity to revolutionise transportation, plus offer a multitude of energy-saving benefits in stationary applications. The engine has no emissions, is very quiet, has constant high torque, a low parts count, no vibration and is very efficient - only 1 PSI of pressure is needed to overcome the friction to enable movement. As my engineering business was doing okay, I was able to spend more time on the idea and with each new prototype the design has been refined. Since then, six prototypes have been built, each more efficient, more powerful and lighter than the previous one. In he migrated to Australia where he established a construction engineering company. From his early experience with Wankel rotary engines, Angelo became interested in developing a more efficient engine than the traditional reciprocating internal combustion engine, and he has worked on various alternative concepts intermittently over the last 30 years. Recognising the potential of his invention Di Pietro decided to fully focus on the development of the new motor concept. The principle worked with the first prototype and, although not built to fine engineering tolerances, its performance far exceeded expectations. Engineair Pty Ltd http: In the first 2 years the company focused on developing prototype models to test the concept and understand the performance characteristics. Current development status shows performance and efficiency to be superior over state of the art air motor technology. The project will run over enabling CityWide to test the vehicle under different environmental conditions. Engineair has already successfully tested the powerplant in a roadgoing passenger car, a go-kart, a boat and as the power source for a utility vehicle for use in the Melbourne Fruit and Vegetable market, the latter project in conjunction with the Melbourne Market Authority. The Di Pietro motor concept is based on a rotary piston. Different from existing rotary engines, the Di Pietro motor uses a simple cylindrical rotary piston shaft driver which rolls, without any friction, inside the cylindrical stator. The space between stator and rotor is divided into six expansion chambers by pivoting dividers. These dividers follow the motion of the shaft driver as it rolls around the stator wall. The cylindrical shaft driver, forced by the air pressure on its outer wall, moves eccentrically, thereby driving the motor shaft by means of two rolling elements mounted on bearings on the shaft. The rolling motion of the shaft driver inside the stator is cushioned by a thin air film. Timing and duration of the air inlet and exhaust is governed by a slotted timer which is mounted on the output shaft and rotates with the same speed as the motor. Variation of performance parameters of the motor is easily achieved by varying the time during which the air is allowed to enter the chamber: A longer air inlet period allows more air to flow into the chamber at high pressure and therefore results in more torque. A shorter inlet period will limit the air supply and allows the air in the chamber to perform expansion work at a much higher efficiency. In this way compressed air energy consumption can be exchanged for higher torque and power output depending on the requirements of the application. Motor speed and torque are simply controlled by throttling the amount or pressure of air into the motor. The Di Pietro motor gives instant torque at zero RPM and can be precisely controlled to give soft start and acceleration control.

Chapter 2 : Air Driven Engine Mechanical Engineering Final Year Project Report | Projects

Abstract. The Air Driven Engine is an eco-friendly engine which operates with compressed air. An Air Driven Engine uses the expansion of compressed air to drive the pistons of an engine An Air Driven Engine is a pneumatic actuator that creates useful work by expanding compressed air.

Compressed air tank The tanks must be designed to safety standards appropriate for a pressure vessel , such as ISO The fiber materials are considerably lighter than metals but generally more expensive. Metal tanks can withstand a large number of pressure cycles, but must be checked for corrosion periodically. One company stores air in tanks at 4, pounds per square inch about 30 MPa and hold nearly 3, cubic feet around 90 cubic metres of air. In bar containers, about 0. While batteries can somewhat maintain their voltage throughout their discharge and chemical fuel tanks provide the same power densities from the first to the last litre, the pressure of compressed air tanks falls as air is drawn off. A consumer-automobile of conventional size and shape typically consumes 0. Where low emissions sources are available, net production of pollutants can be reduced. Emission control measures at a central generating plant may be more effective and less costly than treating the emissions of widely dispersed vehicles. Since the compressed air is filtered to protect the compressor machinery, the air discharged has less suspended dust in it, though there may be carry-over of lubricants used in the engine. The car works when gas expands. History[edit] Gotthardbahn: Pneumatic Locomotive with attached pressure container. During the construction of the Gotthardbahn from to , pneumatic locomotives were used in the construction of the Gotthard Rail Tunnel and other tunnels of the Gotthardbahn. In , the Liquid Air Company located in London England manufactured a number of compressed-air and liquified-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. This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. March Learn how and when to remove this template message 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. Which makes it easier to focus on reducing pollution from one source, as opposed to the millions of vehicles on the road. This presents significant cost benefits. Pollution created during fuel transportation would be eliminated. The price of filling air powered vehicles is significantly cheaper than petrol, diesel or biofuel. If electricity is cheap, then compressing air will also be relatively cheap. The principal disadvantage is the indirect use of energy. Energy is used to compress air, which â€” in turn â€” provides the energy to run the motor. Any conversion of energy between forms results in loss. For conventional combustion motor cars, the energy is lost when oil is converted to usable fuel â€” including drilling, refinement, labor, storage, eventually transportation to the end-user. For compressed-air cars, energy is lost when electrical energy is converted to compressed air, and when fuel, whether coal, natural gas or nuclear, is burned to drive the electrical generators. The heating is necessary in order to obtain a significant fraction of the theoretical energy output. The heat exchanger can be problematic. While it performs a similar task to the Intercooler , the temperature difference between the incoming air and the working gas is smaller. In heating the stored air, the device gets very cold and may ice up in cool, moist climates. Refueling the compressed-air container using a home or low-end conventional air compressor may take as long as 4 hours, while the specialized equipment at service stations may fill the tanks in only 3 minutes. SCUBA tanks are sometimes immersed in water to cool them down when they are being filled. That would not be possible with tanks in a car and thus it would either take a long time to fill the tanks, or they would have to take less than a full charge, since heat drives up the pressure. However, if well insulated, such as Dewar vacuum flask design, the heat would not have to be lost but put to use when the car was running. Early tests have demonstrated the limited storage capacity of the tanks; the only published test of a vehicle running on compressed air alone was limited to a range of 7. Possible improvements[edit] Compressed-air vehicles operate according to a thermodynamic process because air cools down when expanding and heats up when

being compressed. Since it is not practical to use a theoretically ideal process, losses occur and improvements may involve reducing these, e. At the other end, the heat produced during compression can be stored in water systems, physical or chemical systems and reused later. It may be possible to store compressed air at lower pressure using an absorption material within the tank. Absorption materials like Activated carbon , [14] or a metal organic framework [15] is used for storing compressed natural gas at psi instead of psi, which amounts to a large energy saving. Vehicles[edit] Compressed-air locomotive used in boring the Rove canal tunnel in France This section needs to be updated. Please update this article to reflect recent events or newly available information. February Main article: The company is seeking partners to utilise its engine. While their design was simple https: Peugeot says the new hybrid system should get up to miles per gallon of gas. Models should roll out as early as The head of the project left Peugeot in and in the company said it had been unable to find a partner to share the development costs, effectively ending the project. Rin" named air-compressed three-wheeler vehicle was created by Toyota in The speciality about this vehicle is it has registered a record-breaking highest speed This car was developed by the companies "Dream car workshop". This car is nicknamed as "sleek rocket", or "pencil shaped rocket". In Nantes and Paris such trams ran in regular service for 30 years. Historically certain torpedoes were propelled by compressed-air engines.

Chapter 3 : Modular_1 Compressed Air Engine Free Plans

ABSTRACTThe Air Driven Engine is an eco-friendly engine which operates with compressed air. AnAir Driven Engine uses the expansion of compressed air to drive t Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising.

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Chapter 4 : Pneumatic Powered Air Engine | NevonProjects

Driven Engine uses the expansion of compressed air to drive the pistons of an engine An Air Driven Engine is a pneumatic actuator that creates useful work b expanding compressed air.

There is no mixing of fuel with air as there is no combustion. 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 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 There is no combustion taking place in an Air Driven Engine. So naturally there is no need for the spark plug. So the spark plug is removed from its respective position that is on the top of cylinder head. It would be great if we provide the inlet for compressed air at the position of the spark plug as it is better to let the air enter from the top of the piston. So the connector which is used to connect the pipe from the compressed air tank has to be fixed at the position of the spark plug. So we tapped the same thread on the cylinder head at the position of the spark plug. Then the suitable connector was fixed on the cylinder head. For starting; the engine is cranked by the kicker. This will rotate the crankshaft along with the valve timing disk in the clockwise direction. When the IR beam is first cut by ODC region, the circuit activates the solenoid valve by electric signal. At the moment the valve gets opened and allows the flow of compressed air into the cylinder from the tank through the piping system. So all the way long the circuit maintains the solenoid valve open by supplying a continuous supply of electric current to the valve. At the same time the compressed air from the tank continues to fill in the cylinder there by pushing the piston further towards the bottom dead centre BDC. But to increase the fuel efficiency the fuel supply should be cut-off before reaching the EPO. This will cut the supply to the solenoid valve there by closing the valve. This will prevent the valve from being open at the same time of EPO; increasing efficiency. And this cycle continue.

Chapter 5 : Compressed-air vehicle - Wikipedia

When a gas is compressed to a small volume the energy is stored, when it expands the work is done by releasing the energy stored. In the same manner, the air.

Compressed air engine Compressed air cars are powered by motors driven by compressed air , which is stored in a tank at high pressure such as 31 M Pa psi or bar. Rather than driving engine pistons with an ignited fuel-air mixture, compressed air cars use the expansion of compressed air, in a similar manner to the expansion of steam in a steam engine. There have been prototype cars since the s, with compressed air used in torpedo propulsion. Carbon-fiber tanks safely hold air at a pressure somewhere around psi, making them comparable to steel tanks. The cars are designed to be filled up at a high-pressure pump. In compressed air vehicles tank designs tend to be isothermal; a heat exchanger of some kind is used to maintain the temperature and pressure of the tank as the air is extracted. Energy density[edit] Compressed air has relatively low energy density. The energy density of a compressed air system can be more than doubled if the air is heated prior to expansion. In order to increase energy density, some systems may use gases that can be liquified or solidified. However, most air cars have petrol engines for different tasks. The emission can be compared to half of the amount of carbon dioxide produced by a Toyota Prius being around 0. Some engines can be fueled otherwise considering different regions can have very different sources of power, ranging from high-emission power sources such as coal to zero-emission power sources. A given region can also change its electrical power sources over time, thereby improving or worsening total emissions. However, a study showed that even with very optimistic assumptions, air storage of energy is less efficient than chemical battery storage. Refueling may be done at home, [4] but filling the tanks to full pressure would require compressors for bars, which are not normally available for home standard utilization, considering the danger inherent at these pressure levels. As with gasoline, service stations would have to install the necessary air facilities if such cars became sufficiently popular to warrant it. Compressed air engines reduce the cost of vehicle production, because there is no need to build a cooling system, spark plugs, starter motor, or mufflers. The rate of self-discharge is very low opposed to batteries that deplete their charge slowly over time. Therefore, the vehicle may be left unused for longer periods of time than electric cars. Expansion of the compressed air lowers its temperature; this may be exploited for use as air conditioning. Disadvantages[edit] The principal disadvantages are the steps of energy conversion and transmission, because each inherently has loss. For combustion engine cars, the energy is lost when chemical energy in fossil fuels is converted by the engine to mechanical energy. When air expands in the engine it cools dramatically and must be heated to ambient temperature using a heat exchanger. The heating is necessary in order to obtain a significant fraction of the theoretical energy output. The heat exchanger can be problematic: In heating the stored air, the device gets very cold and may ice up in cool, moist climates. This also leads to the necessity of completely dehydrating the compressed air. If any humidity subsists in the compressed air, the engine will stop due to inner icing. Removing the humidity completely requires additional energy that cannot be reused and is lost. At 10g of water per m3 air -typical value in the summer- you have to take out g of water in 90 m3; with a vaporization enthalpy of 2. Moreover, dehydrating can only be done with professional compressors, so that a home charging will completely be impossible, or at least not at any reasonable cost. Conversely, when air is compressed to fill the tank, its temperature increases. If the stored air is not cooled while the tank is being filled, then when the air cools off later, its pressure decreases and the available energy decreases. To mitigate this, the tank may be equipped with an internal heat-exchanger in order to cool the air quickly and efficiently while charging. Alternatively, a spring may be used to store work from the air as it is inserted in the tank, thus maintaining a low pressure difference between the tank and recharger, which results in a lower temperature raise for the transferred air. A University of Berkeley Research Letter found that "Even under highly optimistic assumptions the compressed-air car is significantly less efficient than a battery electric vehicle and produces more greenhouse gas emissions than a conventional gas-powered car with a coal intensive power mix. This engine emits carbon dioxide. Crash safety[edit] Safety claims for light weight vehicle air tanks in severe collisions have not been verified. North

American crash testing has not yet been conducted, and skeptics question the ability of an ultralight vehicle assembled with adhesives to produce acceptable crash safety results. He insists that the millions of dollars invested in the AirCar would not be in vain. To date, there has never been a lightweight, plus mpg car which passed North American crash testing. Technological advances may soon make this possible, but the AirCar has yet to prove itself, and collision safety questions remain. This pushes the design towards minimizing weight. According to a report by the U. This is twice the fatality rate of the safest vehicle class, a "large car". According to the data in this report, the number of fatal crashes per mile is only weakly correlated with the vehicle weight, having a correlation coefficient of just A stronger correlation is seen with the vehicle size within its class; for example, "large" cars, pickups and SUVs, have lower fatality rates than "small" cars, pickups and SUVs. This is the case in 7 of the 10 classes, with the exception of mid-size vehicles, where minivans and mid-size cars are among the safest classes, while mid-size SUVs are the second most fatal after very small cars. Even though heavier vehicles sometimes are statistically safer, it is not necessarily the extra weight that causes them to be safer. Their longer hoods and extra space in the occupant compartment provide an opportunity for a more gradual deceleration of the vehicle, and of the occupant within the vehicle Developers and manufacturers[edit] Various companies are investing in the research, development and deployment of Compressed air cars. Overoptimistic reports of impending production date back to at least May For instance, the MDI Air Car made its public debut in South Africa in , [18] and was predicted to be in production "within six months" in January Most of the cars under development also rely on using similar technology to low-energy vehicles in order to increase the range and performance of their cars. Tata Motors announced in May [24] that they have assessed the design passing phase 1, the "proof of the technical concept" towards full production for the Indian market. Tata has moved onto phase 2, "completing detailed development of the compressed air engine into specific vehicle and stationary applications". Tim Leverton, president and head at Advanced and Product Engineering at Tata revealed was at a point of "starting industrialisation" with the first vehicles to be available by The company is seeking commercial partners to utilise its engine. PSA Peugeot Citroen has put an indefinite hold on the development of its promising-sounding Hybrid Air powertrain, apparently because the company has been unable to find a development partner willing to split the huge costs of engineering the system.

Chapter 6 : Significant new rotary engine design runs on compressed air

Air Engine: Inspire the next generation of engineers, challenge their ability and push the boundaries of what they thought a 13year old can make and challenge what you think a teacher can teach! This is a project I run in my after school engineering club, no.

Chapter 7 : Air Engine | Mechanical Project Topics

If you're looking for a simple engine to build that runs on compressed air, here's a nice set of plans for you. Here's what Rob had to say about his plans: "This was the semester long project we did in class for Machine Tool Technology at the University of Central Missouri.

Chapter 8 : New Project: Plans for a Simple Air Engine - Projects In Metal, LLC

A compressed-air vehicle (CAV) is a transport mechanism fueled by tanks of pressurized atmospheric gas and propelled by the release and expansion of the gas within a Pneumatic motor.

Chapter 9 : Air Driven Engine | Mechanical Project Topics

It is % more efficient than any other air powered engine built. The project will run over enabling CityWide to test the vehicle under different environmental conditions.