New design for motorcycle engines powered by compressed air

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Most motorcycles in the world today use engines that burn gasoline, contributing to greenhouse gasses and adding air pollution to the surrounding area. Now two scientists in India have conceptually designed a new, cleaner motorcycle engine that uses compressed air to turn a small air turbine, generating enough power to run a motorcycle for up to 40 minutes.

Their design, described in a recent issue of the Journal of Renewable and Sustainable Energy, could be combined with a compressed air cylinder as a replacement for traditional internal

combustion engines. In areas where motorcycles are a major source of public transportation, such a technology could cut emissions substantially if widely implemented.

According to Bharat Raj Singh, one of the two authors on the paper and a researcher at the SMS Institute of Technology in Lucknow, India, some 50 to 60 percent of present emissions in some areas could be reduced with the new technology, though a number of technical challenges remain. Designing a compact but high-capacity air tank to store sufficient "fuel" for long rides is a major hurdle. Existing tanks would require someone to stop about every 30 km (19 mi) to swap tanks.

The article, "Study of the influence of vane angle on shaft output of a multivane air turbine" by Bharat Raj Singh and Onkar Singh was published May 6, 2010 in the *Journal of Renewable and Sustainable Energy*. See: http://jrse.aip.org/jrsebh/v2/i3/p033101_s1

… Faster consumption of hydrocarbon fuel in the transport sector is posing global threat of depletion of fossil fuel reserves. Studies are being extensively done to search for an alternative energy source and/or to find out appropriate energy conversion system. Among various alternatives, the use of compressed atmospheric air in air turbine is an attractive option provided the atmospheric air is compressed by natural sources such as sun energy, wind energy, etc. It has the capability to produce shaft work with almost zero pollution in the environment. This paper details the mathematical modeling of a small capacity compressed air driven multivane air turbine. The effect of having different vane angles and inlet pressure on shaft work output has been studied and analyzed here. The study shows that the flow work has significant contribution in total work output and varies from 1.5% to 16.3% at different pressures, 2–6 bars, and injection angles, 30°–60°. The total shaft work is found to be maximum at vane angle $\theta = 36°$ (ten vanes) when injection angle is kept at 60°, and it reduces at vane angle $\theta = 45°$ (eight vanes) when injection angle is kept at 45° and further goes down at vane angle $\theta = 60°$ (six vanes) when injection angle is 30°, if injection pressure is maintained at 6 bars and speed of rotation at 2500 rpm. …

via New design for motorcycle engines powered by compressed air.

Industrial designer Edwin Yi Yuan is hinting toward a future where compressed air would be used as a primary fuel in vehicles such as motorcycles and bikes. The air-powered engine has been lurking around for years with Zero Pollution Motors working to launch air-powered cars soon. The idea does seem fantastic, as air-powered vehicles don't harm the environment with greenhouse gas emissions and above all, air is cheap and readily available. However, most air-powered engines fail in two ways – either the operating range is no long enough or the speed of the vehicle is too low. Edwin, accompanied by a team of student designers and their lecturer, has designed a concept air-fueled bike that possibly removes all obstacles associated with air-fueled vehicles. The motorcycle, known as Green Speed Air Powered Motorcycle, is based on an old Suzuki GP100 from the 1970s. The designers removed pretty much everything on the original bike, the petrol tank, the engine, gear box, etc., and just used the frame of the bike, its wheels and brakes.

The engine that used is a rotary air engine. It is the invention of the Melbourne engineer Angelo Di Pietro. The engine is compact, lightweight and powerful and runs on compressed air from two compressed air tanks on the bike. It revs up to 10,000 RPM, and because of this the inventors didn't need any gear box on the bike. There is only one gear, which is just a sprocket bolted directly to the axis of the engine and chained to the rear wheel.

Compressed air is stored in the bike's on-board carbon fiber tanks. Once mass produced, the bike will have solar panels that will generate enough energy to compress air and store it in the bike's tanks, which will increase its range indefinitely. …

via Eco Bikes