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Original Research Paper

Engineering

PNEUMETIC POWERED TWO WHEELER

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ABSTRACT This project is design, fabrication and development of a design and fabrication of pneumatic bicycle it is rear wheel drive. The conceptual design of this model is taken from manually operated bicycle. The complete body looks like a bicycle in which manual operation followed .this product is a pneumatic vehicle, useful for handicapped people, and also normal persons. The power transmission takes place from rear wheel through chain drive. The entire arrangement of power transmission by means of connecting rod of the actuator is taken along with the chain sprocket. When the cylinder is connected to, it would give a driving force due the pressure at which air is sent. Only one person is allowed on the bicycle at any time. The material, mild steel is choose as a main structure fastening by joint, and main components of this project is , air cylinder, solenoid valve, electrical control unit, pneumatic actuator, power transmitting chain, sprocket wheel, two wheeler rear wheel components of model attach by welding, part by part create then be fabricating together. At the end of the project, the model is tested by several people and their comment then being recorded and performed some tests. The concept of compressed air bicycle in practice reduces the air pollution to large extend as its exhaust is nothing but air.

KEYWORDS : bicycle, solenoid valve, mildsteel, power transmission, cylinder, compressed air.

LITERATURE REVIEW The simplicity in design, durability and compact size of pneumatic systems make them well suited for mobile applications. Pneumatic control system plays very important role in industrial system owing to the advantages of low cost, easy maintenance, cleanliness, readily available, and cheap source, etc. [1]. A particularly well suited application for vehicle operating on compressed air is material handling and for visitors in industry. Compressed air storage energy (CASE) is a promising method of energy storage, with high efficiency and environmental friendliness [2].The moped has top speed of about 18 mph and could go 7 miles before its air pressure ran out .An inventor, JemStansfield, has been able to convert a regular scooter to a compressed air moped [3]. Behavior of compressed air Compressed air is clean, safe, simple and efficient. There are no dangerous exhaust fumes of or other harmful by products when compressed air is used as a utility. It is a noncombustible, non-polluting utility. When air at atmospheric pressure is mechanically compressed by a compressor, the transformation of air at 1 bar (atmospheric pressure) into air at higher pressure (up to 414 bar) is determined by the laws of thermodynamics. They state that an increase in pressure equals a rise in heat and compressing air creates a proportional increase in heat. Boyle's law explains that if a volume of a gas (air) halves during compression, then the pressure is doubled. Charles' law states that the volume of a gas changes in direct proportion to the temperature [4].the air expands outward with so much energy that the balloon explodes. Compressing a gas into a small space is a way to store energy. When the gas expands again, that energy is released to do work. That's the basic principle behind what makes an air cargo[5]. in which the importance of the impact of the fossil fuels in the present and future generations is explained which led them to design a new vehicle which runs by renewable energy sources. Compressed air vehicle are more suitable for low speed, short range and flammable environment [6, 7].The first compressed-air vehicle was devised by Bompas, a patent for a locomotive being taken out in England in 1828. There were two storage tanks between the frames, with conventional cylinders and cranks. It is not clear if it was actually built

Summary of literature review

Sl. No	Points discussed [Researcher, year]	Recommendations	Remarks
1.	Delivery Pressure [John (1995), Bill Howe and Bill Scales (1998), Durmus Kaya et al (2002), Dan Howett (2003), Richard (2004), Asfaw (2005)].	Reduction of delivery pressure can reduce the energy consumption	General methodology to identify the lowest possible delivery pressure and minimum operating pressure bandwidth is hardly available.
2.	Air receivers [Werner and Kurt (1975), Meixner and Kobler (1978), NCDENR (2004), Majumdar (2006)]	Air receivers are used to smoothen the fluctuations and its size depends on consumption, compressor output and control strategy	Focus on the effect of air receiver on energy consumption is found to be rare

3.	Compressor control [John (1995), Wojciech (1996) Bill Howe and Bill Scales (1998), Robert (1999), Gary (1999), Joseph (2002) Chiristina et al (2003)]	Compressor control system affects the performance considerably; maximum possible efficiency cannot be accomplished by a simple controller	Methods to control the compressors for varying load and uncertain variations in load are found to be rare.
4.	Drive systems, VFD [Vern (2000), Elie (2002), Mark (2002), Durmus Kaya et al (2002), Michael (2003), Ibrahim and Engin (2004), Reimund (2005)]	Selection of drive is important. Each drive system is advantageous only under certain conditions	VFD is advantageous for narrow range of loads.
5.	Managerial approach for energy conservation [Jay Stein (1996), Khemri-Enit and Annabi (1996), John (1998), Hans-Dieter and Eberhard (1998), Felipe and Nicolás (1998), Paresh (1998), Grimaldi et al (2000), George (2001), Peter and Edgar (2001) Asfaw (2005), Gopalakrishnan et al (2005)]	Management approach is required in implementation of energy saving programmes. Benchmarking of energy consumption is needed. Some managers not aware of the energy conservation potentials in compressed air systems.	A comprehensive methodology for implementation of energy conservation efforts in industries hardly exists
6	Fuzzy logic system [Mamdani and Assilina (1975), Sugeno (1999), Chen et al (2000), Chen et al (2000), Wei and Tapio (2002), Cho and Yi (2004), Liang et al (2004), Srinivasa Rao and Srikant (2004), Ljiljana and Mahroo (2004), Boada et al (2006)]	Fuzzy logic system is suitable for problems with uncertainty. Effectively used in several applications	Usage of fuzzy logic system for energy conservation in air compressor systems is found to be rare
7.	Target costing (TC) [Yutaka (1993), Takeyuki (1995), Jiigren and Richard (1998),Lisa (2002), Gopalakrishnan et al (2004), Hsin-Hung Wu (2003; 2004), Ugo and Paulo (2007)]	TC is a useful tool to achieve effective cost control. Used for various applications other than cost control of new products	Application of TC approach for energy conservation in compressed air system is to be attempted
8	Reengineering [Michael and James (1993), Lyu (1996), Love and Gunasekaran (1997), Tor (1999), Peter and Amrik (1999), Mohanty and Deshmuk (2001), Zainul Huda (2005)]	Fundamental rethinking and redesign of existing system. It is applied to several requirements	Application of RE for energy conservation in compressed air supply system is yet to be applied

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