International Journal of Research in Engineering, Science and Management
Volume-1, Issue-7, July 2018
www.ijresm.com ISSN (Online): 2581-5782

A Study and Working on Electric Vehicle

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***Abstract*: Fully electric vehicles are being introduced to the passenger car market in addition to the already popular hybrid vehicles. There are existing and proposed standards for the design of these vehicles to reduce the risk of occupants and rescue personnel being exposed to hazards such as corrosive chemicals, toxic fumes, fire and electric shock in the event of a crash. Some manufacturers are understood to be working with rescue organizations to develop appropriate procedures for dealing with these crashes. New Car Assessment Programs (NCAPs) have subjected several petrol-electric hybrid vehicles to the 64km/h frontal offset crash test, 50km/h barrier side impact test and the 29km/h side pole test. No problems with the electrical systems or batteries were encountered. These tests have generally involved vehicles with lead acid or NiMH batteries. Lithium-ion batteries are becoming popular and these might introduce different hazards for crash-test and rescue personnel. In October 2010 a research crash test of an electric car with a Lithium-ion battery was conducted by Australasian NCAP and Japan NCAP. Additionally, Euro NCAP has also assessed a number of vehicles powered by Li-ion batteries. This paper reviews the safety hazards and outcomes associated with those tests and provides draft advice for crash test and rescue organizations.**

Key Words: NCAP, IR sensor

1. Introduction

An electric vehicle (EV), also referred to as an electric drive vehicle, uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels or a generator to convert fuel to electricity. EV's include road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.

EV's first came into existence in the mid-19th century, when electricity was among the preferred methods for motor vehicle propulsion, providing a level of comfort and ease of operation that could not be achieved by the gasoline cars of the time. The internal combustion engine (ICE) has been the dominant propulsion method for motor vehicles for almost 100 years, but electric power has remained commonplace in other vehicle types, such as trains and smaller vehicles of all types.

In the 21st century, EV's saw a resurgence due to technological developments and an increased focus on renewable energy. Government incentives to increase adoptions were introduced, including in the United States and the European Union.

2. Need for Automation

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation. The main advantages of all pneumatic systems are economy and simplicity. Automation plays an important role in mass production.

For mass production of the product, the machining operations decide the sequence of machining. The machines designed for producing a particular product are called transfer machines. The components must be moved automatically from the bins to various machines sequentially and the final component can be placed separately for packaging. Materials can also be repeatedly transferred from the moving conveyors to the work place and vice versa.

Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate. The manufacturing operation is being atomized for the following reasons.

- To achieve mass production
- To reduce man power
- To increase the efficiency of the plant
- To reduce the work load
- To reduce the production cost
- To reduce the production time
- To reduce the material handling
- To reduce the fatigue of workers
- To achieve good product quality

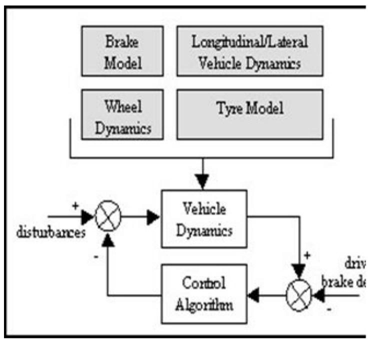

Fig. 1. Energy flow diagram of a solar car

3. Solar Energy Electricity

A. *An Overview*

A solar car is a vehicle, which is powered by sun's energy. A solar car is a light weight, low power vehicle designed and built with a single purpose in mind - racing. They have limited seating (usually one, sometimes two people), they have very little cargo capacity, and they can only be driven during the day. It does, however offer an excellent opportunity to develop future technologies that can be applied to practice applications. The Fig. 1, shows the energy flow diagram of a solar car. The main components of a solar car is its solar array, consisting of photovoltaic cells, which collect the energy from sun and convert it into usable electrical energy. The energy is passed either to the battery for storage, or to the motor to run the car, through a device called power tracker, which converts it into required voltage. The decision on whether to transfer to the motor or battery is made by a small onboard computer called the motor controller. It is responsible for sending the electricity smoothly to the motor when the accelerator is depressed, controlling the torque that goes to the motor such that the car maintains the desired speed.

Some cars also use a process called regenerative braking, which allows some of the kinetic energy stored in the vehicle's translating mass to be stored in the battery when the car is slowing down. A solar car is made up of many components that have been integrated together so that they work a single system. For the case of explanation it has been broken down into five primary systems: 1) Driver Control & Mechanical Systems 2) Electrical System 3) Drive train 4) Solar Array 5) Body and Chassis.

4. Sound Energy to Electricity

In physics, energy (from the Greek ἐνέργεια - energeia, & quot; activity, operation & quot; from ἐνεργός - energos, & quot; active, working is a quantity that can be assigned to every particle, object, and system of objects as a consequence of the state of that particle, object or system of objects. Different forms of energy include kinetic, potential, thermal, gravitational, sound, elastic, light, and electromagnetic energy. The forms of energy are often named after a related force. German physicist Hermann von Helmholtz established that all forms of energy are equivalent - energy in one form can disappear but the same amount of energy will appear in another form. Energy is subject to a conservation law. Energy is a scalar physical quantity. In the International System of Units (SI), energy is measured in joules, but in some fields other units such as kilowatt-hours and kilocalories are also used. Any form of energy can be transformed into another form. When energy is in a form other than heat, it may be transformed with good or even perfect efficiency, to any other type of energy. In all such energy transformation processes, the total energy remains the same. Energy may not be created nor destroyed. This principle, the conservation of energy, was first postulated in the early 19th century, and applies to any isolated system. According to Noether's theorem, the conservation of energy is a consequence of the fact that the laws of physics do not change over time. Although the total energy of a system does not change with time, its value may depend on the frame of reference. For example, a seated passenger in a moving airplane has zero kinetic energy relative to the airplane, but non-zero kinetic energy. Transformation of Energy One form of energy can often be readily transformed into another with the help of a device- for instance, a battery, from chemical energy to electric energy; a dam: gravitational potential energy to kinetic energy of moving water (and the blades of a turbine) and ultimately to electric energy through an electric generator. Similarly, in the case of a chemical explosion, chemical potential energy is transformed to kinetic energy and thermal energy in a very short time. Yet another example is that of a pendulum. At its highest points the kinetic energy is zero and the gravitational potential energy is at maximum. At its lowest point the kinetic energy is at maximum and is equal to the decrease of potential energy. If one (unrealistically) assumes that there is no friction, the conversion of energy between these processes is perfect, and the pendulum will continue swinging forever.

Energy gives rise to weight and is equivalent to matter and vice versa. The formula $E = mc^2$, derived by Albert Einstein (1905) quantifies the relationship between mass and rest energy within the concept of special relativity. In different theoretical frameworks, similar formulas were derived by J. J. Thomson (1881), Henri Poincaré (1900), Friedrich Hasenöhrl (1904) and others (see Mass energy equivalence). Since c^2 is extremely large relative to ordinary human scales, the conversion of ordinary amount of mass (say, 1 kg) to other forms of energy can liberate tremendous amounts of energy (~9×10^{16} joules), as can be seen in nuclear reactors and nuclear weapons. Conversely, the mass equivalent of a unit of energy is minuscule, which is why a loss of energy from most systems is difficult to measure by weight, unless the energy loss is very large.

Ground vehicles: (Plug-in electric vehicle) A plug-in electric vehicle (PEV) is any motor vehicle that can be recharged from any external source of electricity, such as wall sockets, and the electricity stored in the rechargeable battery packs drives or contributes to drive the wheels. PEV is a subcategory of electric vehicles that includes all-electric or battery electric vehicles (BEVs), plug-in hybrid vehicles, (PHEVs), and electric vehicle conversions of hybrid electric vehicles and conventional internal combustion engine vehicles. Cumulative global sales totalled over 1.5 million plug-in cars and utility vans by the end of May 2016. [44] As of June 2016, the world's top selling plug-in electric cars are the Nissan Leaf, with global sales of more than 228,000 units, followed by the all-electric Tesla Model S with about 129,400 units sold worldwide, the Chevrolet Volt plug-in hybrid, which together with its sibling the Opel/Vauxhall Ampere has combined global sales of about 117,300 units, the Mitsubishi Outlander P-HEV with about 107,400 units, and the Prius Plug-in Hybrid with over 75,400 units into matter (particles) are found in high energy nuclear physics. In nature, transformations of energy can be fundamentally classed into two kinds: those that are thermodynamically reversible, and those that are thermodynamically irreversible. A reversible process in thermodynamics is one in which no energy is dissipated (spread) into empty energy states available in a volume, from which it cannot be recovered into more concentrated forms (fewer quantum states), without degradation of even more energy. A reversible process is one in which this sort of dissipation does not happen. For example, conversion of energy from one type of potential field to another, is reversible, as in the pendulum system described above. In processes where heat is generated, quantum states of lower energy, present as possible excitations in fields between atoms, act as a reservoir for part of the energy, from which it cannot be recovered, in order to be converted with 100% efficiency into other forms of energy. In this case, the energy must partly stay as heat, and cannot be completely recovered as usable energy, except at the price of an increase in some other kind of heat-like increase in disorder in quantum states, in the universe (such as an expansion of matter, or a randomization in a crystal). As the universe evolves in time, more and more of its energy becomes trapped in irreversible states (i.e., as heat or other kinds of increases in disorder). This has been referred to as the inevitable thermodynamic heat death of the universe. In this heat death the energy of the universe does not change, but the fraction of energy which is available to do produce work through a heat engine, or be transformed to other usable forms of energy (through the use of generators attached to heat engines), grows less and less.

5. Conclusion

Thus as a whole the introduction of electric vehicles is going to reduce the burden posed by the use of exhaustive energy sources. The increase in efficiency is also going to make our environment free from various pollutants and is going to lead to minimal input cost of vehicular operations and design. Thus on a concluding note we would like to state that: “The future of energy efficient electric cars is really very bright.”

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