

Design and Fabrication on Model on Solar Train

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Abstract--- As we all know that technology is double edged weapon which can turn any situation either into a boon or bane. In recent years we are much familiar with the word “global warming”. Increase in the average temperature of the earth’s near surface air and the oceans. In this paper we are going to explain you about the largest financed domestic project by United Nations for the year 2014. The best way to control this is by efficient use of renewable energy and this is our stream of interest to use solar energy in driving railways which arises the concept of “Solar Train”. Implementing solar energy usage in addition conserves energy source to an extent solar panels fitted on roof of the train used to convert solar to electrical energy and using some technical methods to utilize that energy. The purpose of this research is to examine new solar technologies, in order to gain insight and full understanding regarding alternative energy. Both research ideas and implemented technology is elaborated on. Moreover, ethical issues surrounding this technology are presented and problems preventing its solution are uncovered. In conclusion, the efficiency of solar is challenged and basic statistics assist in this determination.

Keywords--- Solar Power, Alternative Energy, Trains, Tunnels, Average Cost, Average Energy Capacity, Harmful Carbon Dioxide Emissions.

I. INTRODUCTION

The amount of solar energy reaching the surface of the planet each year is twice the amount of energy that will be obtained forever from coal, oil, natural gas and mined Uranium. The ultimate source of much of the world’s energy is the sun, which provides the earth with light, heat and radiation. Since generation electricity directly from sunlight does not deplete among the earth’s natural resources and supplies the earth with energy continuously, solar energy is a renewable source of electricity generation. Solar energy is our earth primary source of renewable energy. To manufacture in expensive solar cells with the same efficiency as current technology. Although this new technology is only capable of supplying low power device with sufficient energy, its implication on society would still be tremendous.

The solar energy flux reaching the earth surface represents a few thousand times the current use of primary energy by humans. The potential of this resource is enormous and makes solar energy a crucial component of renewable energy. Portfolio aimed at reducing the global emissions of green house gasses into the atmosphere.

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Nevertheless, the current use of this energy resource represents less 1% of total electricity production from renewable source.

II. SOLAR POWER WORKING PRINCIPLE

Solar power generation system include: solar module (array), controller, batteries, inverters, lighting load that is composed of the user. Among them, the solar battery components and batteries for the power system, controller and inverter for the control and protection system, the load for the system terminals.

III. COMPONENTS

Solar Panel

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (PV) module is a packaged, connect assembly of typically 6×10 solar cells. Solar Photovoltaic panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions, and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module.



Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.



Battery

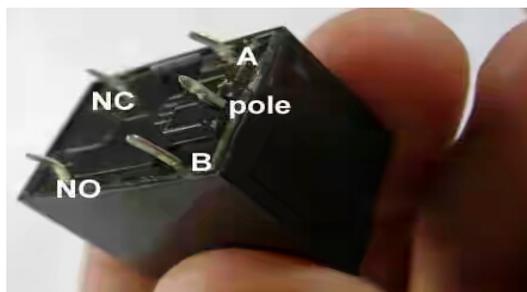
A battery is an electrochemical cell (or enclosed and protected material) that can be charged electrically to provide a static potential for power or released electrical charge when needed. A battery generally consists of an *anode*, a *cathode*, and an *electrolyte*.

Common types of commercial batteries and some of their characteristics and advantages are summarized in the following table. Battery types not shown include the Zinc-Air, Flooded Lead Acid, and Alkaline batteries



Locomotive Frame

A **locomotive frame** is the structure that forms the backbone of the railway locomotive, giving it strength and supporting the superstructure elements such as a cab, boiler or bodywork. The vast majority of locomotives have had a frame structure of some kind. The frame may in turn be supported by axles directly attached to it, or it may be mounted on bogies (UK) / trucks (US), or a combination of the two. The bogies in turn will have frames of their own.



Electronic Circuits Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches.

The relay's switch connections are usually labeled COM(POLE), NC and NO:

COM/POLE= Common, NC and NO always connect to this, it is the moving part of the switch.

NC = Normally Closed, COM/POLE is connected to this when the relay coil is not magnetized.

NO = Normally Open, COM/POLE is connected to this when the relay coil is MAGNETIZED and vice versa.



Wheel

A **train wheel** or **rail wheel** is a type of wheel specially designed for use on rail tracks. A rolling component is typically pressed onto an axle and mounted directly on a rail car or locomotive or indirectly on a bogie, also called a *truck*. Wheels are cast or forged (wrought) and are heat-treated to have a specific hardness. New wheels are trued, using a lathe, to a specific profile before being pressed onto an axle. All wheel profiles need to be periodically monitored to ensure proper wheel-rail interface. Improperly trued wheels increase rolling resistance, reduce energy efficiency and may create unsafe operation. A railroad wheel typically consists of two main parts: the wheel itself, and the tire (or *tyre*) around the outside. A rail tire is usually made from steel, and is typically heated and pressed onto the wheel, where it remains firmly as it shrinks and cools. Monobloc wheels do not have encircling tires, while resilient rail wheels have a resilient material, such as rubber, between the wheel and tire.

Diameter of Wheel-70MM.



Pinion

A **pinion** is a round gear used in several applications: usually the smaller gear in a gear drive train, although in the case of John Blenkinsop's Salamanca, the **pinion** was rather large. In many cases, such as remote controlled toys, the **pinion** is also the drive gear.

Diameter of Pinion-1) Big-70mm

2) Small-40mm

IV. CONCLUSION

This paper describes a simulation tool to assess the viability of the Heliantosolar train project. The whole infrastructure was modelled as a discrete events system (DES), represented by Petri nets, and a supervisory controller was designed for the whole system. The development of the simulation model addressed two main issues: the vehicle dynamics and the DES modelling. Two key toolboxes were used for these purposes, respectively, QSS and Net lab. The performance of the train is analyzed for multiple scenarios and evaluated based on energy consumption, travel time and speed achieved. The influence of variables such as weight and road gradient is studied, and conclusions are drawn for the maximum values allowed for these variables. Suitable constant acceleration and deceleration (when braking) are also studied aiming at minimizing the energy consumption and increasing regeneration.

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