DESIGNING OF SOLAR TRAIN USING MATLAB

Prof.(Ms) Shital Yende[1], Priyanka Gaurkhede[2], Rahul Dekate[3],
Nisha Raut[4], Shabnam Shaikh[5], Ankit Dange[6], Rounak Agrey[7], Ravina Waghmare[8]

[1234]*Assistant Professor, Department of Electrical Engineering. Suryodaya College of Engg. & Technology, Nagpur, Maharashtra, India,*

[5678] *UG Student, Department of Electrical Engineering. Suryodaya College of Engg. & Technology, Nagpur, Maharashtra, India,*

Abstract

We are currently experiencing a lead shortage in the electrical energy industry. The nonrenewable resources that we will use will be depleted, and renewable energy will be critical for the future. In addition, there is a battery shortage in the market, as well as a rise in fuel prices. The train is the most common mode of public transportation. The train requires the greatest amount of electric energy, but sometimes this energy is insufficient to meet all of the train's needs. As a result, we propose using solar energy in the train to modify the application of a standard train. Solar train technology is still in its early stages. The solar train principle is used to store energy in the battery during and after charging it with a solar panel. This concept will aid in the protection of fuel extenuation.

Keywords: *Track-Break,Train, etc.*

1. INTRODUCTION

Fossil fuels are in short supply, resulting in a fuel shortage and price increase. There is a need to reduce carbon emissions, and public transportation must be more environmentally friendly. A solar plane on the train's roof will provide much of the required power. The amount of solar train energy that reaches the planet's surface each year is roughly twice the amount of energy that can be obtained indefinitely from coal, natural gas, oil, and mined uranium. The sun, which provides the earth with light, heat, and radiation, is the ultimate energy source for much of the world. Because directly generating electricity from sunlight does not deplete any of the earth's natural resources while also supplying the earth's with Solar energy is a renewable source of electricity generation because it does not deplete any of the earth's natural resources while continuously supplying the earth with energy. Solar energy is a renewable source of electricity generation because it does not deplete any of the earth's natural resources while continuously supplying the earth with energy. The resource potential is enormous, making solar energy an important component of renewable energy, as well as a means of reducing the greenhouse effect.

The enormous amount of force required for the trains to run can also be made possible by using solar energy rather than current diesel. Considering the train to supply with solar energy is not a simple task, but we believe it is worthwhile. Despite the fact that there aren't many existing sunlight-controlled trains, they appear to be limited and non-specific. The wellness highlight will be the best execution for this thought, which is the ground-breaking recognition. This feature will be extremely beneficial to the public's health and will help to avoid major train mishaps. Divers can use the boards that are powered by the sun. The possibility of a sunlight-powered train can be realised by utilising the available sun-powered boards. The disadvantage that emerges is the significant force that should be given consistent capacity to the train's driving force to pull around 21 compartments appended with it or significantly more. As a result, there is a requirement for consistent ability to be furnished regardless of the climate, accessibility of force, or power of sunlight-based energy. The use of this thought for another train raises the cost of the thought and causes it to fall short financially. As a result, realising this idea for current trains will not complicate the speculation. Despite the fact that there is a lot of opportunity,

Despite the fact that there is a massive venture, there are also massive returns and reserve funds. The main and significant point is that it makes the train eco-friendly, which will help us reduce the scarcity of available fuel. Sun oriented trains are a cutting-edge way to get people to learn about solar energy while also supporting the eco-friendly force age framework

The installation of photovoltaic (PV) panels on existing train housetops has proven to be one of the most suitable large-scale sources of renewable energy for metropolitan trains. This is the first time in a long time that sunlight-based boards have been used as rail route framework. The train has a force backup and can operate on battery power for at least 72 hours. The solar panels generate approximately 17 units of force per day, which powers the lighting framework in the mentor. Railways are currently introducing sunlight-based boards on non-AC mentors. In the coming days, the rail routes hope to present nearly 50 more such mentors.

II LITERATURE

The main aim of this paper is to developed solar power at high speed passenger rail system. These paper is the research, present case to carry out research towards the development and commercialization a light weight solar railway system [1]. This paper gives an information about reduction of diesel consumption of the end of generating system. The paper estimated that one solar train coach can generate at least 18 KWh of electricity in a day, leading to an annual diesel saving of 1700 liters under ideal condition. The Indian railway operates 63.511 coaches and hence under ideal condition, it Can save around 108.5 million liter of diesel annually [2]. The battery driven light rail vehicle developed by railway technical research Institute consumes the electricity of 2.5kWh per kilometer. The charging device are also mounted on the railway system. When the railway stops at the station, Electricity is rapidly transmitted from the charging device of the station to the charging device of the railway. Electrical double layer capacitor are used as charging device. If required electric power can be supplied, It is feasible in the calculation to run the light rail only by renewable energy

We are experiencing a lead shortage in electrical energy. The non-sustainable sources that we will use deplete, and environmentally friendly power is critical for the future. We're also dealing with a battery shortage and an increase in fuel prices. The train is the mainstay of public transportation. Trains require the most extreme electric energy, but open electrical energy does not always meet all of their requirements. As a result, we propose using sunlight-based energy in trains to replace conventional trains. The development of a solar-powered train is still in its early stages..

There are a variety of advantages to embracing a star home framework. Aside from families, star home frameworks may provide support for resources, facilities, or small organisations. Having this fantastic stockpile of daylight for the duration of the night may also deter wild creatures from perilous territory or eat their harvests. They are used to replace fuel lights and candles that have been proven to be used for lighting. Purchasing fuel or possibly candles could be a daily cost that could be eliminated with a SHS.

 Furthermore, the exhaust produced by conventional lighting techniques is hazardous and can lead to long-term lung problems, particularly in children. In general, a family can use approximately three litres of fuel per month. Using these rheostat light sources for learning or crafting will strain the eyes and cause long vision issues. Having a framework allows adolescents to test and small businesses to continue working late into the evening. This increases the population's capacity to be free, raises their earnings, and allows them to begin to lift themselves out of poverty.. The proposed framework consists primarily of a solar-powered board, a battery, and a charge regulator. As the interest in power grows, so does the age of power, and the age of power is insufficient to meet the rapid growth of power interest.. So, by utilising this PV innovation, we will beautify the locations of destitute people for their turn of events. The proposed framework makes use of a sunlight-based board because it is more effective; when light strikes the outside of the board, we get 12V yield, which can be converted into 5V by a transformer IC; this 5V is used as a contribution to the charge regulator. The battery is charged using an electrical device with a charge regulator in the middle. The charge regulator protects the battery from tampering and overcharging. When the battery is charged, a direct current burden can be directly associated with the battery.
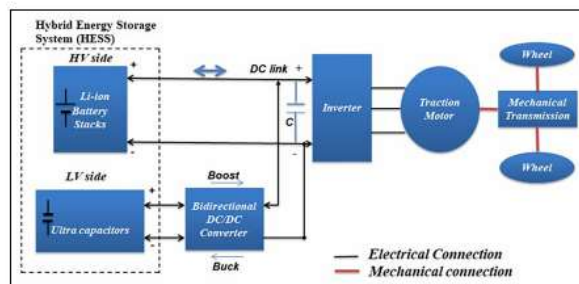
III SYSTEM ARCHITECTURE

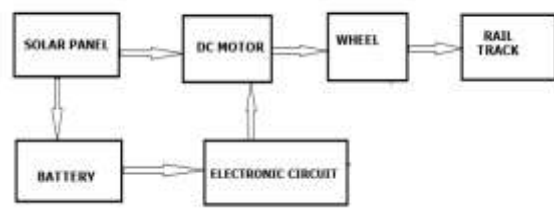Fig.1 MATLAB Model of Electric System of Locomotive Engine

Fig 2 Block Diagram of Overall system

Where the whole rooftop top of the train compartments are being introduced with sunlight based boards with the best creation so it consumes the restricted space and give the more yield.Introducing the boards on rooftop isn't adequate for the necessary ability to run the train.

.   IV   SYSTEM IMPLEMENTATION

The basic principle of solar train is to use energy that is stored in battery during and after charging it from a solar panel during sunlight. Solar array is made up of many photovoltaic solar cells that convert sun energy into electricity. The charged batteries are used to drive the motor which serves here as an engine and moves the train in forward direction. The power produce by the solar array varies depending on the whether the sun position in the sky and solar array itself. The PV cell is producing electricity— the flow of electrons. The produced current goes in the controller and controller regulates the current and charging battery. If a load such as a D. C. Motor load is placed along the battery and switch, the electricity will do work as it flows and then motor start rotating. For 4.5 kW a current on/off 6 poles switch is placed between the motor and solar panel for rotating the motor clockwise. Solar cell converts solar energy to electrical energy Energy saving in train: Suppose for train in India generally 20 coaches are used. With each coach fitted with 12 solar panels and one solar plate size is 17.6 square foot generated 250 watt.

Using 6 hours of full sun gives you this equation: =250 watt x 6 hours =1500 watt [1.5 kW] per day. Means one solar plate produces 1500 watt energy per day. =1500 x 12 panels = 180 watt. Means 18 kW power is produced in one coach. =18 kW x20 coaches =360 kW. So it's 360 kW total energy is generated per day

Advantages

1. Solar energy is renewable and freely available.

2. Fuel source for Solar Panel is direct and endless so no external fuels required.

 3. Unlimited life of Solar Modules, fast response and high reliability.

4. Pollution free.

5. Minimum Maintenance

 6. It can be installed and mounted easily with minimum cost.

7. Solar energy does not cause pollution.

 8. It provides zero% carbon emission

V Conclusion

At the moment, solar trains are used on a very small scale. Despite the fact that they have only been around for a few years, the technology is still in its early stagesAs a result, they cannot be used as a practical form of traction.So the conclusion is that the challenge is in making it a viable mode of transportation. More research is required in this area to improve solar panels, increase efficiency, reduce weight, improve reliability, and lower costs.Many semiconductors and their alloys are being studied in order to develop more efficient solar cells. As a result, this technology will undoubtedly live up to its potential at some point in the future.

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