Photo of subway vehicle energy storage device

The purpose of this facility would be to capture and reuse regenerative braking energy from subway trains, thereby saving energy and reducing peak demand. This chapter provides a ...

To make the most of regenerative braking energy, an energy-saving model with on-board energy storage devices was designed, to coordinately optimize train trip time and recommended speed profiles ...

Energy storage is nowadays recognised as a key element in modern energy supply chain. This is mainly because it can enhance grid stability, increase penetration of renewable energy resources ...

The simulation results show that the supercapacitor bank based on power, capacity and discharge depth can meet the requirement of braking energy recovery for subway vehicles and the economic evaluation of the project shows that the project will achieve good social and economic benefits. The on-board supercapacitor energy storage system for subway ...

The on-board supercapacitor energy storage system for subway vehicles is used to absorb vehicles braking energy. Because operating voltage, maximum braking current and discharge ...

Request PDF | Optimization of storage devices for regenerative braking energy in subway systems | The paper deals with the actual theme of power management in traction systems presenting a study ...

Corpus ID: 117421223; SUBWAY POWER SYSTEMS WITH MODERN SEMICONDUCTOR CONVERTERS AND ENERGY STORAGE DEVICES @article{Kholod2013SUBWAYPS, title={SUBWAY POWER SYSTEMS WITH MODERN SEMICONDUCTOR CONVERTERS AND ENERGY STORAGE DEVICES}, author={O. I. Kholod and D. V Tugay and Natalya ...

In fact, some traditional energy storage devices are not suitable for energy storage in some special occasions. Over the past few decades, microelectronics and wireless microsystem technologies have undergone rapid development, so low power consumption micro-electro-mechanical products have rapidly gained popularity [10, 11].The method for supplying ...

In this paper, a new energy storage system (ESS) is developed for an innovative subway without supply rail between two stations. The ESS is composed of a supercapacitor bank and a braking resistor.

The total energy conversion and storage efficiency, which is the ratio of the energy output from the energy-storage device to the energy input from the ambient environment, is the most important ...

Photo of subway vehicle energy storage device

Energy storage systems play a crucial role in the overall performance of hybrid electric vehicles. Therefore, the state of the art in energy storage systems for hybrid electric vehicles is discussed in this paper along with appropriate background information for facilitating future research in this domain. Specifically, we compare key parameters such as cost, power ...

Rail Vehicle Regenerative Braking Overview ... o The purpose of wayside energy storage systems (WESS) is to recover as much of the excess energy as possible and release it when needed -For use by other trains (energy conservation = reduction of utility energy costs)

The high-energy device can be used as an energy supplier to meet long-term energy needs, while the high-power device can be used as a power supplier to satisfy short-term high power demands. Batteries and fuel cells are ESS devices that can be integrated into an HESS to meet the energy requirements in railway systems.

The paper deals with the actual theme of power management in traction systems presenting a study about the use of regenerative braking energy in electric subway transportation. Storage systems on board of the vehicles or on fixed plants can give advantages both to contain the costs of the electric power and to limit power losses along the traction line. ...

Within the context of many electrified vehicle applications, the energy storage system will be comprise of many hundreds of individual cells, safety devices, control electronics, and a thermal management subsystem. ... Maximizing regenerative energy utilization is an important way to reduce substation energy consumption in subway systems ...

This paper investigates a train timetable problem in a subway system, which is equipped with a series of energy storage devices at stations, and a nonlinear integer programming model is formulated to maximize the utilization of regenerative braking energy. In subway systems, electrical trains can generate considerable regenerative braking energy ...

To further enhance the crashworthiness of subway vehicle anti-climb energy-absorbing devices, this paper proposes a novel collapsible structure, which is embedded with honeycomb aluminum blocks ...

This chapter presents hybrid energy storage systems for electric vehicles. It briefly reviews the different electrochemical energy storage technologies, highlighting their pros and cons. After that, the reason for hybridization appears: one device can be used for delivering high power and another one for having high energy density, thus large autonomy. Different ...

Fuel Cells as an energy source in the EVs. A fuel cell works as an electrochemical cell that generates electricity for driving vehicles. Hydrogen (from a renewable source) is fed at the Anode and Oxygen at the Cathode, both producing electricity as the main product while water and heat as by-products. Electricity

produced is used to drive the ...

An electronic control device with a short-term energy storage capacity is termed a UPS. A UPS is considered one of the most fortunate powers supplying applications that operate during situations that do not last more than 15 ...

20%, the rest of the braking energy is lost in the brak-ing resistors and on supplying the train auxiliary sys-tems. The use of energy storage devices installed on the rolling stock or in the power supply network would allow a significant portion of the energy wasted to be returned to the storage systems and recovered for later use.

4 ENERGY STORAGE DEVICES. The onboard energy storage system (ESS) is highly subject to the fuel economy and all-electric range (AER) of EVs. The energy storage devices are continuously charging and discharging based on the power demands of a vehicle and also act as catalysts to provide an energy boost. 44. Classification of ESS:

The paper deals with the actual theme of power management in traction systems presenting a study about the use of regenerative braking energy in electric subway transportation. Storage systems on board of the vehicles or on fixed plants can give advantages both to contain the costs of the electric power and to limit power losses along the traction line. Moreover, other technical ...

In subway systems, electrical trains can generate considerable regenerative braking energy while braking, and such energy can be fed back to the contact line for further reuse by other accelerating...

Modern railroad and subway trains also make widespread use of regenerative, flywheel brakes, which can give a total energy saving of perhaps a third or more. Some electric car makers have proposed using super-fast spinning flywheels as energy storage devices instead of batteries. One of the big advantages of this would be that flywheels could ...

There are three major challenges to the broad implementation of energy storage systems (ESSs) in urban rail transit: maximizing the absorption of regenerative braking power, enabling online global optimal control, and ensuring algorithm portability. To address these problems, a coordinated control framework between onboard and wayside ESSs is proposed ...

Capturing energy from braking railway cars, which can reduce energy use by to 30 percent, is relatively new technology, says Jacques Poulin, director of energy storage for ...

The paper deals with the actual theme of power management in traction systems presenting a study about the use of regenerative braking energy in electric subway transportation. Storage ...

Photo of subway vehicle energy storage device

The energy storage device converts electrical energy from a power source in or der to store it into another form (electro chemically, mechanically, thermal, electromagnetically, and et c), and

To further enhance the crashworthiness of subway vehicle anti-climb energy-absorbing devices, this paper proposes a novel collapsible structure, which is embedded with honeycomb aluminum blocks and consists of an inner and outer double-layer square tube. An impact finite element model of the subway vehicle"s anti-climb energy-absorbing device was ...

This paper investigates the benefits of using the on-board energy storage devices (OESD) and wayside energy storage devices (WESD) in light rail transportation (metro and tram) systems.

The data collected in this project can be utilized to properly design, integrate and operate energy storage systems in the NYCT Subway system, leading to reduced energy usage, reduced ...

Benefiting from the dual function of energy-saving and voltage balance, OESD is being sought after by researchers [21]. Recently,manyenergystorage-relatedtechnologieshavebeen studied, such as flywheels [22], supercapacitors [23], hybrid energy storage systems [24], which can be divided into station-ary energy storage devices (SESD) and OESD.

The energy storage system recovery includes super capacitor type, battery type and flywheel type energy storage device. This paper introduces three technical methods based on the use of regenerative braking energy, and compares the advantages and disadvantages of different energy storage and recovery devices, and finally come to a ...

the composite energy-absorbing structure of subway vehicle anti-climb energy-absorbing devices through experiments and numerical simulations, analyzing the impact of tube thickness and honeycomb material parameters on the structural energy-absorbing perfor-mance. Their study showed that the honeycomb thickness significantly affects the initial

On-board energy storage devices (OESD) and energy-efficient train timetabling (EETT) are considered two effective ways to improve the usage rate of regenerative braking ...