International Journal of Advanced Technology in Engineering and Science www.ijates.com

Volume No.03, Special Issue No. 02, February 2015 ISSN (online): 2348 – 7550

DESIGN AND ANALYSIS FOR REGENERATING THE ENERGY FROM BUILDING LIFT

Badal E.Ganvir[1], Dr.Achal Shahare[2], Asst.Prof.Hitesh B.Bisen[3]

[1] *II Year M.Tech.(CAD-CAM) Student, Vidarbha Institute of Technology, Nagpur (India)*

[2] *Professor, Vidarbha Institute of Technology, Nagpur (India)*

[3] *Assistant Professor, Vidarbha Institute of Technology, Nagpur (India)*

ABSTRACT

The intention of this specification is to set out the standard of require for lift installations. All lifts shall be robust, reliable and shall meet the department users' requirements and expectations. Lift installation must comply with all current regulations, including Building Regulations. The appointed Design Consultant will be responsible for traffic analysis to provide the most suitable lift solution, including items such as size of lift car, contract load, type of load and its associated safety features, speed, number of passengers etc. Major Modernization is a reasonably straight forward exercise in that, with the exception. It may be possible to increase the lift speed which would reduce travel time between floors. However, this is govern by strict lift regulations and is only possible where the clear headroom at the top of the lift well and the pit depth at the bottom of the lift well are sufficient to allow this. The clauses in this part of the Specification cover all items which are generally standard in this type of installation, while the Particular specification covers the materials and method to be used in the Works.

The following clauses apply equally to new lift installations, major modernization and refurbishments. Where existing installations do not comply with these standards they shall be brought up to date as far as is reasonably practicable. Any remaining sections of the existing installations that do not comply with this specification shall be highlighted and drawn to the attention. In the existing system the new design is used for converting unutilized mechanical energy into electrical energy and it is compactly fitted into headroom. This new design is specific to the regenerate the electrical energy from mechanical energy of the lift which is stored in battery and it will use whenever the light is off This design is easily compile with the existing system this design content two rolling part and a reciprocating part which is used to convert circular motion into reciprocating motion and vice versa. The lift is moving up and down that's the mechanical energy converts that's specific system into electrical energy.

Keyword*: *Electrical Energy, Reciprocating, Rolling.

I. INTRODUCTION

An elevator system, elevator providing a self generating power source. The system converts kinetic energy of an elevator cab movement into electrical energy used to regulate the speed of descent. The elevator system can be structured in numerous ways and includes either a generator or a motor in generator mode, driven by a system to the elevator cab. The present invention relates to a self-powered for elevator systems. More particularly, the

present invention pertains to the use of the kinetic energy of an elevator cab movement to generate electrical energy to regulate the speed level.

II. BACKGROUND OF THE INVENTION

Elevator systems and controls for such systems are known in the art. Such systems and controls use a wide variety of designs to achieve numerous objectives, and the basic principle of balancing an elevator cab against assembly driven by a motor. For years, building designers and code authorities have recognized the necessity of emergency power in buildings to ensure that elevator cabs. Moreover, most elevator systems currently require building power distribution systems to provide transfer switches and emergency feeders for elevators and main distribution emergency switchboards and emergency generators sufficiently large to cover elevator loads, all of which result in additional costs and inefficiencies. Thus, it would be advantageous to have an elevator system that during a power outage or any other occasion when needed accomplishes the controlled descent of the elevator cab without a battery or fossil fuel based generator to drive the elevator motor, but rather accomplishes the initial descent of the elevator cab due to gravitational forces and the heaviness of the elevator cab relative to an attached counterweight, and which then converts kinetic energy of the movement elevator cab into electrical energy used to control the speed of descent of the elevator cab.

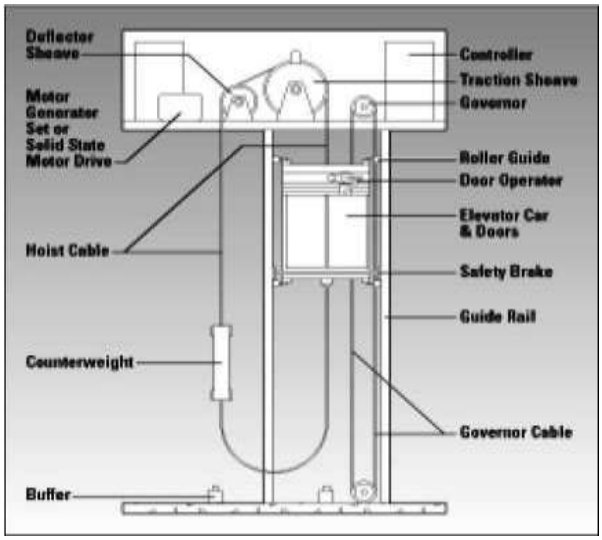

Figure 1: Basic Diagram of Building Lift

III. PROPOSED SYSTEM

The invention and the preferred modes of use will best be understood by reference to the following detailed description of an illustrative embodiment. A control block diagram of a self generating elevator emergency power source for an elevator system using a reciprocating and an electrical generator. A control block diagram of self generating elevator emergency power source for an elevator system using a reciprocating and an elevator motor in generator mode.

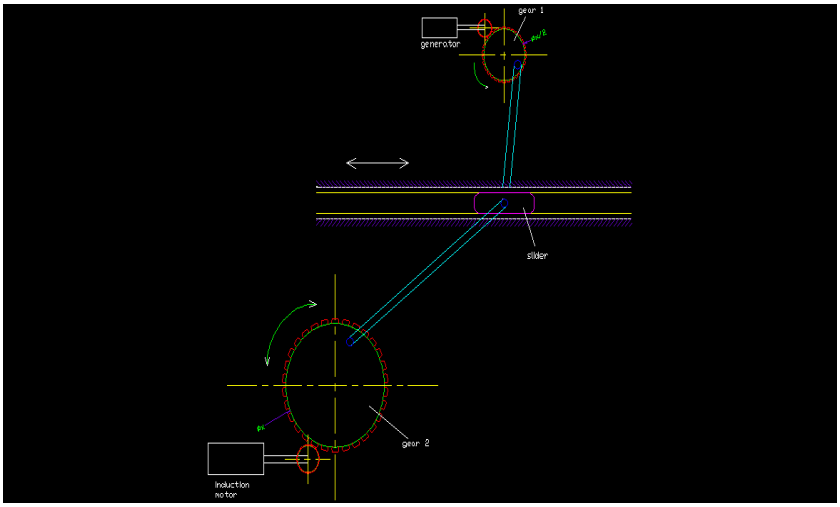

Figure 2: Proposed Mechanism

IV. DETAILED DESCRIPTION

The present invention is based on utilizing the kinetic energy of an elevator cab movement due Reciprocating action of the elevator cab. The movement elevator cab attached to a mechanical system of shafts and pulleys drives either a separate generator or an elevator motor operating in generating mode, converting the kinetic energy of the movement elevator cab into electrical energy. The torque generated by a separate generator or elevator motor in generating mode is directed against torque produced by movement elevator cab and when controlled, a controllable speed of descent to a preset or selected floor can be achieved which provides braking power for a controlled speed of descent to a preset or selected floor, comprising: an a building distribution system electrical supply panel, an elevator controller with an integral battery to support control during power loss or interruption, an electrical drive motor, a load bank, a thiristor or transistor switch or similar operative device, a summing device to sum all control signals and to generate a resultant control signal, a tachogenerator speed feedback device, a dedicated emergency descent controller with pulse width modulation (PWM) output, a mechanical system of shafts and pulleys and respectively, an elevator cab, an alternating or direct current electrical generator, a cable, a permanent counterweight, a detachable counterweight, electrically held spring release locks, detachable counterweight free fall catchers, elevator brakes, a counterweight rail system, and an elevator cab rail system.

The elevator controller with an integral battery to support control during power loss receives power from a building distribution system via the electrical power supply panel. The elevator controller drives the elevator drive motor. The elevator drive motor is connected to the elevator cab via the mechanical system of shafts, pulleys and drives the elevator cab up and down guided by the elevator cab rail system. The elevator controller also is connected to electrically held spring release locks. The bottom part of the spring release locks is coupled to the detachable counterweight, and the top part of the spring release locks is coupled to the permanent counterweight, such that when the permanent counterweight and detachable counterweight come together the locking mechanisms of the spring release locks on each of the two counterweights and engage and thereby join the permanent counterweight and detachable counterweight together to act as a single counterweight. Both the permanent counterweight and the detachable counterweight are guided by a counterweight rail system. Free fall

catchers are coupled to the detachable counterweight. When the spring release locks are engaged during normal operation, the spring release locks lock the permanent counterweight to the detachable counterweight, comprising the total weight offsetting the weight of the elevator cab through the connecting cable and counterweight pulley system.

When the elevator controller senses a power loss in the electrical supply panel, the elevator controller cuts off control voltage to the electrically held spring release locks, causing the spring release locks to disengage the detachable counterweight from the permanent counterweight upon detachment, the detachable counterweight descends under its own weight until the speed of the detachable counterweight exceeds a preset value, at which point the free fall catchers stop the descent of the detachable counterweight by clamping onto the counterweight rail system. The elevator controller is also connected to the elevator brakes, and when the elevator controller senses a power loss in the electrical supply panel, the elevator controller causes the elevator brakes to be released and held in a released position.

Due to the heavier weight of the elevator cab relative to the permanent counterweight, and due to the elevator brakes being held in the released position, the elevator cab begins movement under its own weight after detachment of the detachable counterweight. The movement elevator cab is connected to the alternating or direct current electrical generator through the cable, and mechanical system of shafts and pulleys and respectively, and the descent of the elevator cab thereby causes the cable to rotate the counterweight pulley, thereby through the mechanical system of shafts and pulleys driving the electrical generator. The alternating or direct current generator is connected to the load bank via the thiristor or transistor switch or similar operative device. The dedicated emergency descent controller with pulsewidth modulation (PWM) output is connected to the thiristor or transistor switch or similar operative device, and thereby regulates the generator current through the load bank.

The elevator controller directs the elevator drive motor to rotate the counterweight pulley to raise the elevator cab and correspondingly cause the attached permanent counterweight to descend until the top half of the release locks coupled to the bottom of the permanent counterweight engages the top half of the release locks coupled to the top of the detachable counterweight, at which point the release locks engage and thereby couple the permanent counterweight to the detachable counterweight, restoring the elevator system to normal operation.

In an alternative embodiment, an elevator system, instead of using the electrical generator of to generate electrical energy during power loss or interruption, the system uses the elevator drive motor with a motor mode operation switching contactor. The elevator controller is connected to the motor mode operation switching contactor.

In an alternative embodiment, an elevator system, instead of using the electrical generate electrical energy during power loss or interruption, uses the elevator drive motor with a motor mode operation switching contactor. Further, rather than using the detachable counterweight with release locks and free fall catchers, the system uses the permanent counterweight that is lighter than the elevator cab so that when the elevator controller after sensing power loss directs that the elevator brakes release and be held in a released position, the elevator cab begins movement due to its heaviness relative to the permanent counterweight.

In another embodiment of the invention, a retrofit kit can be installed in existing elevator systems to accomplish an elevator system. The retrofit kit is comprised of a replacement counterweight consisting of a permanent

counterweight joined to a detachable counterweight with free fall catchers through electrically held spring release locks or other like devices. The top half of the spring release locks is coupled to the bottom of the permanent counterweight, and the bottom half of the spring release locks is coupled to the top of the detachable counterweight. The retrofit kit includes a small battery for the elevator controller to support control during power loss, which battery is integral to the elevator controller. The retrofit kit further includes an alternating or direct current electrical generator, the output of which is connected to the load bank via the thiristor or transistor switch or similar operative device. The retrofit kit includes a dedicated emergency descent controller with pulsewidth modulation (PWM) output connected to the thiristor or transistor switch or similar operative device, which thereby regulates the generator current through the load bank.

In an alternative embodiment, a retrofit kit can be installed in existing elevator systems to accomplish an elevator system. A difference between the elevator retrofit kit based and the elevator retrofit kit based is that instead of being comprised of the electrical generator to generate electrical energy during power loss or interruption, the retrofit kit is comprised of the elevator drive motor with the motor mode operation switching contactor. When installed, the retrofit kit functions in a manner consistent with the elevator system described.

In yet another embodiment, a counterweight device is comprised of the permanent counterweight and the detachable counterweight with free fall catchers, the permanent counterweight and detachable counterweights being coupled together by electrically held spring release locks or other like devices when the locks are engaged. The bottom part of the spring release locks is coupled to the detachable counterweight, and the top part of which spring release locks is coupled to a permanent counterweight.

When the permanent counterweight and detachable counterweight come together, the locking mechanisms of the spring release locks on each of the two counterweights engage and thereby join the permanent counterweight and detachable counterweight together to act as a single counterweight. Both the permanent counterweight and the detachable counterweight are guided by the counterweight rail system. Free fall catchers are coupled to the detachable counterweight. A power loss to the electrically held spring release locks, whether by direction of an elevator controller or otherwise, causes the spring release locks to disengage. Upon detachment, the detachable counterweight descends under its own weight until the speed of the detachable counterweight exceeds a preset value, at which point the free fall catchers stop the descent of the detachable counterweight by clamping onto the counterweight rail system. After return of normal power and upon the permanent counterweight being lowered to the detachable counterweight, or upon the detachable counterweight being raised to the permanent counterweight, the electrically held spring release locks engages and thereby couples the permanent counterweight to the detachable counterweight.

Although the invention has been described with reference to specific embodiments, this description is not meant to be construed in a limiting sense. Various modifications of the disclosed embodiments as well as alternative embodiments of the invention will become apparent to persons skilled in the art upon reference to the description of the invention. It is therefore contemplated that the appended claims will cover any such modifications or embodiments that fall within the true scope of the invention. In the existing system the new design is used for converting unutilized mechanical energy into electrical energy and it is compactly fitted into headroom. This new design is specific to the regenerate the electrical energy from mechanical energy of the lift which is stored in battery and it will use whenever the light is off This design is easily compile with the existing

system this design content two rolling part and a reciprocating part which is used to convert circular motion into reciprocating motion and vice versa. The lift is moving up and down that's the mechanical energy converts that's specific system into electrical energy.

V. CONCULSION

Various modifications of the disclosed embodiments as well as alternative embodiments of the invention will become apparent to persons skilled in the art upon reference to the description of the invention. It is therefore contemplated that the appended claims will cover any such modifications or embodiments that fall within the true scope of the invention.

REFERENCE

[1] Thanit Punprayoong and Boonyong Plangklang, energy saving elevators by in Building a case study: RMUTT, Conference on Energy Network of Thailand 8. 2-4 May 2555, Maha Sarakham: 4, 2555.

[2] H. Inaba, S.T. Nara, H. Takahashi$M. Nakazato, High speed elevators controlled by current source inverter system with sinusoidal input and output.

[3] http://www.danahermotion.com/education_training/motor/four-quadrant operation (August, 2012).

[4] Rajamangala of Physics, Department of Physics Faculty of Science Rajamangala, University of Technology Thanyaburi.

[5] Pirote Brikapkul., The design of the feedback controller in integral self-adjusting for permanent magnet synchronous motors, Master degree thesis, Electrical Engineering, KMUTNB Thailand, 2546.

[6] Ashok B. Kulkarni, Hien Hguyen and E.W. Gaudet "A Comparative Evaluation of line Regenerative and Non-Regenerative Vector Controlled Drives for AC Gearless Elevator",IEEE 1431-1437 .

[7] Masaki Nomura, Hiroyu Ikejima, Shigetaka Morita and Eiki Watanabe, Regenerative Power Control For VVVF Motor Drive (Critical Braking Method Applied To The Elevator), IEEE 97-105 .