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# Regenerating the Energy from Building Lift

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**Abstract**: Regenerative drives are another remarkable advancement in energy-efficient lift technology. They recycle energy rather than wasting it as heat. The intention of this specification is to set out the standards of the requirement 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 Modernisation is a reasonably straight forward exercise in that, with the exception of the It may be possible to increase the lift speed which would reduce travel time between floors. However, this is governed 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 General and Particular Specifications are to be read as one. Any conflicts shall be brought to the attention of the Contract Administrator. The following clauses apply equally to new lift installations, major modernisation 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 of the Contract Administrator prior to completion.

**Keywords:** Electrical Energy, Reciprocating, Rolling.

## I. INTRODUCTION

Systems design and equipment shall ensure whenever mechanical energy is connected to the generator and the electrical energy will go through an initialization routine and saves in the battery minimal associated energy conversation. Which can use for regeneration of electricity. Equipment shall be designed to achieve maximum economic utilization of energy/under full and part load operation. In the event of a power failure or whenever the lift is switched off, the controller will automatically restart on the restoration or re-connection of the power supply and cause the lift to move from its static position.

When the lift encounters a floor with auto position reset, the floor value in the controller will be reset and normal lift operation will resume. The design and construction of the bedplate, raft, and steel supports shall be such that the true alignment of the equipment under all conditions is maintained. Roll pins shall be used in the feet of all components to maintain their alignment and position. The power developed by the motor shall be transmitted directly to the driving sheave which is to be located on the same shaft as the motor. The main shaft shall be supported on two large bearings that may be of the sleeve, roller or ball race type.

## II. BACKGROUND AND LITERATURE SURVEY

The machine room less lift is to utilise permanent magnet, synchronous gearless drive technology powered by a variable frequency inverter unit matched to the machine to deliver and control the necessary torque throughout the full speed range of the machine provided. All drive equipment is to be mounted in the lift shaft without the need for separate plant rooms. Where the control panel is required to be mounted outside of the lift shaft. Lift or elevator is transport devices that are used to move goods or peoples vertically. In this project, the Motorola MC68CH11 A1 microcontroller based lift control system is constructed to simulate as an actual lift in the real life. This project dissertation documents the findings and results of a research on a microcontroller based lift control system. It provides useful information to those who wish to carry out a lift control system research or project.

This paper presents Power Generation for Permanent Magnet Motor Elevator by Energy Regenerative Unit (ERU). The study reveals that permanent magnet motors with rated 5.5 kW in elevators which is working by transferring mechanical energy into electricity when the motor is rotating without power therefore the motor is capable of producing electrical energy back into the grid system. This situation is call "Regenerative mode" which is the wasted energy can be used once again. This investigated ERU and inverter in this study can be applied for future use of in existing elevator system. The Proposed ERU is used to convert DC voltage to AC voltage for gird synchronization. The investigated ERU is operating as three-phase module. From experiment, it is observed that when the motor operates as a generator then ERU will

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receive DC voltage from the elevator inverter system then convert to AC voltage that can be fed into the grid system.

## III. PROPOSED TECHNOLOGY

### PROBLEM IDENTIFICATION

In the present system the arrangement the power generated due to the motion of lift is unutilized. The mechanical energy generated during the up and down motion wasted. To utilize the mechanical energy to electrical energy to generate power.

### OBJECTIVES

- Analysis of present system.
- Suggest the best possible gear arrangement system for the existing operation system.
- To find the properties and analysis of power generation.
- Cost reduction of maintenance for existing operation.

### RESEARCH METHODOLOGY TO BE EMPLOYED

- Design & analysis of lifts.
- Analytical Calculations.
- Analysis of power generation using
- Result finds out using software.
- Traditionally, electric traction lifts were equipped with DC motors due to their easy controllability, but the development of variable frequency drives led to the introduction of the now prevalent AC induction motors or permanent magnet DC motors. These drives provide excellent ride conditions, with smooth acceleration and deceleration and high levelling accuracy.
- There are two main types of traction lifts: geared and gearless. Geared lifts use a reduction gear to reduce the speed of the car while in gearless lifts the sheave is directly coupled to the motor.

### ADVANCED DRIVES AND REGENERATION

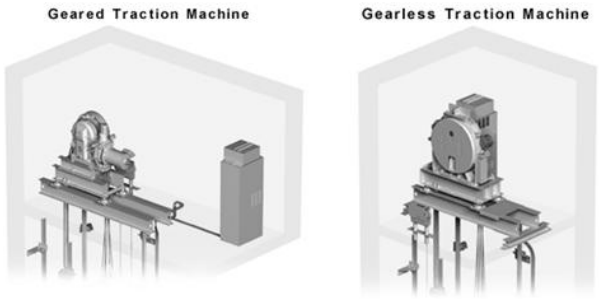
The choice of the drive has historically been motivated by factors such as travel speed, levelling accuracy and comfort. Before the introduction of solid- state control techniques, the most common option was the Ward Leonard set which provided the best ride quality. However, there are large energy losses in the motor and generator arrangement, which converts electrical energy into mechanical energy and finally back to electrical energy again. The advent of power semiconductors and subsequent evolution of AC motor control techniques has led to its wide spread use with equivalent ride quality and even some advantages such as lower maintenance, faster response, energy savings, lower peak demand and better power factor.

The most common types of motor drives in use today are:

- DC motor with Ward Leonard set.
- DC motor with solid state controller.
- Two-speed AC motor.
- AC induction motor with Variable Voltage controller.
- AC induction motor with Variable Voltage Variable Fr equency controller.
- AC Permanent Magnet Synchronous Motor with Varia ble Voltage Variable Frequency controller.

A detailed description of these drive systems can be found in DC systems, solid state controllers have been the most common option since the early 90's, substituting the Ward Leonard set with great efficiency improvements and more accurate speed and levelling control. The energy costs when using solid state controllers can be reduced by as much as 60% when compared with equivalent Ward Leonard drives. Although DC motor controllers are simple and inexpensive, DC motors require frequent maintenance because of the brushes. In order to reduce maintenance costs the market begun shifting towards AC induction motors. The evaluation of control techniques for induction motors has led to very reliable and accurate systems. In AC motors, the speed is determined by the number of pole pairs and the frequency of the supplied current. Initially pole changing motors were used to achieve the lift's two operating speeds. However, a large flywheel has to be used to smooth the sudden change in torque, thus reducing the jerk perception of passengers. The flywheel stores energy which is dissipated later, contributing to the low efficiency of these systems. The use of two-speed motors present some problems regarding levelling accuracy and ride comfort.

Variable voltage controllers were widely installed from them id eighties to the early nineties. These systems are very simple. They rely on three pairs of back-to-back thyristor for varying the RMS (root mean square) voltage to the motor and, as a result of this voltage reduction, there is an increase in motor slip, which translates into speed reduction. However, the increase in motor slip also translates into a large increase in the motor losses. Furthermore, at low voltages, the firing angles of the thyristor are large and the harmonic content of the voltage becomes very high. As a result, the motor gets hot and the system efficiency drops. The efficiency of variable voltage systems is very low.




### OUTCOME

Losses in bearings result from several types of friction (rolling friction loss, sliding friction loss, sealing friction loss and drag or lubricant shearing

loss). A new generation of bearings is appearing in the market that can reduce these losses by 30% to 50% while extending the service life by a factor of two. These bearings feature optimised internal geometry, a new polymer cage design that reduces rotational mass and cage deformation, low noise, as well as a low torque, and long lasting grease.

Energy- efficient bearings are now available for light and medium loaded applications, such as industrial electric motors driving machines (e.g. pumps, compressors, fans and conveyors), but solutions are currently being developed for lifts and escalators/moving walks that can respond to the specific needs of these systems (low speed, frequent starts and stops).

## IV. CONCLUSION

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.

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