ELEVATOR CONTROL SYSTEM BY USING PLC

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ABSTRACT

In this paper we are designing and constructing three level elevator control system and increases its steady state & stability by using a programmable logic controller (Allen Bradley Micrologix-1400 BXBA) the software used for communication is RSLogix-500/5000 PLC'S are useful in industrial automation where number of equipments are replaced by contactor and switches. Elevator is nothing but the vertical transportation device which is used to transfer the goods and peoples limit switch is used for the floor indication. The limit switch is used for positioning of floor and the Direct Current (DC) motor is used for movement of elevator cabinet. Electromagnetic relay is used in control circuit to control elevator in upward and downward direction .As the India is developing country and there wide increase in high rise buildings and malls and elevator is integral part of infrastructure by implementing such projects we can reduce the human efforts , accident due to breakage of rope , efficiency and speed of elevator is improved .Even the time can be consumed by using such system. This paper mainly concentrate on programmable logic controller to control the circuit and building the elevator model for smooth operation of elevator.

Keyword: *- PLC, Elevator, Push buttons, limit switch , relay, rope.*

1. INTRODUCTION-

With the overall speedy capitalization taking place in all fields the living standard of human being particularly in metros vastly increased as such as industries, malls, hotels etc. Thus the excavation of lift in high rise buildings become an important part of infrastructure for the transportation of human and material. So the control system is to be vital for stability and steady state of lift. It guides the lift in what order to stop at Floors, when to close and open the door.

1.1Problem Statement:

The aim of this project is to search various elevator control methods and to find the more efficient , in terms of reduce energy and consume time , for certain buildings by programming simulator in which various control methods can be implemented . the goal Is to make the simulator as modern as possible so that different scenarios simulated and find the best control planning's.
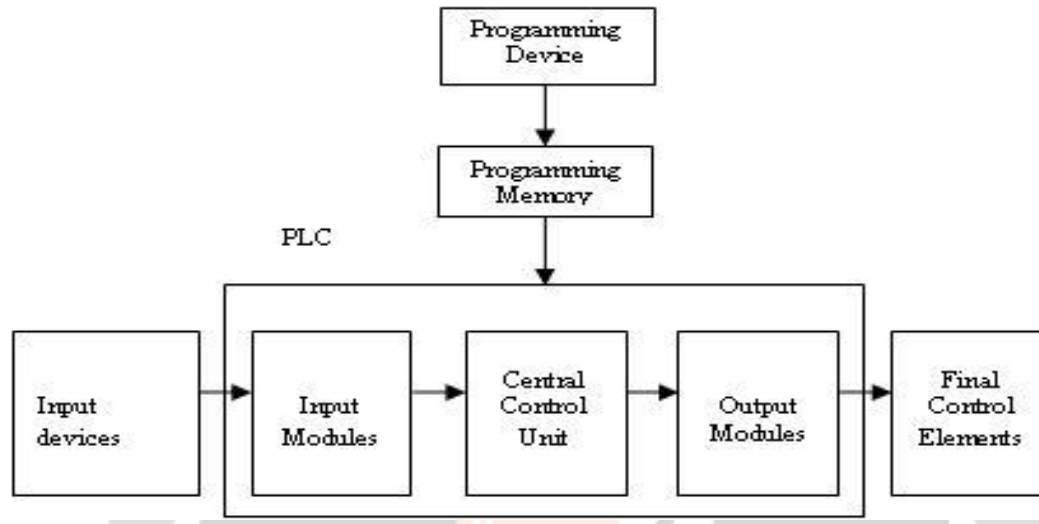
2. METHODOLOGY:

Figure1: Block Diagram Of Elevator Control System By Using PLC

The design can be divided into several sections such as sensor section , power section , processing section , Figure 1.shows the block diagram of a PLC based Elevator control system Supply is given to PLC as well as to the dc motor. This is connect with the elevator cabin the use of limit switch the position of the cabin will be determined and by using the level sensor limit switch the position of the floor and indication of floor is by using the push button and we are using the emergency start and stop button to stop the operation of lift in the emergency cases figure 1 shows the block diagram of elevator control system by using plc [4]

2.1 Design of Elevator Cabinet:

The elevator cabinet is designed by having in mind the number of traveler it is going to travel. Also it should have the strength to convey the weight of the traveler travelling in the elevator. The general calculation for elevator [1]

No of person accommodate in the elevator is = 8

Approximate weight of each person =60 kg

Maximum weight that the cabin can handle = 480 kg

2.2 Calculation of rope strength

The force which acts on the rope can be given below[1]

$F=mg$

F= (480+100+100)* 9.8

=6664 N

The dynamism acting on the string is 6.6kN. So a string with the strength to 7kN convey at least has to be chosen.

2.3 Limit Switch:

It's an electromechanical device used as sensor that detect presence and absence .Most of the limit switches are Mechanically activated means that they have some sort of arm , leaver, plunger etc. Which are activated by making contact with another devices. As object makes contact with actuator eventually actuator move to its limit where the contact change state. [3]
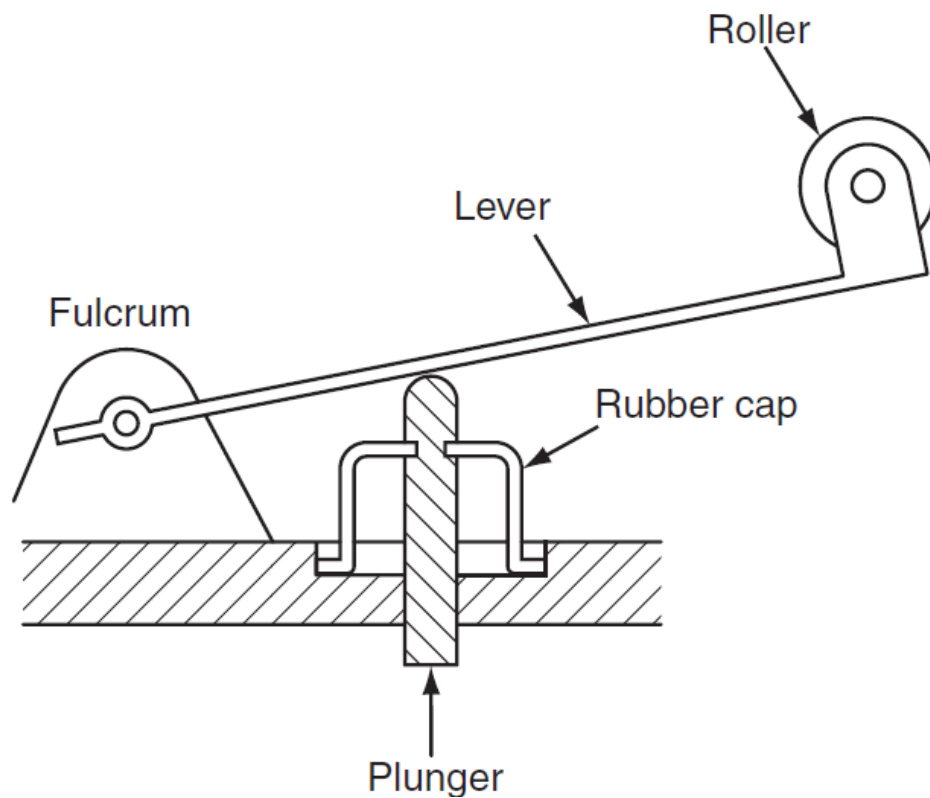

Figure 2 : Overview Of Limit Switch

2.4 Programmable Logic Controller (PLC)

The Complex Relay Control System Was Replaced By Engineers At General Motors In 1968. The Term Plc Is Defined By En-61131-1 As Digitally Operated Electronics Device Having Programming Memory To Store Special Function Such S Logic , Sequencing , Timing And Counting For interface Between Hardware And Software[2]

2.5 Programming Languages

Part 3 of **IEC-61131** Deals with Programming .Languages It Defines Two Graphical and Two Textual Programming Languages [2]

- ✓ Ladder Diagram (G)
- ✓ Functional Block Diagram (G)
- ✓ Structured Text (T)
- ✓ Instruction List (T)

2.6 Ladder Logic

Its Primary Programming Language Of Programmable Logic Controller Since PLC Was Developed To Replace The Relay Logic Control System To Make Aware About Ladder Logic Programming Simple Switch Circuit Are Converted To Relay Logic And Then PLC Ladder Logic [2]
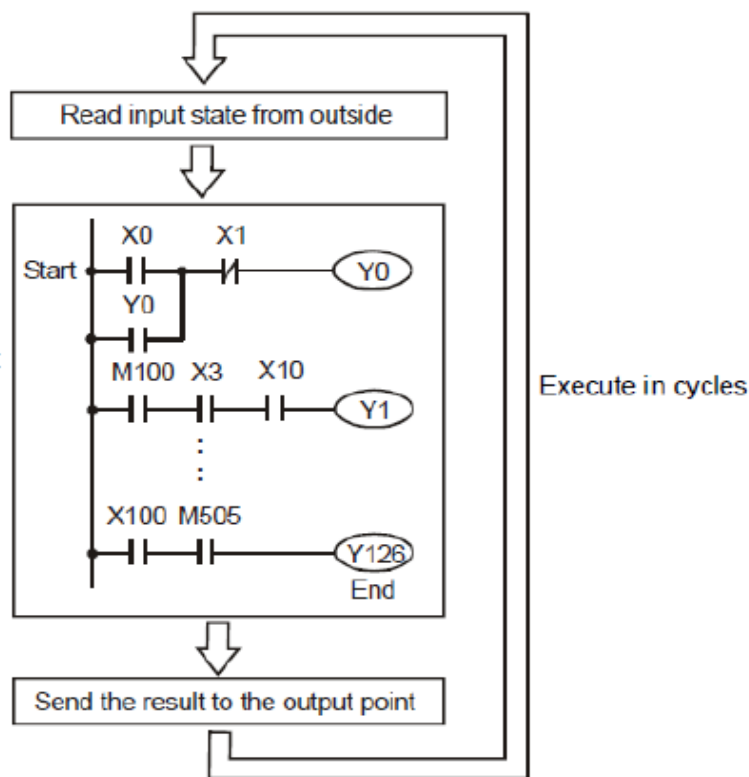

Fig.3: Ladder Diagram Algorithm

In the chart of traditional ladder diagram, if X0, X1, X4 and X6 are in ON condition and the others are in OFF condition, output point Y0 will be in ON condition as shown as dotted line in the figure 3.[2]

3. FUTERSCOPE:

- ✓ Nowadays in elevator control model various access control devices are used for safety purposes
- ✓ The VFD'S and high speed motors are used to increase speed and efficiency of elevator

4. CONCLUSION

Thus this PAPER describes the entire circuit diagram and development of ladder logic. The developed ladder logic has been implemented by using RS-LOGIX 500 Here the required inputs and outputs for elevators forward and reverse motoring, door opening and closing and the indication of floor end of both the door opening and door closing have been included in the logic and the program is interpreted .Several interlocks can be handled at time

6. REFERENCES

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   ***Available Online at* www.ijecse.org ISSN- 2277-1956 Implementation of PLC Based Elevator Control System**
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