Base Control Elevator via PLC

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Abstract
In this paper the elevator control system is designed and simulated using LOGIX PRO version 1.6. The simulation program is successfully tested. It is utilized to control and manage the four floors elevator building, a ladder diagram language is chosen to build the complete program.

Keywords: PLC, Elevator Design, Hall Effect Sensor, DC Motor, Ladder Logic.

1. Introduction
The latest control systems witness an incredibly large application in the whole portion of the life anticipated to its easiness in the use and appropriate to response to the businesses being used. The most frequent type of these systems is programmable reason control mechanism PLC, supervisory control and data acquisition SCADA, and distributed control systems DCS. PLC is a processor function based system that uses programmable recollection to store instruction and use function such as reason, sequencing, timing, depending and arithmetic as a way to control machines and process. A PLC constantly checks its inputs, centered on or off. The first PLC machine originated in 69 by standard motors. A microprocessor established PLC was introduced in 1977 by Allen Bradley. It was based in 8080 processor with circuitry to take care to manage little instruction at top speed [1]. Primarily, ICS acquired little similarity to traditional information technology (IT) systems in that ICS were isolated systems running exclusive control protocols using particular software and hardware. Extensively available, low cost Internet Standard protocol (SP) devices are replacing exclusive solutions, which enhances the ability of web security weaknesses and happenings. As ICS are using IT alternatives to promote corporate business systems connection and distant access capacities, and are being designed and applied using industry standard computer systems, operating systems (OS) and network protocols, they are starting to resemble this systems. This kind of integration supports new that capabilities, but it provides significantly less isolation for ICS from the outside the house your house world than forerunner systems, setting up a greater need to for getting these systems. When security alternatives have recently been created to deal with these security issues in typical this systems, special precautions must be studied when launching the approaches to ICS environments. In some instances, new security alternatives are needed that are focused on the ICS environment.

2. Methodology
A lift known all across the world is called an escalator in the United Claims. A great elevator or lifts a transport device used to progress goods or people vertically, from one floor to another. The elevator turns electrical power into mechanical rotational power. The elevator must pick back up and drop off traveler as successfully as possible. If collection of escalator is used, an elaborate controller usually controls them. There are many sort of escalator or lift depending on uses of it nonetheless they all operate the same way. These are passenger elevator, freight escalator, vehicle elevator, boat escalator, aircraft
elevator, dumbwaiter, paternoster while others. Good start escalators consist of 4 major components. The lift elevator cab or plat form, the base or hoist way, the drive system and the counterweight. The cab is moved vertically using either hydraulic piston or a pulley system. The weight of the cab is balanced by counterweights so that the drive system uses minimal energy this cannot be made too big and, therefore, have an effect on the structure of the building itself. Possible constraints on the weight taken within the elevator may be determined from the size of the motor unit and the other components within the elevator system. This weight limit must be large enough to handle daily usage. The elevator must fit within the given space requirements of the building. It ought to be made large enough to deal with the standard daily traffic also to move the necessary objects within home. It cannot be made too big and, therefore, affect the structure of the building itself. Feasible restrictions on the weight carried within the escalator may be determined from the size of the motor and the other components within the escalator system. This weight limit must be large enough to handle daily utilization.

3. Results and Discussion

This section presents and discusses the results obtained upon the program simulated by LOGIX PRO version 1.6. The results include the control of the elevator floors and how to move from floor to next floor.

A. Repeated Loop:

When the press starts the elevator ready to movie in this circuit use start and stop switch automatic to energize the output b3.0, the output can operation the program in repeated loop. As shown in Figure 1.

B. Floor Sense Subroutine Program:

Five different functions were required for the elevator to work properly and after a function was completed the next could start. After a floor is sensed by the sensor, the elevator could be called to another floor. With a floor called, the hoist motor could operate, lifting the human up or letting it down. When the sensor sensed that the human was at the correct floor, the door open/close function could run. The last function reset the system so the elevator could be called to a different floor. Since there are five functions, five different subroutines were put in place in the program. As shown in Figure 2.
C. Call Floor Subroutine:

Next, the elevator could be called to a specific floor when the call floor subroutine, operates. When the First, Second, or Third floor call button is pressed, its output coil turns on, sealing the button. The output also deactivates the other two floors rungs. With a floor called, the program returns to the main ladder diagram.

D. Hoist Subroutine

When the First, Second, or Third floor call button is pressed, its output coil turns on, sealing the button. The output also deactivates the other two floors rungs. With a floor called, the program returns to the main ladder diagram. The master stop/start seal circuit was included in the hoist subroutine stop all Action since this subroutine worked a moving part. Since the human could go up or down, it was obvious that the only direction the human could go from the first floor was up, and likewise, the human could only go down from the third floor. The difficult part of this subroutine was to discriminate which direction the human would go from the second floor. The floor sense output aided with this problem. When the second floor sensor sensed the human, the second floor sensed output deactivated the second floor call button. So that if first is called from the second floor, the motor let the human down, or if the third floor is called, the motor pulled the human up. When the floor called and the floor sensor of the floor called is true, the hoisting complete output turns on and deactivates the up and down outputs, it also allows the program to return to the main ladder.
E. Doors Subroutine

Once the human reached the floor it was called to, the doors had to open, stay open for ten seconds and then close. Three timers and a master timer used in this subroutine when the floor that was called was sensed, a five second timer was activated. While the timer was timing, the motor would run, opening the doors. The done bit of the first timer activated the next timer, which held the doors open for ten seconds. The done bit from that timer activated the motor to close the doors. The master timer started its twenty seconds when the first timer started, when the twenty second timer was done, it allowed a return from the doors subroutine. As shown in Figure 5.

F. Reset Subroutine

The completion of the doors subroutine signified that the process was over and needed to be reset. The next subroutine of the program reset the outputs so that a new floor could be called and reset all the timers. When these resets were complete, the whole process was finished, awaiting new orders for a floor. As shown in Figure 6.
4. Conclusion

In this paper the elevator control system program is designed and simulated using LOGIX PRO simulation package. The simulation program is successfully tested. It is utilized to control and manage the elevator control system four floors building. A ladder diagram language is chosen to build the complete program. Adding weight sensor to each floor to keep track that which floor has the maximum crowded. More security like ringing of an alarm when the weight of the lift crosses.

References