

A Study of the use of PLC Turnstiles at Football Stadiums to aid the Return of Safe Standing

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INTRODUCTION

The stadium has four different areas/sections. Within these sections there are revolutionary turnstiles that will allow fans in and out of the stadium during the pre-game period. The use of these turnstiles will allow the return of safe standing into stadia by limiting the number of fans in each area. The PLC turnstiles will count when a fan goes into the stadium and will count down when a fan comes out. The following will be recorded and used as follows.

- Start and stop buttons to emulate the stadium being open and closed.
- Area counter pre-set – The area counters can be set to a specific value before the gates open, so the attendance can range from anywhere between 10,000 fans (minimum) and 40,000 fans (maximum) this is most useful during the trying times the world has encountered with COVID-19. And any other safety reason these counters will only go to the pre-set value.
- Operation lights – These operation lights work in tandem with the pre-set value. For example, if the pre-set value for area 1 is set at its value, 10,000 fans, there are five different light indicators which tell the operator if the area is 0-24% full, 25-49% full, 50-74% full, 75-99% and a stop light for 100% full.
- Area counter – each area will have a designated counter and the value of these counters will be stored in the HMI and accessible to all operators.
- Global counter – The sum of each area counter will be the result of the global counter. Giving an overall view of how many fans are in the stadium in total.

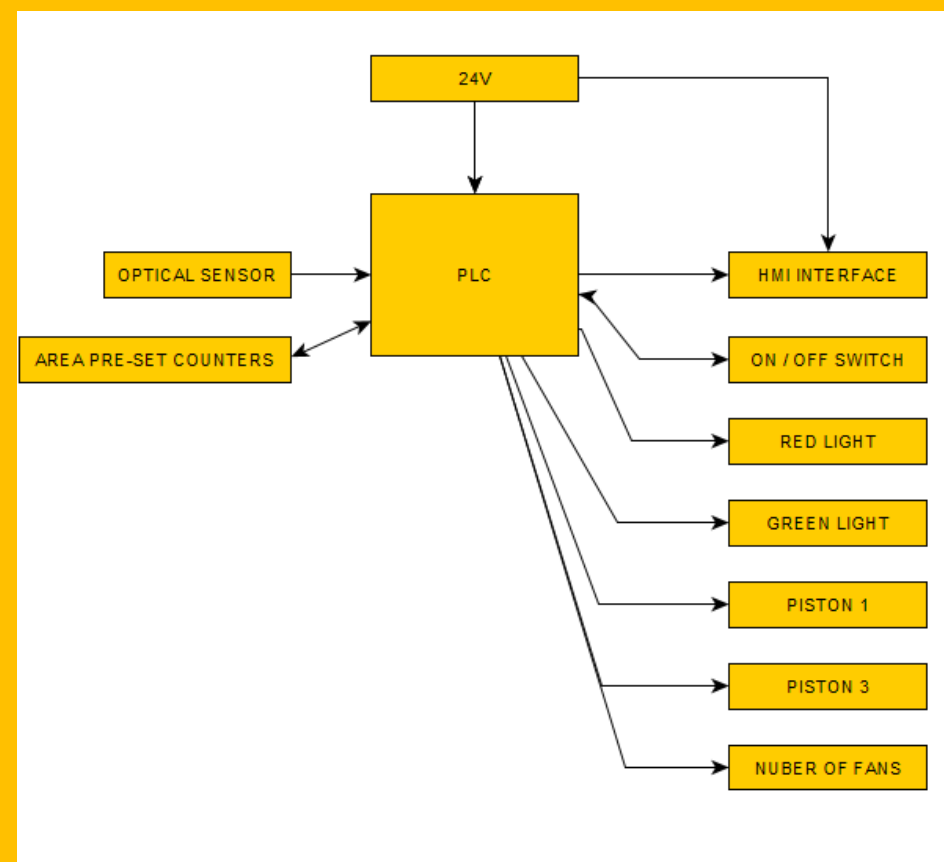
METHOD

By using Siemens TIA V16 a PLC system has been designed and developed for this project along with a HMI interface that allows operators to observe the numbers and figures, also a simulation has been created using Factory I/O that operates the same way as the actual build and provides the same results.

The testing of this system was a success and has all been concluded in the report along with future recommendations that would improve this project and prepare it for introduction globally.

BLOCK DIAGRAM

below is the block diagram of how the system links together.



CONCLUSION

In conclusion, the project works as it should, except for the graph page on the HMI which can be improved. The design works very well and is proven by the evidence in the YouTube video [18]. However, there are many improvements that can be made to this project, they will be discussed below.



ACKNOLEDGEMTS

I'd like to give thanks to everyone that has supported me in the past 2 years.