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PROJECT REPORT

On

EFFICIENT AUTOMATION OF CONCRETE BATCHING PLANT USING PLC & SCADA

Bachelor of Engineering

In

ELECTRICAL & ELECTRONICS ENGINEERING

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CHAPTER-1

INTRODUCTION

1.1. General

The advance in electronics and computer technology has resulted in an enormous impact on various industrial manufacturing practices. The manufacturing of hollow concrete blocks and its allied products used widely in the construction field is one such application.

In the process of manufacture of concrete blocks, an aggregate consisting of crushed dust, sand, 6mm jelly and 12mm jelly, is mixed with cement and water in a given proportion. Then the block is manufactured using a compacting machine. The resulting block is cured in a chamber.

The traditional process used earlier for production of concrete blocks required a large amount of human intervention. Workers use to carry the aggregate and cement to the mixer manually. Then they used to mix water. The quantity of water mixed was by trial and error method. Once everything was mixed, the mix is carried by them to the compacting machine and the blocks from the compact machine are moved to the curing chamber manually. While moving the wet blocks to the chamber several breakages used to happen resulting in loss of production.

The problem that was encountered during that time was

1. A large number of workers are required.
2. The weight that each worker has to carry is limited.
3. The loss that results from even slight negligence of the worker is quite large.
4. The mix that goes as waste during trial and error method.
5. If the water is mixed more than the required quality, the resulting block will not have the required strength.
6. If any of the ingredients is mixed with more quality then the block will not have enough strength and desired finish.
7. The time required to reach the target is considerably more.

8.Absenteeism hurts the production.

9.Since manually stacking pallets one above the other has height reduction, large storage yard is necessary where as in automation up to 16 tiers can be stacked to a height of 4mt safely. This would occupy vertical space thereby reduces the need for large yard space. During rainy season sand is wet and water is to be adjusted by trial and error method.

1.2. Objective of the Study

The purpose of this project is to automate the entire manufacturing unit, using PLC and SCADA system, so that above problems can be solved to a greater extent. In a fully automated system, one palette is manufactured in every 15 seconds and each pallet will carry 3 blocks so that in an hour 720 blocks can be manufactured and if they work for 10hours, 7200 blocks can be manufactured in a day. In a larger machine more than 40,000 blocks will be manufactured in a day.

The advantages of automating the system are:

1. It speeds up the process giving same quality all the time as in each mixing the quality of ingredients measured is accurate.
2. It needs only 2 to 3 operators and that too when there is a need, otherwise everything is automated and runs on its own.
3. The material lost during trial and error process is negligible.
4. Since pallets are stacked vertically by machines, less factory space required for more production.

1.3. Overall process

The blocks making plant has three sections.

- Weigh batching and mixing.
- Compacting.
- Transport system.

A brief explanation of automation of three 3 sections of the plant: is given below

1.3.1. **Weigh batching and mixing:** In this section, the aggregate that is crushed dust, sand, 6mm jelly and 12mm jelly, is mixed with cement and water in a given proportion. This batch of mix is fed to the compacting machine for the purpose of producing the concrete blocks.