ISSN 2278-9723
doi: 10.31838/ijccts/07.SP01.07

Research Article

DESIGN OF LCU FOR REVERSE AIR BAG HOUSE IN CEMENT INDUSTRY

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Received: 07.05.19, Revised: 07.06.19, Accepted: 07.07.19

ABSTRACT
The term LCU refers to the Local Control Unit. Cement industry may contribute significantly to the air pollution level in the vicinity of the industry. Large quantities of pulverized material are handled and the main air pollution is emission of dust. Dust is generated at all stages in cement manufacturing process from quarrying through crushing, homogenizing, burning, handling and storing to the final distribution. Reverse Air Bag House (RABH) is used to control industrial particulate pollutants. The term bag house refers to a filtration technology that uses cloth or synthetic filters for the dust collection. It consists of several bags inside it above the hopper. Dust particles from the raw mill, pre-heater are fed to this reverse air bag house section. The bag filter filters the dust outside of the bag. On cleaning the fine dust particles, it falls into the hopper and stores on the silo. Hence 99% of the fresh air is exhausted outside. The proposed system will automate the Reverse Air Bag House unit separately using PLC and SCADA.

Key words: LCU (Local Control Unit),MCU(Master Control Unit), RABH(Reverse Air Bag House),

INTRODUCTION

The design of the Local Control Unit for the Reverse Air Bag House is mainly designed to run the RABH unit continuously. Because, in some of the process industry there is no Local Control Unit for the desired units, only primary controller is enabled there is no secondary controller. If there is any problem in Primary controller the desired unit will not run continuously, it will be stopped to recover the problem. If the secondary controller is enabled parallel to primary controller, in case of any problem in primary controller the secondary controller will take of the desired process. By this the process may run in continues manner. The design of an industrial Reverse Air Bag House involves consideration of many factors including space restriction, capacity, cleaning method, fabric construction, fiber, air-to-cloth ratio; and many construction details such as inlet location, hopper design, and dust discharge devices. MODULE DESIGN:-To design the LCU for Reverse Air Bag House in Cement industry the PLC & SCADA software's are used. **DELTA PLC** is used in designing of LCU for Reverse Air Bag House in Cement industry. The PLC is a microcontroller based device with input/output circuitry that monitors the status of field connected sensor (inputs) and controls the attached (output) actuators (motor - starters, Solenoids, PLC Architecture:-

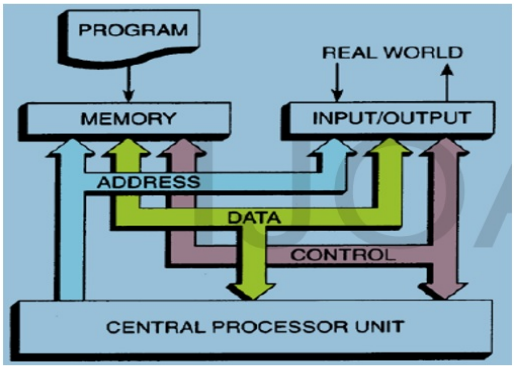

Fig 1:- PLC Architecture

The PLC architecture is divided into three parts
It is the brain of PLC system .It consists of the microcontroller, Memory IC and necessary circuit to store and retrieve information from the memory. The Job of CPU is to monitor status or state of input device, scan and solve the logic of a user program and control ON or OFF state of output device. PLC architecture design can be an open architecture design or a closed architecture design. An open architecture design allows the system to be connected easily to any device and also to programs

developed by other manufacturers. **SCADA** software (WONDERWARE INTOUCH) is also used to design the LCU for RABH unit in Cement industry. Many control systems these days need a way to interact with the process or machine operator. Legacy systems might present a whole panel full of pushbuttons, lights and switches; the development of electronic HMI (Human Machine Interface) devices made operator control and monitoring operations much more flexible, presenting text, graphics and even video to help the operator make quicker and more informed decisions."Embedded" HMIs are black boxes with a text or graphical screen that execute a configured set of displays and actions, typically running on a proprietary hardware/firmware platform. Connected to a controller via a communications port, these devices, such as Automation Direct's C-more, have come a long way in the last 20 years. It used to be that HMIs were just a convenient way to control a local PLC because you didn't have to wire up all those buttons and switches and you didn't have keep to re-wiring everything as the system grew. You could just download a new HMI configuration, which saved you time and money. SCADA (Supervisory Control And Data Acquisition) systems used to be primarily for control and monitoring of much larger, complex or widely distributed systems, such as in the oil and gas industry and utilities. They can both give you a convenient graphical user interface that makes it easy to view and control your operations. And now that many embedded HMIs have remote access, mobile apps, data logging, HDMI outputs, USB ports, audio, etc, they are taking over functions that were traditionally SCADA system space. The representation diagram of the SCADA using wonderware in touch is shown in the below figure.

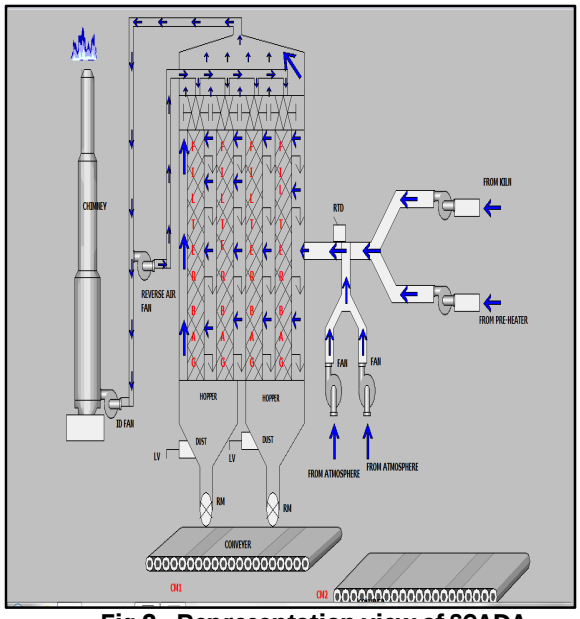

Fig 2:- Representation view of SCADA

Here the above shown figure is the developed SCADA screen of Local Control Unit for Reverse Air Bag House.

PRINCIPLE

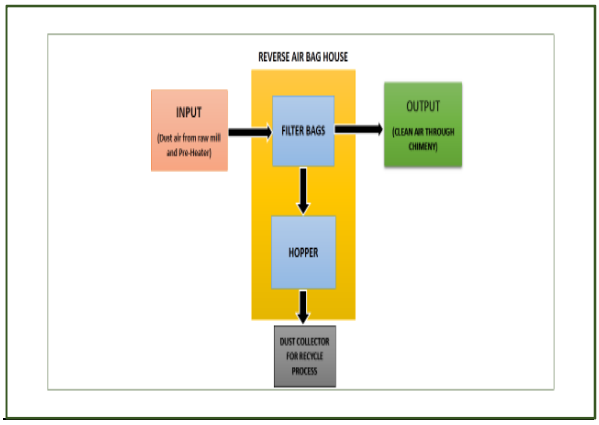

Fig 3:- block diagram of RABH

The Reverse Air Bag House (RABH) is a custom-built filter designed for cleaning gases with typically high flow rates and high temperatures. RABH is in modular construction with four or more independent modules.

Existing System

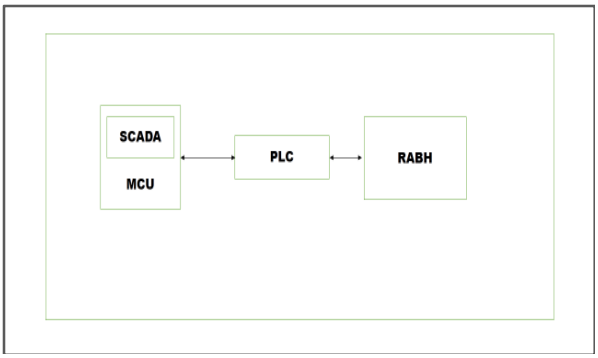

Fig 4:- Existing system

Here the RABH unit is controlled and monitored through SCADA by the MCU (Master Control Unit), the Master control Unit and the Reverse Air Bag House unit is interconnected through the Programmable Logic Controller. So if there is any problem in interconnections between MCU and PLC or PLC and RABH, the RABH unit will be subjected to stop condition, there will be no continues running of RABH.

Proposed System

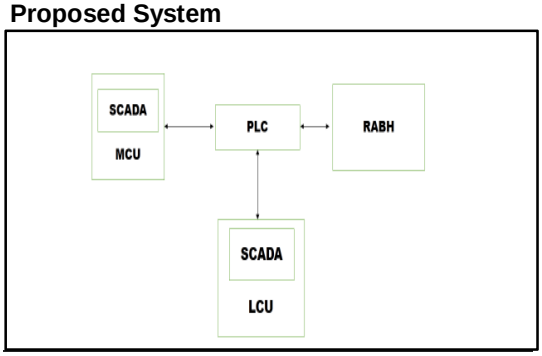

Fig 5:- Proposed system

Here the drawbacks in the existing system will be overcome by the proposed system. The Local Control Unit is introduced in this system as a secondary controller. So is there is any case of problem in between the Master Control Unit and to the Reverse Air Bag House the secondary controller (Local Control Unit) takes over the process, controlling and monitoring of the RABH unit will be taken. So there will be acontinues process of Reverse Air Bag House Unit.

Result

By designing the LCU for RABH in cement industry, the RABH unit will be run continuously although is there is any problem in Primary controller..

Conclusion

By designing the LCU for RABH offer up to 2-3 times the filter life over conventional polyester felt bags, and it allows to the continues process of the industry.

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