International Journal of Engineering Research and General Science Volume 3, Issue 1, January-February, 2015
ISSN 2091-2730

METAL SENSING USING SCADA

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Abstract— This paper presents an overview of metal sensing using SCADA. The main aim of the paper is to explain the fundamental functioning and working of the metal sensing and its need. Sensors are being used to detect the metal piece and the correct metal pieces are collected and used further as per requirement, whereas the defected metal pieces are rejected. Nowadays metal sensing is used in various industries like in automobile industries, hardware industries. The software which is used to achieve this is SCADA.

Keywords— metal sensing, sensors, ejector, designing of the system, SCADA

INTRODUCTION

With the rise of technology, automation has become an integral part of the industries. The word automation means automatic control of system and information technologies to increase the productivity in the generation of goods and delivery of the services. It helps to achieve the goals which are not possible with human involvement. The main advantages of automated manufacturing are higher quality and consistency, simplified construction, reduced handling, reduced lead time and improved work flow.

Metal sensing is the process which involves sensing of a metal with a set of parameters that need to be processed. Metal pieces are sensed using inductive sensors. If the metal piece turns out to be defected then it is removed from the conveyor belt through ejector. The verified metal pieces are collected and stored. Further, these corrected metal pieces are counted with the help of a sensor and a counter. The counter in the PLC is responsible for storing the number of verified metal pieces. This whole process is automatically controlled. The software used to design this model is SCADA.

SCADA

Supervisory Control and Data Acquisition (SCADA) system is defined as an industrial measurement and control system which is used to monitor the parameters of the system. It is flexible and open architecture.[1]It provides an interface between software and hardware. SCADA systems have made a tremendous improvement over the recent years in terms of scalability, functionality and performance. Data acquisition is very important aspect in industries as a person can supervise, control and monitor various parameters of the system located far away from the plant. Data can be acquired either through wired connection or wireless.[2] SCADA is actually a graphical and visual representation of the system through which the person can visualize the process taking place at any instant of time and can take the desired step as per the requirement. Whenever any fault occurs it will be depicted on the SCADA screen and the operator will send the message to the concerned person to rectify the fault, hence eliminating the need to visit the site on regular basis to verify the system.

DESIGNING OF MODEL

Now on the designing stage of the model we are using the components namely 3 inductive sensors, switches, ejector, conveyer belt and metal pieces.

First of all, a new file is created in the SCADA software where all the equipments will be placed from the symbol factory. One can also design these equipments manually with the help of tool box. Once all the equipments are placed as per the desired location, scripting is done to control the process to control the process. In scripting all the conditions and parameters like positioning 1of the objects and timing is set as per requirement. The model is actually a representation of the hardware model. The user can use his creativity to change the outlook of the project. Since the whole system cannot be depicted on a single screen so multiple screens are used which are later interlinked through scripting.

WORKING

The design model consists of 3 inductive proximity sensors placed above the conveyor belt.

Sensor 1- It detects the metal piece. As soon as it senses the metal, it sends the signal to the motor which start the conveyor belt therefore moving the metal piece further.

Sensor 2- This sensor senses the circular cut on the top face of the metal piece. If there is a circular hollow cut as per the required parameters in the metal piece then it will not send any signal to the ejector and the metal piece will be moved further. If the metal piece doesn't have the appropriate circular hollow cut as per the requirement then it will send the signal to the ejector.

Ejector - An ejector is placed just after the sensor 2. It will throw the metal piece out of the conveyor belt as soon as it receives the signal from sensor 2. This helps in separating the defective metal pieces from corrected pieces.

Sensor 3-All the verified metal pieces are counted with the help of counter and the numbers of pieces are displayed on the SCADA screen.

Conveyor Belt- The movement of conveyor belt is through single phase dc motor. It moves according to the scripting or programming of the SCADA.

EXPERIMENTAL DETAILS

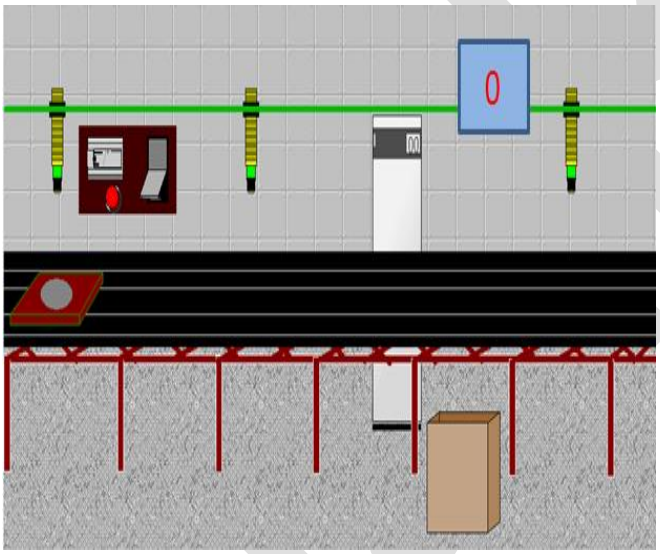

Fig.1 Layout of the proposed mode

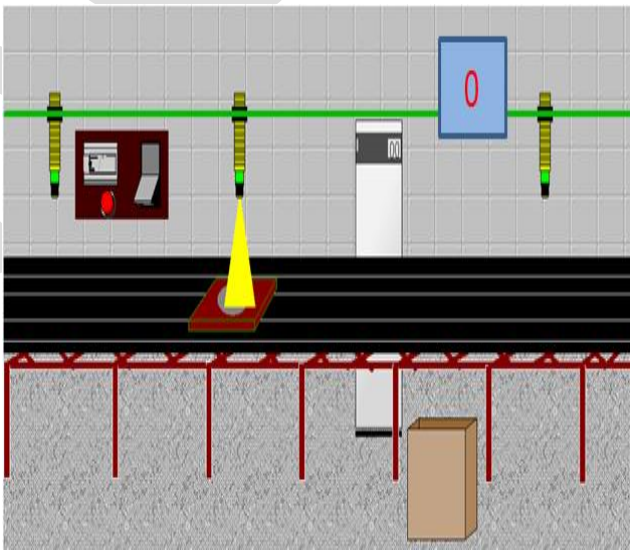

Fig.2 Runtime (circular cut sensed by sensor 2)

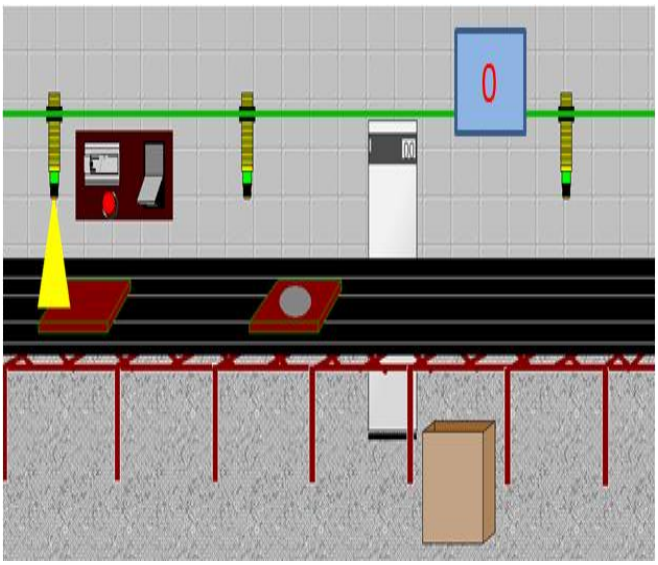

Fig.3 Runtime (defective metal at sensor 1)

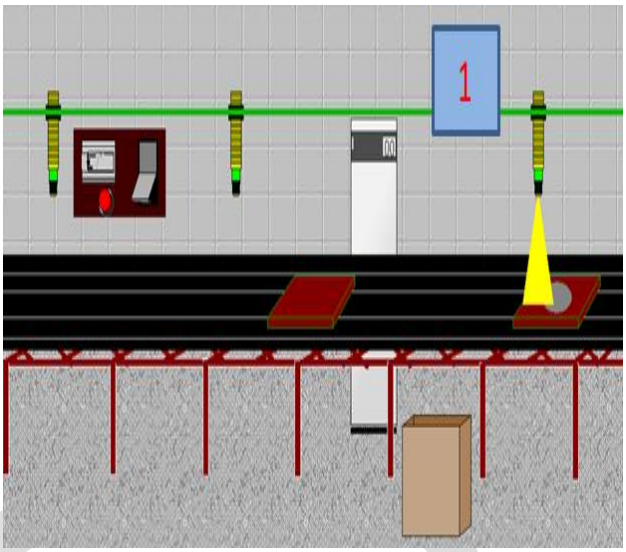

Fig.4 counting the number of metal pieces

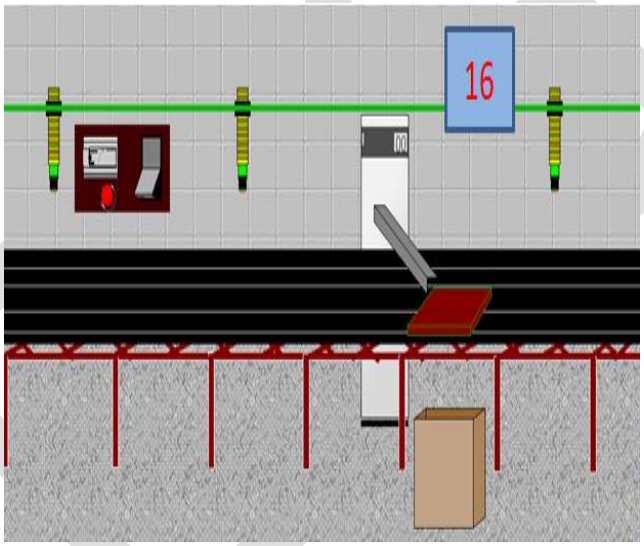

Fig.5 Ejecting the metal piece out of the conveyor

CONCLUSION

The proposed model is actually a small part of industrial automation. The model is quite useful as it can be successfully communicated with PLC (programmable logic control). The whole hardware process is represented on the computer screen which facilitates the operator to control the functioning as well as acquire the data without actually monitoring the site.

The model can be modified as per the requirement of the industry. Similar SCADA models can be designed keeping in view the hardware model designed on PLC.

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