

Material Separation And Counting System

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Abstract — The paper relates to material separator based on metallic and non-metallic material according to their characteristics that identify the same as belonging to different classes. The paper is about to separate two metals with the help of sensor and actuator. The paper describes about industrial material separator which is the main heart of the material feeding or managing the row material for the industries. Material separator basically works on identify the metal of any kind or which we want to separate also Counting and controlling system indicate how much products /material passed by with the help of sensors.

Keywords—metals, sorting, sensor, counting, Keil programming, micro-controller, conveyor belts.

I. INTRODUCTION

Partition forms are utilized different fields, for example, the concoction and oil refining enterprises where division forms are utilized to isolated and purge the results of responses, the aluminum, steel, and metal throwing ventures where detachment forms are utilized, in addition to other things, to sanitize liquid metal and to sort scrap, the glass business where division forms are fundamental to the reusing of pre and post-customer cullet, the backwoods items industry where divisions are associated with almost all procedure ventures of pulping and papermaking.

Notwithstanding the significance of partition advancements in modern procedures, division forms additionally show open doors for squander lessening and more effective utilization of vitality and crude materials. New advancements in division innovations are consequently basic for the proceeded with efficiency and worldwide aggressiveness of these enterprises.

II. LITERATURE REVIEW

In recent years, applied researchers have become increasingly interested developing new advanced techniques for the sorting of different types of scrap metals. One of the multiple steps in the recycling of non-ferrous metals is the separation of shredded material into different groups.

At present, mechanical separation and manual sorting are widely used in recycling technology. Manual sorting as well as mechanical systems such as eddy current separators (ECS), heavy media separation systems (HMS) or magnets are used to separate metal particles into several fractions. However, manual sorting is labor-intensive and mechanical systems often produce insufficient product quality. Therefore, new methods are being developed to improve the separation process. [1]

A device for detecting metallic objects in a material flow, comprising as sensing member a scanning coil consisting of a primary coil and, for example, two oppositely connected secondary windings arranged symmetrically around the primary winding so that the voltage induced in the secondary winding becomes zero as long as no conducting objects appear in the scanning area. To eliminate irrelevant signals from conducting objects in the vicinity of the scanning coil but not in the material flow or from weakly conducting objects in the material flow, the primary winding is fed with at least two alternating currents having different frequencies. [2]

The eddy current separation is a technology which applied to the field of resources to be recycled and reused that aimed at separating the scrap metals from the nonmetal substance or separating the metals from different types of scrap metals. This paper introduces the theory of eddy current separation technology, analysis the structure, working principle, advantages and disadvantages of eddy current separation equipment for electrical type eddy current separator (ECS), slipway type eddy current separator and so on. Based on the existing problems and shortcomings, discusses the key technology to resolution in the scrap copper separation field, and makes a brief design of the equipment for separation ferromagnetic metal and nonmagnetic metal at the same time and the equipment of separation for the block scrap copper. [6]

Over the last few years, there has been an increase in the application of inductive sensing in industrial automation control systems and other areas. Presently, for many applications there are standard solutions whereby the selection of the probe coils and the parameterization of the devices is carried out using empirical values. In part the signal

evaluation adapts itself to the respective test conditions automatically. With the help of a mathematical modelling approach and the visualization of the measured fields it is possible to optimize all constructive and physical parameters of inductive sensor for the various settings of tasks, e.g. in the field of eddy current crack detection, metal detection in environmental systems, food industry and demining problems of antipersonnel landmines. In order to realize this approach, the engineer can make use of different numerical procedures and software packages. In this paper the boundaries of the analytical method are discussed and the possibilities of modern numeric procedures for the computer-aided draft of inductive sensors for different applications are shown. [8]

III. WORKING OF THE SYSTEM

The system works in two phase: A) Separation B) Counting.

A. Separation

In the division stage, as a matter of first importance the power supply is given to dc engine and transfer board by means of transformer and rectifier circuit. The transport line component is associated with the dc engine for material transportation. The metal sensor is kept at certain separation from the finish of transport line. The metal sensor is associated with the hand-off board circuit. The actuator that drives the metal down from the belt is settled close-by the attractive sensor. At the point when blended material (plastic and metal) passes on the transport line the sensor detects the metal. The sensor offers flag to the circuit and transfer works the instrument. This component works like actuator. It drives metal down and plastic goes through. That is the way it isolates the plastic and metal materials. Figure 1. Demonstrates the working of the partition procedure and its different segments.

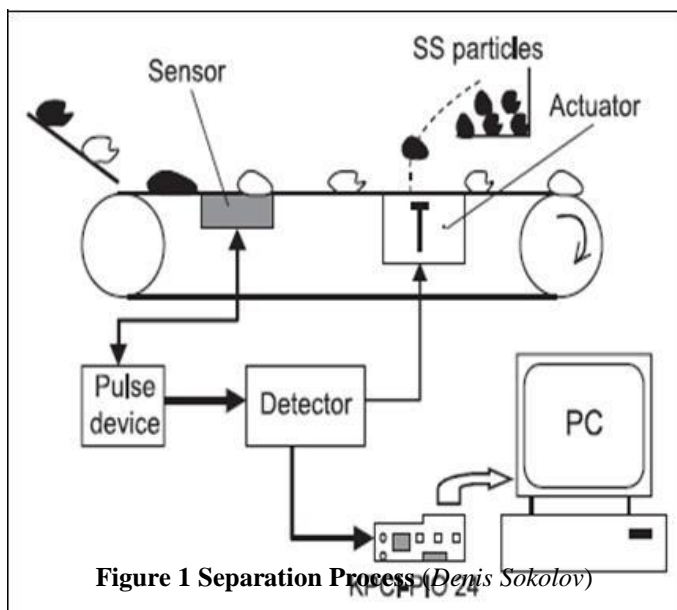


Figure 1 Separation Process (Denis Sokolov)

B. Counting

The last creation is turning out on the transport line component. Presently an infrared nearness sensor is associated at both side of transport line for checking the creation. This sensor yield is associated with microcontroller based circuit. The LCD in microcontroller pack demonstrates the quantity of generation tallied by the sensor. At the point when the item goes before the sensor, the sensor tally the items. Presently in the event that we need to control the creation then we need to set the particular number of generation in LCD by utilizing microcontroller unit. At the point when the required creation is done microcontroller stops the engine of transport line, the transport line quits passing material. That is the means by which the creation can be controlled. Figure 2. Demonstrates the tallying procedure and how its different parts functions.

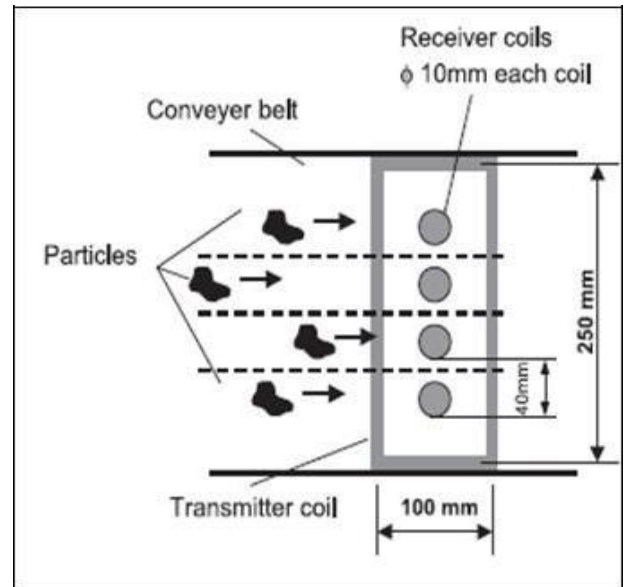


Figure 2 Counting Process (Denis Sokolov)

Figure 3. shows the modeling of the system. It is build up on creo modeling software.

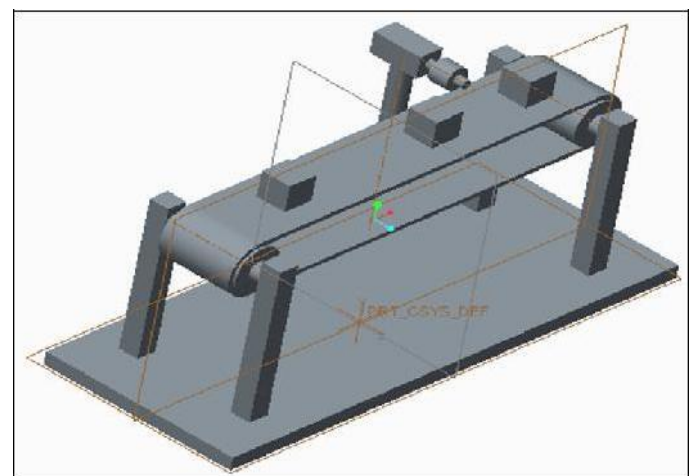


Figure 3 Modeling of system

IV. CONCLUSION & FUTURE WORK

Material separation and counting system, separate the material as per user requirement as well as count and control the number of production. Ultimately it reduces the human efforts and promote the industrial automation. Due to its usage it is widely adopted in the industries. In this paper we have discussed a varieties of separation and counting system, which leads to developing more efficient system in future as per their characteristics. This system basically focuses on the separation of the objects by considering their physical properties like metallic and non-metallic object. In future this can be extended by considering other factors such as temperature variance, color, weight, size, density and many more.

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