

A New Method of Automatic Dimension Analyzer

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Abstract--- *The main aim of the project is to measure the dimensions of object in the fully automated way and it can be implemented in the industrial applications mainly in the manufacturing industries, when the object was manufactured it was inspected automatically and can also decide automatically whether the manufactured product is accepted or rejected and also either it may be re machined again. Mainly it was used in the QC department of manufacturing industries.*

Keywords--- *Automatic Dimension Analyzer ADA, Microcontroller, Stepper Motor.*

I. INTRODUCTION

Automatic dimension analyzer is a machine , can measure the dimensions of the components. As we all know Measurements play a vital role in manufacturing field to maintain the quality of the product. Generally we are using measuring instruments like vernier calipers, micro meters, etc to measure the dimensions of various components at required level of accuracy. But Dimension analyzer has a capability to measure & display the dimensions of basic shapes like CUBES, RECTANGLE BLOCKS and CYLINDERS.

ADA can measure the following features:

- LENGTH
- WIDTH
- THICKNESS
- DIAMETER
- HEIGHT
- DEPTH

II. PHYSICAL STRUCTURE

The roller of the conveyor was engaged with the gear to the stepper motor and it will help to move the conveyor. The **IR LED** and the **PHOTO DIODE** was situated in the conveyors either side. There was a mechanical arrangement to push the components to the respected bin. These mechanical arrangements were geared with the stepper motor. This stepper motor was connected to the driver IC of the stepper motor and the IC was connected to the microcontroller.

The changing of the position of component is done by using the stepper motor and the sliding guide ways. The component was transferred precisely using those guide ways and the motor.

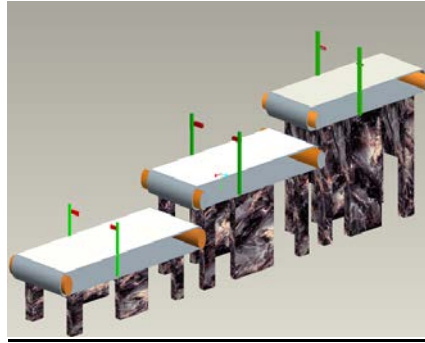


Fig 1. Three Stages of Conveyor Sketch

This sketch shows the three various stages of the conveyor which will be able to carry the component to be measured and the component was transferred to the next conveyor using some mechanical techniques and the guide ways, these three stages can perform the measurements such as length in the first stage, width in the second stage and the thickness or height in the third stage of the conveyor

III. PRINCIPLE OF WORKING

The ADA consists of the stages conveyor, the component is traveling in the conveyor and when it reaches the IR LED tip which is emitting the rays. It will disturb the rays between the emitter and collector that are between IR LED and the photo diode and at the time of interrupting the clock inside the microcontroller starts counting the time period that the IR beam rays have interrupted. At final when the component crosses the IR LED and passed away again the clock inside the microcontroller stops.

$$\text{DISTANCE} = \text{SPEED} \times \text{TIME}$$

SPEED = Speed of the servo motor (rpm)

TIME = Interruption period of the laser beam

DISTANCE is the measurement of the component (length, width, thickness, and diameter)

The microcontroller senses and calculates the reading and displays using LCD display. Thus the dimensions are observed. This automatic dimension analyzer able to perform the measuring of dimension without any human help. This dimension analyzer project also has the provision of accepting and rejecting of a component that is coming after the machining process. These components are checked and decided whether it is to be accepted or rejected by measuring the dimension of the component. It is done by the comparing of measured values and the pre-defined values in the microcontroller.

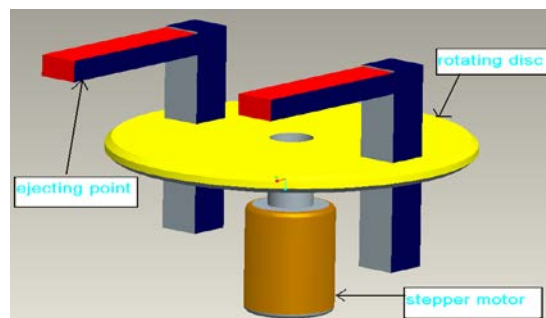


Fig 2. Rejecting Mechanism For The Rejected Component

IV. RESULT AND CONCLUSION

The main aim of the project is to measure the dimension of the component automatically without any human interface and also having the intelligence to decide whether the component is accepted or rejected to the next stage.

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