DESIGN AND IMPLEMENTATION OF AUTOMATIC TRAVERSE MACHINE

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ABSTRACT

Today's Industry where production rates are higher large amount of components are produced everyday it is necessary to keep a track of components produced every day . While some industries may do so by giving each component a unit number, it is relatively difficult to give each component a unit number by carving the number of unit on the component using a hammer and nail. This method is also inefficient. This project pertains to the Linear Traversing System with workstation, which caters to better ease of setup Features. Traverse is the method in the field of surveying to establish control network. Linear Traverse operation - Initially Traverse will be at home position. Operator will locate the job into the fixture and manually push the fixture at printing location on LM guides and make sure he will fixture base plate is in contact with butting plate. Job presence sensor will check the job in fixture. He will press Two hand push buttons mounted on table to trigger the traverse. Traverse will move in forward direction and again come back to home position in reverse direction. Printing will take place in forward movement of print head. Operator will pull the fixture base plate towards table front side. He will unload printed job and load the new job and repeat the process. Light curtains are provided for operator safety. Traverse mechanism will not work if the doors are open or Light curtains are cut. For new job operator will have to change the fixture and select printing message through printer. This project hence helps not only to in increase the efficiency in keeping track of components but also reduces the load on workers.

Keywords: Linear Traversing System, Butting plate, Print head, Light curtains.

1. INTRODUCTION

Traverse is a method in the field of surveying to establish control networks. It is also used in geodesy. Traverse networks involve placing survey stations along a line or path of travel, and then using the previously surveyed points as a base for observing the next point. A traverse is a means of providing a network of control stations over an area, the stations being used subsequently for surveying detail in the preparation of site plans prior to the design and setting out of an engineering project. The Linear Guided Stepper motor control X axis traverse mechanism will be mounted On 80X 40 aluminum profile and whole assembly will be mounted on Table. Print head will be mounted on Traverse carrier plate. The Stepper motor used is a Lead shine. This is the prime mover of the system. While choosing a system, one has to keep in mind the application .Bar codes have been used extensively in production systems to eliminate the laborious and time-consuming process of manual data entry and to capture information about products to which they are Attached Bar codes are used to check theft and speed up sales. In recent years deep learning and artificial intelligence with high transform and morphological operations is increasingly being used to localize and decode barcodes The Parallel Line Segment Detector with Hough transform and morphological operations have also been used to decode barcodes in real-time Furthermore, the Zamberletti algorithm has recently been used to detect multiple 1D and 2D bar code images Most of these methods have tried to localize barcodes in real-time when the images are stationary rather than in motion. There is still the increasing need to capture barcodes in motion. In summary,

according to literature and practice, speed, dirt, moisture, uneven illumination and complex background hinder successful barcode detection. Therefore, there is a need to find appropriate solutions to overcome these

problems. The objective of this research was to provide a robust system for successful automatic detection of barcodes in production. This was achieved by comparing a hand based barcode laser detection system to an image-based barcode detection system to determine which provides more reliable, stable and faster results under various conditions.

1.1 COMPANY PROFILE

A Leading Manufacturing Company of Elevator Panels and Fabrication of all types of Elevetors Parts. We have added new fabrication equipment to cater to various other Products, in mechanical, electrical applications. I Established in the year 2012, the company, with its experienced people and their accumen, has been gradually moving towards achieving its goal to become a major player in catering to the needs of the Industry.Situated in the heart of Rabale, Navi Mumbai, the company today has been fortunate to have served some of the esteemed customers.

1.2 LINEAR TRAVERSE OPERATION

Initially Traverse will be at home position. Operator will locate the job into the fixture and manually push the fixture at printing location on LM guides and make sure he will fixture base plate is in contact with butting plate. Job presence sensor will check the job in fixture. He will press Two hand push buttons mounted on table to trigger the traverse. Traverse will move in forward direction and again come back to home position in reverse direction. Printing will take place in forward movement of print head. Operator will pull the fixture base plate towards table front side. He will unload printed job and load the new job and repeat the process. Light curtains are provided for operator safety. Traverse mechanism will not work if the doors are open or Light curtains are cut. For new job operator will have to change the fixture and select printing message through printer.

Before starting the system, check that all the wires have been correctly connected to their respective functional peripherals. Once this is ascertained, check & confirm that there are no mechanical obstruction to the Linear Traversing as this can cause an accident. Then machine power will switch on.The work piece has to be marked with serial number at exact same positions this process should be carried for each similar work piece without any disturbance is required criteria of industrial clients including basic safety features.In the time it takes average person to manually punch or mark/type a couple letters or numbers to keep count of inventory. The serial numbers, barcodes can be laser printed on the work piece for economical and time saving purpose.you can scan a single serial number/barcode containing numerous characters at once. That means serial numbers and bar coding your inventory will make inventory management much quicker and easier.

FIG 1.1 ACTUAL MODEL OF TRAVERSE MACHINE

1.3 SYSTEM OPERATION

The Auto component marking system through linear traversing system comprises of the following parts …

1. Linear Traversing system
2. Stepper Motor with Drive
3. Control Panel
4. Linear Component mounting Fixture

The Linear Guided Stepper motor control X axis traverse mechanism will be mounted On 80X 40 aluminum profile and whole assembly will be mounted on Table. Print head will be mounted on Traverse carrier plate.

1. The Stepper motor used is a Leadshine. This is the prime mover of the system. While choosing a system, one has to keep in mind the application.

2. The control panel is a system comprising of …

• Delta makes PLC and HMI,
• Meanwel makes SMPS,
• Interface card
• Leadshine makes Stepper motor and drive.

3. The system is normally supplied with a set of 2 hurting connector 1 is 6 pin connector used for printer IOS and other is 24 Pin connector for machine IOs.

2. OPERATION IN TRAVERSE MACHINE

Initially Traverse will be at home position. Operator will locate the job into the fixture and manually push the fixture at printing location on LM guides and make sure he will fixture base plate is in contact with butting plate. Job presence sensor will check the job in fixture. He will press Two hand push buttons mounted on table to trigger the traverse. Traverse will move in forward direction and again come back to home position in reverse direction.

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FIG 2.1 FIXTURE

3. WELCOME SCREEN & RUN SCREEN

After switch on the power supply, following "Welcome screen" will display. From this screen we have to press following button on HMI screen or after switch on the system approximately . 1.5 sec the screen will change to RUN screen. The Run screen will display on HMI. After "welcome screen" following "Run screen" will display.

FIG 3.1 RUN SCREEN DISPLAY

4. SEMI AUTOMATED SYSTEM

Adjust the printing head as per the job height as per provided the height fixture bar as per the job height. Please check for the alarm, if any alarm is present take the corrective action and remove the alarm. In alarm windows "HOME NOT DONE" is showing please press the alarm switch on the HMI. Linear traverse goes its home position. And on alarm windows show that "SYSTEM HEALTHY". Press the Cycle Start button. After completing the homing of liner traverse. It is essential to press the Cycle Start Push button from Panel. Please take the fixture plate outside put the job on the fixture plate and push the fixture plate Inside the workstation upto the butting plate. Once the fixture plate touch the butting plate fixture position proxy will get on. If job is present on the fixture the job present sensor also get on. Press the two Green mushroom head push button at a time to start the traversing system. If you push the one push button and within the 5 sec if you not push the other push button on the alarm window the warning will show that button press time out. Now Liner traversing system start to move the forward direction, as it started to move in forward direction PLC system generate the print trigger signal and send to the printer. As per the printer parameter set in the printer will print the data on the job. The traversing system reach its forward direction, after some millisecond it automatically start to move reverse direction and came to its home position. Take the fixture plate outside by pulling it, remove the printed job and put the new job on the fixture plate and repeat the cycle. As soon as printer prints the data on the job, the counter will increment by 1 count. During the operation if operator cut the light curtain, open the rear door, press the Emergency switch or open the panel door the traversing system stop instantly. And in the alarm window concern alarm will display. During the cycle running operator push the "STOP PB" system will complete the current cycle of printing traverse came to home position and system will stop. It is semi automatic system. Same cycle will continue till operator press the Cycle stop button.

5. RESULT AND COMPARISION

5.1 On Field Testing Remark

Machine print the serial number in proper dimensional region & accuracy.

Machine print serial number in proper working condition.

No sparks observed during testing.

5.3 MANUALLY DONE JOB

As you can see this was the basic method for serialing the job. which is the manual method the worker use to do it manually.

FIG 5.3.1 MANUALLY DONE JOB

Advantages

- Its cheap

Disadvantages

- Time consuming
- Human energy needed
- Serialing is not visible clearly
- Loss of material
- Its not safe to use because brute force required

5.4 JOB DONE ON TRAVERSE MACHINE

This method is automated method so it is made to overcome the manual method. Therefore it is more efficient method.

FIG 5.4.1 JOB DONE ON TRAVERSE MACHINE

Advantages

- Its time efficient.
- No human energy required as it is automated.
- Serialing done is clearly visible.
- No unnecessary material loss.
- All safety measures are taken.
- No need of experience workers.
- Its very easy to operate.
- The count of jobs can be kept in proper manner.

Disadvantages

- Need more space than manual method.
- Not cheaper than manual method.

CONCLUSION

As the outcome we can see automated traverse machine is more efficient than the manual machines. We have design it in such a way that keeping safety measures in mind for workers working on it. There will be no wastage of material or job. The printing of barcode on the job will be accurate at the same position and there will no confusion during marking system. Experience worker not required. Reduce Time consumption the work speed will be accurate. It will give more enlargement for upcoming engineers to study and develop in field of engineering.

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