AUTOMATIC SHOT BLASTING PROCESS

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Abstract: This paper describes the solution on problem of shot blasting process with the help of automation, which leads to time and energy consumed. Shot Blasting is a surface treatment process using high velocity steel abrasive. Shot blasting is method through which it is possible to obtain excellent cleaning and surface preparation for secondary finishing operations. It also implies the problems like unequal finishing, more time and energy consuming and bad quality product. The automation is presented here has been designed to reduce all the problems regarding shot blasting process.

Keywords: Solution by using automation, consumption of time and energy, obtain excellent cleaning Improved casting product quality.

I. INTRODUCTION

Automatic shot blasting is intended for metal structures. This is an effective cleaning & surface finishing method. It is the process for removing sand, other impurities from the metal. Higher class cleaning can be provided by that automatic cleaning method. Automatic shot blasting is subject to strict control under international requirements for the clients or customers to be 100% confident of high quality service. There is having blast of shots before application of paints and related product. Hence there is removal of previous coating with the help of this machine & efficient structures. The automatic process of shot blasting having quick action of cleaning & finishing. All are having safety features. It reduces chances of corrosion & oxidation as well.

II. REVIEW OF PAST PROCESS IN AN INDUSTRY

From the past process of shot blasting there are various parameters which are ignored at previous. It may lead the quality of the product.

Various parameters like:
1. Improper shot level.
2. Weight of the shots.
3. Pressure of forced shot/directed shot.

Are not carried out properly for achieving best quality product. All above process were manual control. Its process time entirely by artificial time. These were on the one hand may be due to operation of workers did not control the time, more or less require for processing. Leading to product quality problem and waste of energy, increase equipment wear and tear.
Our project analysis from an industry:
1. Hopper level = 800kg (Old)

<table>
<thead>
<tr>
<th>Current</th>
<th>Voltage</th>
<th>Time cycle (min)</th>
<th>Load (kg)</th>
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<tbody>
<tr>
<td>10</td>
<td>437</td>
<td>7+4</td>
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<tr>
<td>15</td>
<td>438</td>
<td>10+5</td>
<td>301-400</td>
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2. Hopper level = 800kg (600 new + 200 old)

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<tbody>
<tr>
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III. PROPOSED METHOD FOR MITIGATE ABOVE PROBLEM:
1. Use of PLC
2. Microcontroller

1. Automation by using plc

Block diagram

PLC is arranged in electric control blast. The automatic control device can preset the technological time and is high in automation, degree, safe and reliable.

In our project, we have considered inputs and outputs to make PLC logic and to start machine work process. The dust collector fan, bucket elevator drive, spinner hanger drive, turbines, shot feed valve these whole assembly is a shot blasting machine. All above are outputs of PLC and the switches of all above are inputs.
To achieve our objectives, a present invention includes a shot blasting machine and electric control box, the shot blasting machine is connected an electric control circuit. The electrical control box is equipped with a PLC via a wire and electrical control box panel.

The present invention, since the electrical control box is equipped with PLC, the transmitter operating time by PLC, after preset time is reached automatically stopped working.

The whole process without having to look after the workless. The present invention can be preset process time, high degree of automation, safe, reliable.

2. Automation by using microcontroller

Microcontroller is used in automation of shot blasting process. It enables connectivity and control in all the “things” around us. It is a decision making block in our project. The microcontroller makes decision weather to work out next process or to block and to stop the process of machine i.e. finishing.

Microcontroller is used in any application that requires decision making or system monitoring. It is having analog and digital input/output capabilities. User can program a required condition in programming language. Microcontroller accept the information and takes an action or decision on it. Like in our project, we have put load conditions with acceptable current.fr particular load, the defined currents are present, then microcontroller allows to continue work of machine and demanding to fulfill the parameter like shots in hopper placed above the machine to get required current and voltage to done the satisfied finishing work of casting material.

IV. RESULT

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<thead>
<tr>
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<th>Voltage</th>
<th>Time cycle(min)</th>
<th>Load (kg)</th>
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<td>7</td>
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</tr>
<tr>
<td>15</td>
<td>428</td>
<td>10</td>
<td>401-500</td>
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V. CONCLUSION

In our opinion, if there is unbalanced weight of hopper of shots, improper switching of all motors, drives and turbine assembly, then machine leads to incorrect operation. Analysis and risk assessment play an important role in this project. Improper handling, switching and incorrect adjustments may consist risk and decaying life of machine.

To achieving better finishing and quality product it is necessary to fulfill the requirement of that particular machine. Main required parameters are current rating voltage rating and shot level to run the machine satisfactorily. Size of shots is one more factor for efficient work.

In our project, we include automation. We had done automation by using microcontroller as well as PLC. Automation brings here more easy operation, indication of parameter fulfillment, better finishing than any of manual work.

REFERENCE


IV. American Industrial Hygiene Association 25711 Southfield Road Southfield, MIT 48085.