

## **Rehabilitation of manufacturing equipment**

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### **Abstract**

With the advice of some teachers Institute of Technology engineers Nuevo Laredo was achieved rehabilitate and operate an arm and a conveyor belt electro- pneumatic. Both machines were broken and does not work. The aim of this work was to restore an electron - pneumatic arm and a conveyor belt of a production line and have more teaching tool for student use. How these machines mentioned above were carried back to the operation described.

### **Technology, PLC, Solenoid**

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## Introduction

At present, technology is in constant progress and growth in greater proportion compared to past decades. Car models, electronic gadgets such as cell phones, home appliances, all show updates with improvements in both software and hardware or both. Therein lies the importance of also having school equipment (with which students can practice) in a constant update.

This document explains how an electro-pneumatic arm "Amatrol Flexible Manufacturing 2- 94 - FMS2" and a conveyor belt of the same brand were updated. In addition to the PLCs with which they were controlled (Allen Bradley obsolete), they were updated by Siemens of new generation.

## Materials and methods

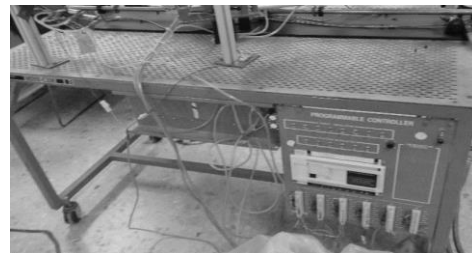
We were given (to the students who would perform this work) from our advisors, the electro-pneumatic arm and the conveyor belt under the conditions that can be seen in figures 1, 2 and 3. It was started making operational reviews in The conveyor belt. It was proved that the operation of the elements (solenoid valves, pistons, hoses, switches, wiring).



**Figure 1** Conveyor belt

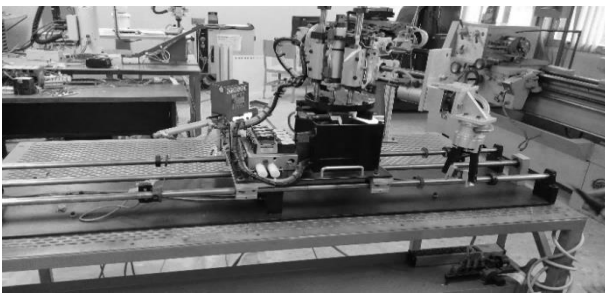
A compressor was placed and checked that there were no leaks in the hoses. The continuity of the switches was checked with a multimeter. After the functional tests were carried out, it was verified that the electrovalves were operated manually. The compressor was connected to the hoses and each electrovalve was individually checked. In solenoid valves that failed, they were opened and cleaned inside, they were rearranged their packaging. Of a total of 8 solenoid valves, one failed and was replaced. It was checked that there were no deterioration and / or damage in the conveyor chain. Wiring of valves and switches was separated and labeled for better organization.

For the pneumatic arm, it started in the same way as with the conveyor belt, checking and correcting faults. The electro-valves this time had damages that we only managed to make them work momentarily, therefore, our adviser opted to replace all the electro-valves. The wiring of each switch and valves was identified, so that connections to the new PLC could be made easier and the margin of error reduced.



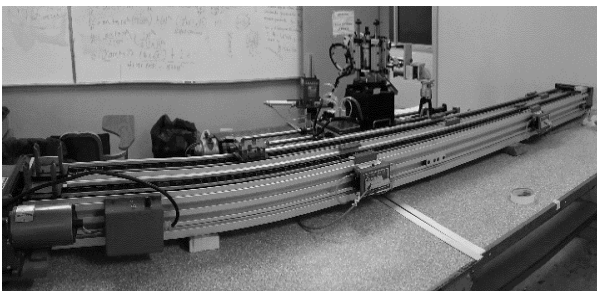
**Figure 2** Obsolete PLC's

Once the machines were already checked, the old PLCs were dismantled and the new ones were installed. The rest of the work was to make the connections between the 24V power supply with which the current, the electro-valves and the switches were to be supplied. Push buttons were also mounted to operate as a start and stop.



**Figure 3** Electro-pneumatic arm

A program was loaded onto the electro-pneumatic arm to verify that it was working completely. The results were favorable, the arm and the conveyor belt functioned in their entirety. Figure 4 shows the final result.



**Figure 4** Equipment rehabilitated

## Discussion

The greatest benefit obtained from a rehabilitation of this manufacturing equipment is that it will be very useful for the didactic use, being of support for both professors and students.

However, do not forget that the equipment is not new. Periodic maintenance is required to verify the condition of both the electro-pneumatic arm and the conveyor belt. Check the good functioning and that its components are in optimal conditions to reduce the probabilities of a future failure.

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