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Automated Stamping Machine

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ABSTRACT

In a continuous production beverage industry where multiple beverages are manufactured this machine can be used to sort different kinds of beverage bottles which in turn will save time and labour. This machine will sort metallic cans from plastic bottles and will push the plastic bottles into another conveyor belt. This machine works on electro-pneumatic and plc. This uses air from compressor to drive the cylinder. This machine is made by using a double acting pneumatic cylinder, a double solenoid valve, and proximity sensors which sense metals. This machine works on plc software "SIEMENS STEP 7 LITE". All the pneumatic components are Festo manufactured.

I. INTRODUCTION

Mechatronics

Mechatronics is a multidisciplinary field of science that includes a combination of mechanical engineering and computer and electronics engineering. As technology advances, the subfields of engineering multiply and adapt. Mechatronics' aim is a design process that unifies these subfields. Originally, mechatronics just included the combination of mechanics and electronics, therefore the word is a combination of mechanics and electronics; however, as technical systems have become more and more complex the definition has been broadened to include more technical areas. The word "mechatronics" originated in Japanese-English and was created by Tetsuro Mori, an engineer of Yaskawa Electric Corporation. The word "mechatronics" was registered as trademark by the company in Japan with the registration number of 46-32714 in 1971. However, afterward the company released the right of using the word to public, and the word "mechatronics" spread to the rest of the world.

Description

A mechatronics engineer unites the principles of mechanics, electronics, and computing to generate a simpler, more economical and reliable system. The term mechatronics was coined by Tetsuro Mori, the senior engineer of the Japanese company Yaskawa in 1969. An industrial robot is a prime example of a mechatronics system; it includes aspects of electronics, mechanics, and computing to do its day-to- day jobs. Engineering Cybernetics deals with the question of control engineering of mechatronic systems. It is used to control or regulate such a system (see control theory). Through collaboration, the mechatronic modules perform the production goals and inherit flexible and agile manufacturing properties in the production scheme. Modern production equipment consists of mechatronic modules that are integrated according to a control architecture. The most known architectures involve hierarchy, polyarchy, heterarchy, and hybrid. The methods for achieving a technical effect are described by control algorithms, which might or might not utilize formal methods in their design.

Applications

- Automation and robotics
- Servo-mechanics
- Sensing and control systems

- Automotive engineering, automotive equipment in the design of subsystems such as anti-lock braking systems
- Computer-machine controls, such as computer driven machines like CNC milling machines,
- CNC water jets, and CNC plasma cutters
- Expert systems
- Industrial goods
- Consumer products
- Mechatronics systems
- Medical mechatronics, medical imaging systems
- Structural dynamic systems
- Transportation and vehicular systems
- Mechatronics as the new language of the automobile
- Computer aided and integrated manufacturing systems
- Computer-aided design
- Engineering and manufacturing systems
- Packaging
- Microcontrollers / PLCs
- Mobile apps
- M&E Engineering

As more and more robots are designed for specific tasks this method of classification becomes more relevant. For example, many robots are designed for assembly work, which may not be readily adaptable for other applications. They are termed as assembly robots. For seam welding, some suppliers provide complete welding systems with the robot i.e. the welding equipment along with other material handling facilities like turntables etc. as an integrated unit. Such an integrated robotic system is called a welding robot even though its discrete manipulator unit could be adapted to a variety of tasks. Some robots are specifically designed for heavy load manipulation, and are labelled as heavy duty robots

Physical implementations

Mechanical modeling calls for modeling and simulating physical complex phenomenon in the scope of a multi-scale and multi-physical approach. This implies to implement and to manage modeling and optimization methods and tools, which are integrated in a systemic approach. The specialty is aimed at students in mechanics who want to open their mind to systems engineering, and able to integrate different physics or technologies, as well as students in mechatronics who want to increase their knowledge in optimization and multidisciplinary simulation technics.

The specialty educates students in robust and/or optimized conception methods for structures or many technological systems, and to the main modeling and simulation tools used in R&D. Special courses are also proposed for original applications (multi-materials composites, innovating transducers and actuators, integrated systems, …) to prepare the students to the coming breakthrough in the domains covering the materials and the systems.

For some mechatronic systems, the main issue is no longer how to implement a control system, but how to implement actuators. Within the mechatronic field, mainly two technologies are used to produce movement/motion.

II. LITERATURE REVIEW

- **Simulation in a virtual environment to operate with an automatic production line used in the automotive industry.**

Author:- Glauber Ladislau Pinto

Abstract:- The globalization of the economy has increased competition and intense dispute for new markets. It has accelerated the evolution of technology in all segments. Manufacturing automation, robotics production lines, programmable logic controllers (PLC), simulation and offline programming of equipment technologies are known by the main companies, but the integration of these technologies is always a complex issue and requires timing. Actually it expands time in development of standards, in design software and simulations, while much work still remains to be done in the field.

Aligned with the technology of Digital Factory there is a technology of Virtual Commissioning. With this technology it is possible to bring to the lab environment a lot of solutions found so far only in the installation phase.

- **A Complete Approach to Automated Assembly.**

Author:- Randy Behring , Giovanni Bonomi

Abstract:- Technological advances have made it possible to advance assembly of aircraft from the days of "Rosie the Riveter" to automated manufacturing facilities of the future.

Improvements in CNC controlled machines, called Positioners, and tooling, called End Effectors, have enabled the assembly process to pass from, two people, to robots working on opposite sides of a panel. Further developments with Multi-functioning End Effectors and stiffer more accurate Positioners have reduced the station to station cycle times of completely assembled panels. New generation systems show even greater promise for, not only lower cycle times, but lower investment costs and higher reliability. The new generation systems consist of an advanced Rivet Feed System, for trouble free fastener feeding, an Automatic Part Feed System, for greater utilization of the Assembly Cell, a Double Ram Gantry, for stiffer more accurate end effector positioning, and Multi-function.

III. SUMMARY

They were first developed in the automobile industry to provide flexible, ruggedized and easily programmable controllers to replace hard-wired relays and timers. Since then they have been widely adopted as high-reliability automation controllers suitable for harsh environments. A PLC is an example of a hard real-time system since output results must be produced in response to input conditions within a limited time, otherwise unintended operation will result.

IV. CONCLUSION

PLCs are well adapted to a range of automation tasks. These are typically industrial processes in manufacturing where the cost of developing and maintaining the automation system is high relative to the total cost of the automation, and where changes to the system would be expected during its operational life. PLCs contain input and output devices compatible with industrial pilot devices and controls; little electrical design is required, and the design problem centers on expressing the desired sequence of operations. PLC applications are typically highly customized systems, so the cost of a packaged PLC is low compared to the cost of a specific custom-built controller design. On the other hand, in the case of mass-produced goods, customized control systems are economical. This is due to the lower cost of the components, which can be optimally chosen instead of a generic solution, and where the non-recurring engineering charges are spread over thousands or millions of units.

V. REFERENCES

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