

Dedication

To,

My father

My mother

My wife

My family

Acknowledgements

The research would not have been possible without the efforts of many people. My warm appreciation to supervisor

Ustaz ABD ALLA SALIH ALI for his effective and unlimited support and assistance in success of this research and preparation of qualified future engineers.

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Abstract

The PLC is one of the current control units. The PLC now becomes very necessary control unit for many factories. In soft drinks bottling factories, there are critical problems facing these factories. One of these problems has occurred in the bottle washing machines during cleaning the bottles. There are several stages of cleaning the bottles. In the first stage cleaning bottles is done by fresh water. In the second stage cleaning bottles is done by caustic soda. In this stage there must be limited concentration of caustic soda.

Unfortunately, concentration of caustic soda is not stable. Sometime it becomes lower and at other times it becomes higher, and this results in some problems such as unclean bottles and cost effective. If the concentration of caustic soda is lower, bottles will be dirty and higher concentration leads to higher cost.

The objective of this project is to use a PLC to control caustic soda concentration instead of manual adding caustic soda by operators supervised by Chemical Engineers. Caustic soda will be added automatically to avoid unbalanced caustic soda concentration.

تجريد

حاكمة المنطق القابلة للبرمجة أصبحت تحتل أحد أهم مكونات التحكم الحالي و أهم وحدة تحكم بالنسبة لبعض المصانع . هنالك مشاكل حرجة تواجه معظم مصانع المياه الغازية والعصائر ، إحدى هذه المشاكل تحدث في ماكينة غسيل الزجاج خلال مراحل نظافته. توجد عدة مراحل لنظافة الزجاج. في المرحلة الأولى تتم نظافة الزجاج بواسطة الماء النقي. أما في المرحلة الثانية، تتم نظافة الزجاج بواسطة الصودا الكاوية وفي هذه المرحلة يجب أن يكون تركيز الصودا الكاوية محدد.

لسو الحظ في هذه المرحلة تركيز الصودا الكاوية غير مستقر، أحيانا يكون تركيز عالي وتارة أخرى يكون تركيز منخفض واختلاف التركيز يؤدي إلى بعض المشاكل مثل الزجاج الغير نظيف والتكلفة الفعالة. إذا كان تركيز الصودا الكاوية منخفضا، فإن الزجاج سوف يكون متسخا. إذا كان تركيز الصودا الكاوية عاليا يؤدي إلى تكلفة عالية.

الغرض من هذا المشروع هو حل مشكلة تركيز الصودا الكاوية باستخدام برنامج التحكم المنطقي بدلا عن إضافتها يدويا بواسطة المشغلين تحت إشراف المهندسين الكيميائيين. في هذا المشروع تتم إضافة الصودا الكاوية بواسطة متحكم أوتوماتيكي تجنباً لحدوث عدم التوازن في تركيز الصودا الكاوية.

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Abbreviations

PLC	Programmable Logic Controller
MODICON	Modern Digital Controller
I/O	Input/Output
MAP	Manufacturing Automation Protocol
PC	Programmable Controller (UK Origin)
PBS	Programmable Binary System (Swedish Original)
RAM	Random Access Memory
ROM	Read Only Memory
EPROM	Erasable Program Only Memory
EEPROM	Electric Erasable Program Only Memory
CPU	Central Processing Unit
PM	Programmable Monitor
DC	Direct Current
AC	Alternating Current
A/D Module	Analog/Digital Module
OTL	Output Latch
RES	Reset
CTU	Counter Up
CTD	Counter Down
UDC	Up-Down Counter
HSC	High Speed Counter
TON	On-Delay Timer
TOF	Off-Delay Timer
RTO	Retentive Timer

TMRA	Accumulating Timer
TMH	High Speed Timer
TMS	Super High Speed Timer
TMRAF	Accumulating FAST Timer
IC	Integrated Circuit
LEDs	Light Emitted Diodes