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The works must be unpublished and refer to topics of Capitalist systems; Socialist systems and transitional economies; Socialist institutions and their transitions, Other economic systems; Comparative economic systems, Comparative analysis of Economic Systems, Comparative studies of particular economies and other topics related to Social Sciences.

Presentation of the content

In the first article we present, *Maintenance Strategies, by FERNÁNDEZ, Tomás, MIRANDA, Francisco and ROCHA, Elpidio*, as next article we present, *Design and implementation of a control card for a linear actuator of a paper impregnator*, by GIRÓN-REYES, Jesús, SÁNCHEZ-LÓPEZ, Héctor, ROJAS-OLMEDO, Israel and HERNÁNDEZ-GONZÁLEZ, Daniel, as next article we present, *Design and implementation of a colorimeter for the classification of fabric by tonality in its final manufacturing process*, by HORNILLA, Mario, JUÁREZ, Carlos and MARTÍNEZ, Irma, with adscription in the Universidad Autónoma del Estado de México, as next article we present, *Smart traffic lights in sustainable urban logistics*, by MOLINA-NAVARRO, Antonio, ZAMORA-CASTRO, Sergio, REMESS-PEREZ, Miriam and LAGUNES-LAGUNES, Elsa, with adscription in the Universidad Veracruzana.

Content

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Maintenance Strategies

Estrategias de Mantenimiento

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Abstract

Maintenance means keeping equipment running or restoring it to operating condition. However, the 21st century will usher in a broader need for equipment management, a cradleto-grave strategy to preserve equipment functions, avoid the consequences of failure and ensure the productive capacity of equipment. Profitable future operations will have reduced the 35% of operating costs typically spent on maintenance and the unfavorable impact of downtime that often multiplied these costs by 300%. They will survive those operations that tried to carry outdated "maintenance" thinking beyond the XXI Century.

Maintenance, Industries Generation, Administration of equipment

Resumen

El mantenimiento consiste en mantener los equipos en funcionamiento o restablecer su estado operativo. Sin embargo, el siglo XXI marcará el comienzo de una necesidad más amplia de gestión de equipos, una estrategia de principio a fin para preservar las funciones de los equipos, evitar las consecuencias de los fallos y garantizar su capacidad productiva. Las operaciones rentables del futuro habrán reducido el 35% de los costes de explotación que se suelen gastar en mantenimiento y el impacto desfavorable de los tiempos de inactividad que a menudo multiplican estos costes en un 300%. Sobrevivirán a las operaciones que intentaron llevar el pensamiento anticuado del "mantenimiento" más allá del siglo XXI.

Mantenimiento, Generación de industrias, Administración de equipos

Citation: FERNÁNDEZ, Tomás, MIRANDA, Francisco and ROCHA, Elpidio. Maintenance Strategies. Journal-Economic Systems. 2021. 5-9: 1-7

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Introduction

The objective of this work is to provide ideas and and to propose how maintenance strategies would be carried out in the sugar maintenance strategies, as well as the steps to be as well as the steps to be applied in a continuous continuous improvement, the stages of the life cycle of the equipments the stages of the life cycle of the equipment to form a competitive competitive maintenance, as well as the strategies that can be and can be applied and carried out in relation to the maintenance of the equipment.

The maintenance operations of survival should be operations should be applied to modern management techniques and management techniques, and to the current and current technologies, and it is also required that the that the personnel be trained to provide solutions to the to meet the needs of the equipment. Managers of the future will have to use the equipment maintenance management as an integral as an integral part of a total production total production strategy.

Development

This work is based on practical work carried out in sugar mills where it was implemented and carried out, to date these maintenance strategies continue to be implemented since it is a long-term work and in which the maintenance has to be carried out. culture change in the operating and maintenance staff and this is very complex to bring to a successful conclusion.

Not so long ago, in the past, the local heroes in the industries was, the foreman, in charge of maintenance. He was in charge of maintenance operations and disasters that occurred, and he was also in charge of starting up the equipment. These factors meant that omissions when disasters occurred were never questioned. Managers had little time as maintenance was running.

Figure 1

Many managers designated business units to control operations and maintenance. Through this, they provided hermetic control to the maintenance functions, those new designs of leading business units liked to have maintenance and manual personnel. But they find the burden of various activities, such as rebuilding components, etc.

Business unit leaders are also caught looking at measures of increased production. Through this, little was improvised to understand the functions that make maintenance work properly. The experience the managers took was, a delegated action. Few managers take direct action to cause maintenance for part of their entire operating plan.

The fact that maintenance personnel cannot perform their jobs without full support and cooperation has to be apparent for some time. However positive action for recognition, and to correct matter by continuing to distinguish profitable maintenance of the future for the rest.

Figure 2

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Thus, the most fundamental aspect of the successful use of maintenance resources. Maintenance alone cannot guarantee confidence in the equipment.

Experience has established that maintenance makes (has) a big impact on profit when all maintenance departments provide coordinated support and hold maintenance managers fully accountable.

A great mistake of operators in the 20th century was that they assumed that maintenance was a lone force, also capable of guaranteeing the reliability or profitability of equipment.

A great lesson for the 21st century is that operators must ensure levels of control and acknowledge and correct errors. Effective maintenance requires the participation of each department in the support of managers for, cooperation with, and use of maintenance resources.

Pensar strategies

One strategy for success is to build skillful planning first, followed by effective execution. Military strategy strategists never go into battle starting with their reserves from camp. Even treating maintenance as a single force, the handling of maintenance in the 20th century was similar to a military battle in a battle without reservations.

Therefore, for there to be a winning combination, maintenance managers must pull out all the stops. They must ensure that each department contributes to having reliable equipment in each phase of the equipment life cycle.

Equipment life cycle

A strategy of team managers first admits that teams are obsolete through a life cycle with support from different departments that need to be associated with each stage.

Each stage in the equipment life cycle dictates a progressive responsibility for each department that must each have a manager.

Selection.- Determination of the equipment that has the best use of sets and behaviour requirement (performance) against price, easy to operate and maintain, quality reputation and spare parts support.

Purchase.- Carry out bids to obtain the best equipment.

Installation.- Locate the equipment in service.

Tests.- Make sure that the equipment receives the necessary requirements for its use.

Operation.- Operate the equipment during the operation processes.

Maintenance.- Conduct repair and maintenance expenses.

Major maintenance (OVERHAUL).- Restore the equipment with the original design specifications.

Modifications.- Changes in the configuration of the equipment to produce better behavior or to correct or update the operating characteristics.

Replacement.- Replace with similar or better equipment with the same behavior characteristics.

Department Responsibilities

During the operation stage of the due cycle of the equipment it was put into service by operators and maintained by maintenance. But it is less obvious that the department's staff were training new operators and providing high or high training experience to their maintenance staff.

Similarly process data is being stored in production statistics and operating costs, accountants and managers are analyzing the information, fiscal actions and operating decisions. Normally, the warehouse and buyers are supplying parts and the workshops are repairing the components.

Execution of the proposed goals

The execution of the goals is established by the managers for each department when they find a community, then:

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– Make sure the team behaves effectively

– Safety and correct operation of the equipment.

– Ensure proper maintenance.

– Provide quality material for maintenance.

These goals place each department at the bottom of the behavioral modes. This requires those who set too high a standard for their assigned goals. These goals encourage mutual effort.

– Comparing is not getting the right reservation unless maintenance provides other things.

– Thes operations are not proper equipment operations unless maintenance repair histories indicate zero problems with no operator error.

Evaluation behavior

At regular intervals, all the managers of the other departments meet to discuss the goals achieved, the appropriate information is used to observe the behavior of each department.

– Thes operations meet the maintenance schedule 85% of the time.

– The warehouse has zero backorders in its stock.

– Thes purchases of materials are 24 hours before being occupied.

– The maintenance plans are met with a minimum 65%.

Strategy as an agent of change

The strategy of team managers should be a framework to change the culture of the entire organization towards maintenance, many see this as a necessary evil. Thus, the strategy must also cause total workforces to view maintenance as a total operations plan, and the workforces and responsibilities to control and convey out maintenance must be reviewed.

This must be a "when he runs your stand your ground (steady)" mentality present in some organizations. The strategy should create a better appreciation of the importance of the maintenance strategy. So, the strategy can focus people on new ideas and responsibilities in the team. People have to be given fresh training in maintenance so they can apply modern techniques and information to realize and apply the benefits of a maintenance manager's strategies.

"Say goodbye to the excuse culture in maintenance"

Change the culture.- Before any maintenance strategy initiates the activities of this century towards the culture of maintenance, it must be corrected.

Managers who see maintenance as a cost expose failures in the improvement effort by suggestions that the maintenance culture (knowledge, beliefs, behavior) precludes their acceptance of potential changes to benefit. Successful implementation of a team managers strategy must recognize that improving maintenance behavior is not about starting and ending by alternating maintenance readiness solely toward change. The success of the implementation must impact the entire organization. The need to alter the culture must catch up and move up in operations. Everyone must adjust their thoughts to view maintenance as a path to productivity, improvement, profitable performance, and minimizing wasted time.

In the 21st century, I know it must include a total organization culture of improvement towards the activities that will be called maintenance. This is a prerequisite for successful application and modern breeding strategies.

Strategies to encourage the work team

Reforming maintenance responsibilities.- Once the organization accepts maintenance as an element of the production strategy, the strategy encourages the alignment of responsibilities.

Equipment operators view, check, adjust and correct through diagnostics, inspect, calibrate or change major components.

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The organization perceives and verifies that engineering redesigns or modifies and buys by collaborating with maintenance, the warehouse and purchases. In plants, operators look at equipment to check, adjust, clean and make quick repairs.

Implement efforts in the work team

The implementation of reliability centered on maintenance requires a great effort in the work team, specialists for operations and maintenance. Operations identifies the functions and behavior standards, maintenance must identify the types of failures. Both collaborate in the consequences of fault identification.

Implementing Trust Centered Maintenance (CCM)

It is a logical procession of 8 steps that build or are part of the responsibilities of a department. Implementation steps include:

1. Selection of the most critical team most critical.

2. SDIIdentify the functions of the most critical equipment.

3. Establish control limits for these machines.

4. Decide the characterteristics de operation and types of faults.

A potential failure is an identifiable physical condition that indicates that the failure process has affected the machinery, typical failures could be:

a) Vibrations signaling determined start on transmission failure.

b) IIndicating the onset of fatigue in machinery.

c) Metal particles in the oil system indicating possible failures.

A functional failure is the facility to meet the performance specified by a standard.

5. Listing the consequences of failures What happens if a specific failure occurs? The consequences of Failures can range from inconveniences to catastrophes. Without reliable equipment, quality production and customer satisfaction are difficult goals. It can also, put personnel at risk, create environmental hazards, and undermine energy efficiency, for all those reasons. The consequences of failure should be a primary object of maintenance.

6. Range of failure consequences. Because the computer has increased in complexity, the number of ways it can fail has multiplied. From now on, failure consequences must be classified to guide maintenance personnel in taking preventive and corrective actions.

7. Use effective monitoring techniques. Thes Operational failures result in lost production plus the cost of repair. Non-operational failures result only in repair costs. In machinery, the most important aspects are to avoid and reduce further consequences of operational and safety failures. From citing whether the most competent types of prevention and correction techniques, such as vibration analysis, are used. They can detect deteriorating conditions in equipment with greater accuracy and reliability than humans. These techniques detect hidden faults that humans cannot find unless they test a control mechanism and it does not respond. With the ability of more effective and cost-effective condition monitoring techniques, equipment conditions can be more accurately monitored. This allows a unit to remain in service if it continues to be known to perform as standard rather than replace the component at the first sign of potential failure. This approach to performance extends the life of components and units.

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8. Establish a complete maintenance plan, based on the failure sequences, a maintenance program is applied, resulting in the conditions of the monitoring techniques. This identification of potential failures (starting failure) accurately and quickly excludes their functional deterioration to functional failure levels.

The most effective maintenance program is built on the implementation of steps.

Understanding the progress of equipment failures

Failure process.-

The components of a mechanical equipment are subject to wear, corrosion and fatigue. As deterioration increases; the profitability of the equipment decreases unless they are detected and corrected, Impairment; of components increases until the equipment fails. Failures are unsatisfactory conditions that must be considered in the context of using the equipment. A standard operating decision that is unsatisfactory for equipment use would build a fault. But the difference between unsatisfactory and satisfactory depends on the type of equipment and the environmental operations.

Traditionally, maintenance has observed, detected and corrected failures. This has been done by inspection and servicing at fixed intervals. So anticipating the age of any component that is likely to fail, maintenance has replaced them and performs checks at set times. This routine has often not had a presence on the current conditions of the equipment. This is done until the end of a certain period.

However, many faults are not likely to occur due to aging in equipment, from now on maintenance programs should not be obsolete, they are based on periodic replacement services, or component checks. Testing can actually reintroduce some of the factors that cause "Infant Mortality" failure of the equipment.
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Thes Current maintenance conditions are based on careful monitoring of current equipment conditions.

This is always less costly and more effective than replacement and examination at fixed intervals throughout the life cycle of the equipment.

The Time Based Checkup maintenance philosophy pays less attention to how components fail and the consequences of failure. There is an assumption that components wear out and become less reliable, as increasing aging by operation hitherto maintenance on machinery has prohibited restoring equipment to "like new" condition by periodic replacement of components or examined from the unit. Thus in actions maintenance has overlooked the failure processes themselves and the issues that constitute a failure.

This omission has given a process of maintaining these lost time and lower production rather than one based on a wide range of consequences for equipment failure. This helps explain why there is so much, emphasis on knowing the goal of production and thus little attention to maintenance. Thus far, maintenance-focused reliability reminds us that those consequences affect all things reliability and utilization, and they demand more attention than they receive.

Reliability Age: Reliability is the probability that the equipment will survive a defined period of operations under specified operating conditions and without failure. From now on the unit of a component makes little sense unless a survival chance is associated with it. Component life (mean time between failures) or failure ratios are helpful in budgeting for maintenance tasks, set at appropriate intervals.

The success of a maintenance program can only be judged in terms of how well it will prevent the safety or operational consequences of equipment failure.

With these failure models, machinery operations require that maintenance must respond to real needs because many failure models do not exhibit pronounced wear periods, responsible maintenance must be aimed primarily at detecting potential failures or hidden failures, mainly failures. functional.

From now on those responsible for maintenance must also include, remove and replace major components at a specific age limit but only that the exact condition is confirmed with inspection, testing and monitoring conditions, simply never at the end of a predetermined period.

This really explains why more shortened operations that have instituted maintenance engineering strive to more effectively apply and manage the various maintenance responsibilities, that modern equipment requires the traditional physical inspection to be quiet combined with modern production techniques akin to an examination of ultrasound. Any of the responsibilities can only be set to perfect a reliable team.

Monitoring conditions techniques and applications.- The monitoring conditions are constituted on the failures that give some type of warning to which they can occur (potential failures). This is the physical indication that a functional failure (the computer cannot meet its standard operating specifications) is in the process of occurring.

This condition monitoring techniques can be obtained by pinpointing evidence that a fault is occurring. Condition based monitoring techniques used to determine potential failures are called condition tasks.

Obtaining and reporting of failures.- Maintenance and operation personnel have important roles in the detection and reporting of failures, equipment operators observe the dynamic operation of the equipment in its normal environment. They witness functional failures occur when equipment fails during use. In addition, they experience the results of a hidden failure when the controls fail to respond. Equipment operators are the most likely to report most failures because they are on or near the equipment during the changeover. From now on the initiatives of the operators in the report of the problem or in the limited maintenance operation can mean the complete improvement and the operation of the equipment. This reinforces the mutually supportive theme of team maintenance strategies.

Operators' ability to unavoidably determine faults is an additional aid to device and instrument warnings.

This includes computers that monitor hundreds of various equipment systems, which perform their functions. Personal of operation and maintenance are a complementary idea in fault detection.

Operators identify functional failures and hidden failures when controls don't respond. Maintenance personnel detect potential failures and hidden failures using condition monitoring techniques.

Conclusions

LThe application of these maintenance strategies mentioned above in this work are being carried out in the San Miguelito sugar mill in the state of Veracruz, all previous development has established that maintenance must be an integral part of production strategies. The 21st century must be built on this. Equipment in the 21st century will be more reliable and more complete. New strategies and procedures will be required to realize potential reliability and turn it into something profitable and profitable operations will be those that have using an equipment management strategy to evoke new procedures to apply modern management techniques as well as maintenance.

References

Avalone, Eugene. (1959). Marks "Mechanical Engineer's Handbook". McGraw Hill, 8th Edition

Me.smenet.org. (2016). Mining Engineering Online. [Online] Available at:http://me.smenet.org

Lloyd E. Brownell, Edwin H. Young. (1959). Process Equipment Design: Vessel Design Edit. Addison-Wesley, 2nd edition

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Design and implementation of a control card for a linear actuator of a paper impregnator

Diseño e implementación de una tarjeta de control para un actuador lineal de una impregnadora de papel

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Abstract

This paper details the design, construction and test of a linear actuator control to an impregnation of paper machine, which has the function of aligning resin impregnated paper by a linear actuator. The prototype consists of a linear power supply, a system of pulsewidth-modulated, direction and speed control for the system to operate in manual or automatic mode. Finally, the results obtained are mentioned after performing of prototype installation in the MASISA SA de CV Company.

Impregnation of paper, Linear actuator, Linear power supply, Ultrasonic sensors and optoelectronic

Resumen

En este trabajo se detalla el diseño, la construcción y la prueba de un actuador lineal de control para una máquina de impregnación de papel, que tiene la función de alinear el papel impregnado de resina mediante un actuador lineal. El prototipo consta de una fuente de alimentación lineal, un sistema de control de ancho de pulso modulado, dirección y velocidad para que el sistema funcione en modo manual o automático. Finalmente, se mencionan los resultados obtenidos después de realizar la instalación del prototipo en la empresa MASISA SA de CV.

Impregnación de papel, Actuador lineal, Fuente de alimentación lineal, Sensores ultrasónicos y optoelectrónicos

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Introduction

During the paper resin impregnation process (IPR) at the MASISA SA company in and It is necessary to replace the paper alignment control that is carried out by means of optoelectronic sensors, since in most of their optical lenses they are transparent, causing the sensor not to detect correctly over time, due to the accumulation of resin in it. , which in a certain time dries up, obstructing the detection, causing failures in the alignment control; To counteract this inconvenience, ultrasonic sensors were added to improve detection, which are particularly used by the ACCUE WEB INC and FIFE brands. For this reason, it is proposed to implement an electronic control system for a linear actuator, through ultrasonic and/or optoelectronic sensors that control the alignment of the IPR (see figure 1).

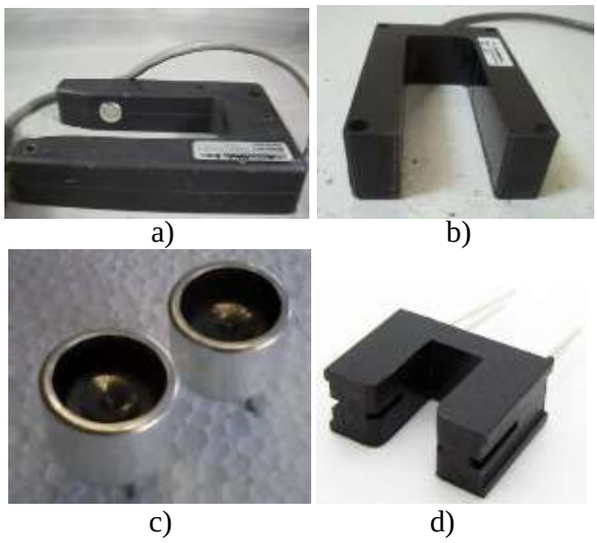

Figure 1 a) and b) Optoelectronic sensor, c) Ultrasonic sensor UCM-R40K1 (TX–RX) and d) Optoelectronic sensor ITR8102 (E–R)

To carry out the control of the linear actuator of the paper impregnator, a linear voltage source was built, it is responsible for supplying the voltage to the linear actuator at the same time that it will protect it against overcurrents, a Width Modulation system was implemented Pulse (PWM) for speed and direction control of the actuator. Additionally, ultrasonic and optoelectronic sensors were used to control the alignment manually or automatically. The block diagram of the electronic circuit design is shown in figure 2.

Figure 2 Block diagram of the electronic circuit

Power supply

A linear power supply was built using the LM723 regulator (see figure 3), which provides an adjustable output from 0 to 35 V [1]. The output voltage is adjusted by TRIMPOT2. The source was designed with an overcurrent protection parameter, adjustable by means of TRIMPOT1 in a range of 0 to 2 A, from the established value the source will be protected automatically limiting the current to avoid damage to the linear actuator, in case of a over current the source is restored by pressing the button (SW1) [2] and [3].

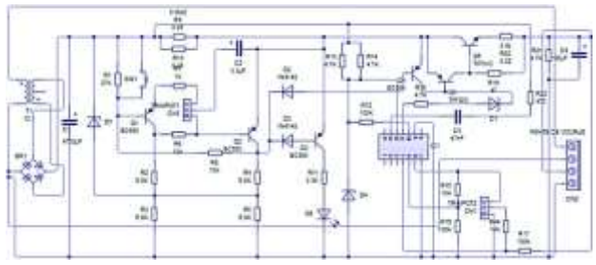

Figure 3 Linear voltage source

Speed and direction control

The speed of the linear actuator motor is controlled by the PWM KA3525A and the direction control of the linear actuator motor was carried out with the H-bridge L298N since it is necessary to change the direction of rotation of the linear actuator motor; either manually or automatically, according to the conditions required by the operator (see figure 4), the function of the diodes is to prevent the speed and direction control from being damaged by the counter electromotive force generated by the motor.

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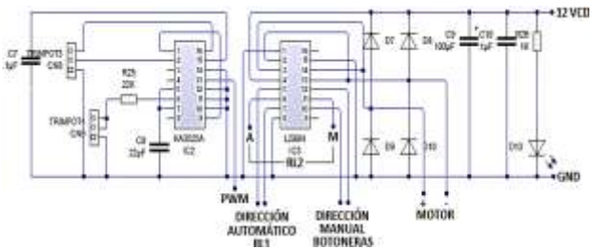

Figure 4 Withspeed and direction control

Manual or automatic control

To safely control the movement of the aerial roller of the linear actuator, two ways were implemented: manual and automatic, this was achieved using a normally open contact (NO), a closed contact (NC) and an SCR, which in turn send the signal to the L298N to control the direction.

The manual or automatic system is controlled by a relay RL2 where the NO contact is the automatic mode; which gives a voltage pulse to the gate of the SCR C106D in charge of performing the electronic interlocking, pressing the NC button activates the manual mode, interrupting the SCR power supply causing it to unlock; for manual mode (see figure 5). IPR detection; in automatic mode, it is achieved by means of the sensor that activates the RL1 relay where the NO is the input direction and the NC is the output direction of the linear actuator, in each of its contacts a bicolor LED (green and red) is connected. to indicate the sensor.

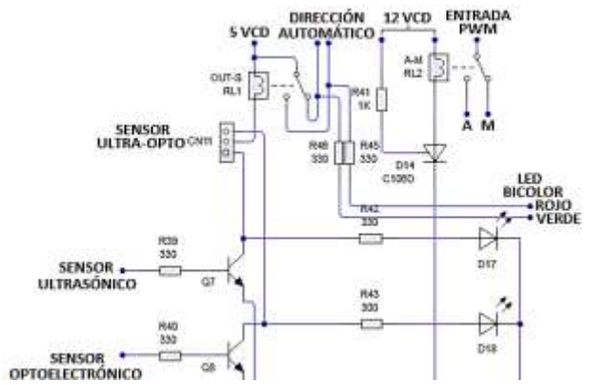

Figure 5 With manual and automatic control

Ultrasonic and optoelectronic sensors

For the alignment control of the IPR, two sensors were used: ultrasonic transmitter-receiver UCM-R40K1 (TX-RX) [2], and optoelectronic transmitter-receiver ITR8102 (E-A) [4] and [5].

With the purpose that the operator can choose the most appropriate for his process (see figure 6).

The ultrasonic sensor is designed with 3 integrated circuits, the IC (CD4046B) is a PLL (phase tracking loop) this IC was used to feed back the frequency and phase of the sensor where the frequency margins in which it will be are defined. sending and receiving the ultrasonic signal, with the IC (HD74LS14P) it is an integrated with 6 trigger inverting logic gates, which is used to invert the signal and reduce noise. Through the TL082C it amplifies the signal received from the (RX) and the signal (TX) coming from the CD4046B. At pin 1 of the TL082C the output signal is directed to a 1N4148 diode which triggers a voltage at the base of transistor BC542 to activate the relay (RL1).

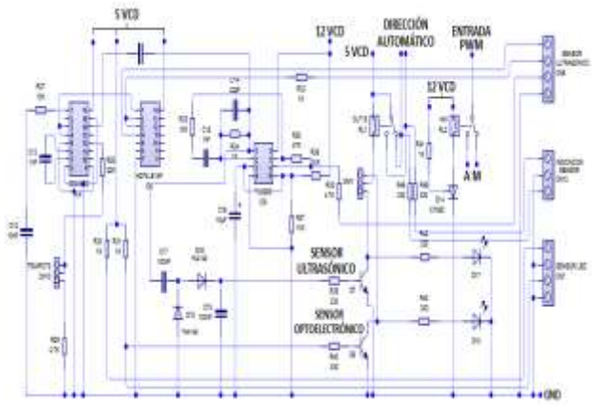

Figure 6 Ultrasonic and optoelectronic sensor

The adjustment of the detection interval of the ultrasonic sensor was made with the TRIMPOT5 potentiometer together with a 22 KΩ compensation resistor R28 (see figure 6), these send a modulated signal that is directly connected to the CD4046B Voltage Controlled Oscillator (VCO) that is a phase tracking loop [6], where the frequency adjustment is done by means of resistor R28 and capacitor C13.

Control card

Based on the different stages shown in figures 2, 3, 4 and 5, the control card shown in figure 7 for the linear actuator of the paper impregnator was made.

Figure 7 Control card for the linear actuator of the paper impregnator

Results

The control card was tested for a total of 352 hours to verify the performance of the design at the company MASISA SA de CV in the area of impregnation (see Figure 8).

Figure 8 Ptest performed in impregnator #4

Tests were carried out in manual mode in order to observe the adjustment of the paper. The implemented system detected even transparent paper by adjusting the ultrasonic sensors to a range of 5 cm.

In an industrial work environment with excess temperature caused by the impregnation process itself, it did not affect the operation of the electronic control electronic card. The manufacturing cost is 80% lower than the cost of the ACCUE WEB and FIFE brands. Finally, according to the supervision of the maintenance and instrumentation areas, it was observed that the operational prototype complies with the characteristics and parameters established in the electronic control required by the paper alignment process in comparison with the ACCUE WEB and FIFE brands.

Gratitude

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Conclusions

The built control card allowed verifying the correct operation of the design in an industrial environment.

The ultrasonic sensors improved the detection range up to 5 cm with respect to the optoelectronic sensors.

Selected business components in the card design are easily accessible and allow quick maintenance with savings of up to 80% over the ACCUE WEB and FIFE brands.

References

B.rown M. (2001). Power Supply Cookbook. USA: Newness.

B.rown M., (1990). Practical Switching Power Supply Design. Motorola. Series in Solid State Electronics.

Parra, L. Orozco F. (1995). Regulated and switching power supplies. Mexico City: BECANOR.

Malvino AP (2000). Electronic principle. Ed. Mc. Graw Hill. 6th edition. Spain.

B.Oresstein, H. R. Feng L. (1996). Where am I? Sensors and Methods for Mobile Robot Positioning. USA: J. Boresstein.

Muhammad H.R. (2011). PowerElectronics Handbook. USA: Elsevier

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Design and implementation of a colorimeter for the classification of fabric by tonality in its final manufacturing process

Diseño e implementación de colorímetro para la clasificación de tela por tonalidad en su proceso final de fabricación

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Abstract

The color tones in textile fabrics vary slightly affecting makers of clothing, since they can cause clothing with slight color variations. The proposal of this project is to design and build a portable device able to estimate the color of the tones of the fabric colors, with the aim of reducing waste, minimizing costs and increasing quantity. The device is made in Arduino environment and processed in Matlab, it is able to take readings of different elements forming groups "clusters" with consistent patterns. In the phase of implementation textile fabrics were used. The device developed identifies compatibility margins of the elements by his color, Finding the Right Features for the correct garment manufacturing process.

Colimeter, Textile Industry, Functions Grouping (Clustering)

Resumen

Las tonalidades de los colores de los tejidos varían ligeramente afectando a los fabricantes de ropa, ya que pueden provocar prendas con ligeras variaciones de color. La propuesta de este proyecto es diseñar y construir un dispositivo portátil capaz de estimar el color de los tonos de los colores de la tela, con el objetivo de reducir los residuos, minimizar los costos y aumentar la cantidad. El dispositivo está realizado en entorno Arduino y procesado en Matlab, es capaz de tomar lecturas de diferentes elementos formando grupos "clusters" con patrones consistentes. En la fase de implementación se utilizaron tejidos textiles. El dispositivo desarrollado identifica los márgenes de compatibilidad de los elementos por su color, encontrando las características adecuadas para el correcto proceso de fabricación de la prenda.

Colímetro, Industria Textil, Agrupación de Funciones (Clustering)

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Introduction

As Dr. Patlán (2010) mentions, since clothing is a high consumption product, the textile industry occupies an important place in the economy, because it is a dynamic and relevant activity, which generates jobs and activates the economy.

However, the textile industry is one of the most controversial sectors since the formation of national and international trade agreements due to breaches of labor and salary conditions. In addition, it is a trade that is mainly integrated by micro and small manufacturing companies from private homes, workshops, manufacturing facilities to large companies.

Dr. Patalán also mentions that despite having a significant demand for its products, this industry competes with imports of goods from other countries. Although the garments do not meet customer specifications, sometimes unfair competition occurs. for the low prices.

Rhys (2012) discusses the environment and industry in Mexico, trends and business regulation, and in particular how Mexican industries have generated great progress in recent years, thanks to the implementation of technologies that favor the production process.

Rhys presents the main problems that can be eliminated to improve product quality, generating higher income for the sector, minimizing the amount of imported merchandise and facilitating industrial processes. It is a fact of the need to modernize technology in the textile industry, generating jobs, income, and increasing customer satisfaction.

Throughout history, color has acquired a very important role in people's taste, comfort, and mood. Begoña (2016) affirms the importance of color appropriation in the emotional sphere in order to generate brand value. that is why the fashion industry has evolved significantly in obtaining the desired colors with respect to the required color.

This condition is no different for the textile industry where it is continually required to obtain versatile shades for seasons of the year, short periods of time or occasional. Generating a latent problem since it is not always possible to obtain the requested tonality.

For this reason, various methods have emerged to dye fabrics, which are used according to the components of each type of fabric, cost of the process and demand. A bad dyeing can be perceived in the aspects that Lockuán (2012) states "The textile industry and its quality control".

One of the main characteristics that is required when subjecting a fabric to a dyeing process is that it does not lose its natural properties in the face of complex agents, as described by Sánchez (2013), which can cause important problems in the dyeing process, such as the formation of of soluble compounds and stable complexes, causing an uneven coloration.

This type of color inequality is often not noticeable during the process of monitoring compliance with the required quality standards, and they are packaged and shipped with these defects.

J. Díaz (2013) argues aboutthe main problem faced by the garment maquila industry is having a diversity of shades with which they are supplied by the suppliers of textile rolls.

The need for industries to make their industrial processes more efficient has led them to improve their production processes, which is why the need in the textile industries to have a portable device with the qualities of identifying similar color patterns in the rolls for the realization of uniform clothing.

The main objective of the work is to design and build a device that classifies the shades of fabrics in their final manufacturing process, to eliminate waste and rework in the production of garments, and the specific objectives are basically two:

– Reduce fabric waste, as well as time lost in the garment manufacturing process.

– Increase customer satisfaction in quality, time, cost and presentation of the product.

This work addresses the problem generated by the variety of shades obtained in the manufacture of fabrics, this situation hinders the production processes of garments, as shown in figure 1.

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Figure 1 Difference in shades of the same batch of fabric manufacturing pants, courtesy of Bonpros SA de CV

Autonomous color selection system.

The development of an autonomous system of color selection will help to classify the tonality in the fabrics, for the packaging and delivery of rolls according to the specifications of the client.

Given the growth and scientific and technological development as mentionedA. Garcia Higuera(2005) in recent decades there have been important advances in the field of automation of production processes due in large part to the implementation of controls that systematize the work, so today it is not usual to omit automation in industry to increase product quality, reduce production times, perform complex tasks, reduce scrap or defective parts, and especially increase profitability.

In the same way, automatic systems are widely used thanks to the great benefit they provide for problem solving, in addition to being implemented in the automation of small and large-scale engineering.

Color, as stated by A. Valero (2013), is the result of an interaction with the reflection of light between an object and the human eye, predominantly red, green and blue known as primary colors and are the basis of space. of the RGB color.

Next, we explain the operation of the components that make up the circuit of the autonomous color selection system, as well as the programming contained in the Arduino board that helps monitor the tests on the different test fabrics.

The diagram that makes up the connections of the Autonomous Color Selection System.

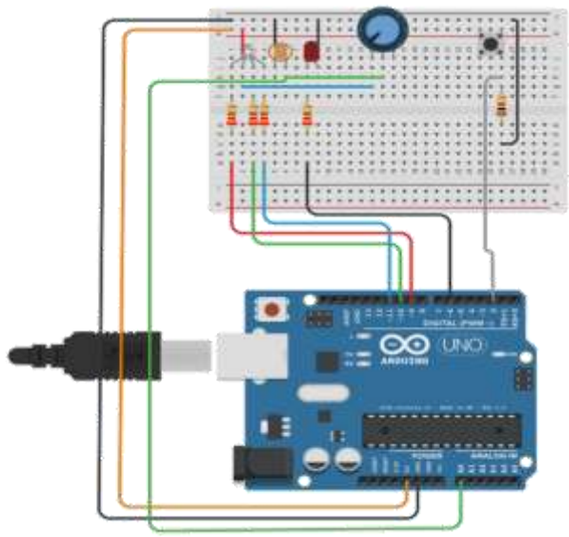

Figure 2 Arduino board interface connected to circuit components

The diagram in figure 1 consists of an RGB LED which emits Red, Green and Blue light at intervals of half a second and the photoresistor absorbs the saturation of each reflected color to identify the RGB pattern of the fabric.

Figure 3 System controlled with a potentiometer.

Figure 3 shows the potentiometer which has the purpose of adjusting the intensity of the RGB LED according to the light absorption of each fabric.

For the final design, it was decided to place the card and the electronic components inside a portable package, exposing the elements that help carry out its application, such as the sample collection section, the push-button that sends the signal , the input of the Arduino card and the sensitivity graduation of the potentiometer (see figure 4).

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Figure 4 Final structure of the autonomous color selection system.

After several tests, it was identified that the correct way to carry out the test is through a dark surface with the least amount of reflecting light, with a little softness to adapt to the pressure of the device and thus avoid the entry of light, such as is shown in figure 5.

Figure 5 Correct way to make a sample of tonality in a fabric

Results

The fabric used to carry out the samples is composed of 65% polyester and 35% cotton, made with the corresponding weaving, dyeing, ironing and finishing processes. This type of fabric was selected because, due to its cross weave, this fabric is very resistant, has a soft, light, thin and versatile texture, which makes it one of the most used for the manufacture of clothing such as pants and trousers skirts.

To test the system, four colors of fabric were used that were taken from different rolls and thus be able to check the tonality of the fabrics.

Figure 5 Color samples to analyze

The colors selected to analyze the compatibility of the shades are Beige, Navy Blue, Bottle Green and Wine Color, the cases are shown in figure 5.

It is important to mention that all the samples come from different rolls from the same supplier and that the identification of the color tone before the cutting process allows identifying compatible fabrics for the manufacture of garments with the most uniform color tones possible. Using the device described, the measurements of the different shades of each color were taken, which are shown in table 1.

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Tone	Red	Green	Blue
Beige			
T1	110.9	127.75	160.4
T2	110.75	127.32	160.3
T3	111.25	126.9	159.25
Navy colour			
T1	147.75	170.75	198.5
T2	148.65	173.5	200.5
T3	148.65	173.5	200.9
T4	149.5	172.9	200,825
T5	149.75	174.57	202
bottle green color			
T1	147	164	197
T2	145.9	162.5	196.07
T3	144.75	159.32	193.65
T4	145.15	161	194.4
T5	144.75	160	193.4
Wine color			
T1	139.25	172.25	202.5
T2	136.5	170.75	202
T3	138.25	172	202.07
T4	138.5	172.75	203.15

Table 1 Result of RGB Hues of the color samples.

Table 1 shows the RGB colors of each fabric where it can be seen that despite coming from the same batch of fabric there are small differences between each of the rolls, which is why it is very important to identify the compatible rolls beforehand. of the cutting process.

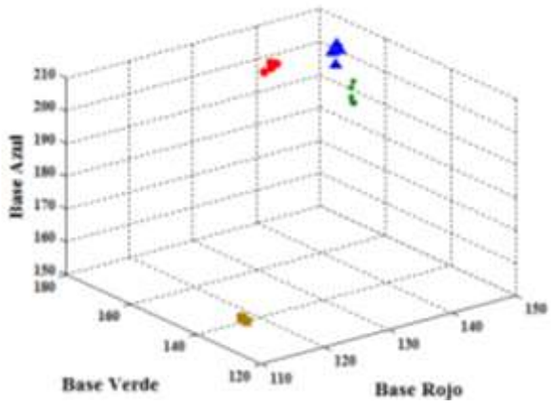
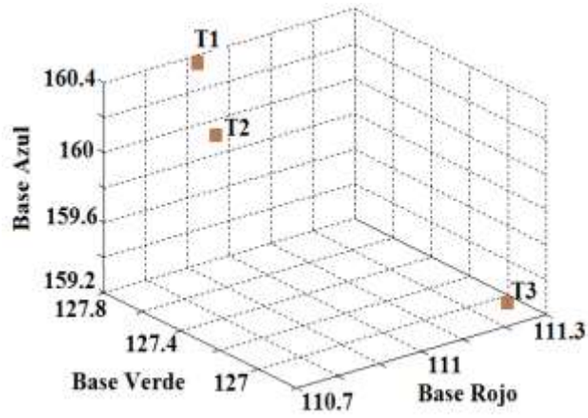


Figure 1 Samples in RGB space defined for all samples identified by their color

To facilitate the interpretation of table 1, the three-dimensional RGB representation was used, as shown in graph 1, where we can see that each color is grouped into well-defined regions, with Beige being the furthest away from the others. To carry out a better study, each batch of color is analyzed separately.



Graph 2 Samples in RGB space for the color Beige

Graph 2 indicates that shades 1 and 2 show greater similarity, while shade 3 is further away and the variation between the equivalent shades is mainly in the green color. Therefore, to ensure correct quality, only combinations between the fabrics of rolls 1 and 2 are allowed.

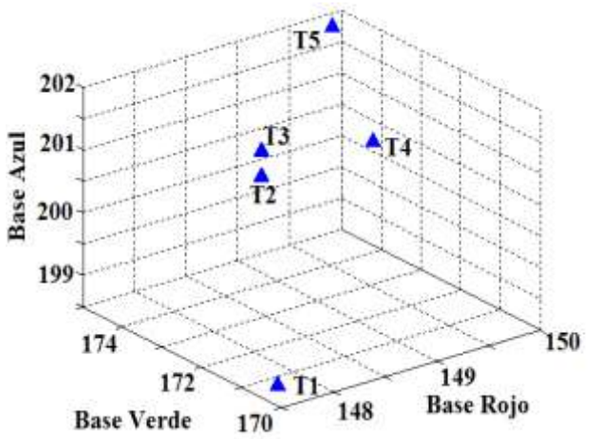


Chart 3 Samples in RGB space for the color Navy Blue.

For the Navy Blue color, it is observed that tones 2 and 3 are very similar, tone 4 is close to them, and tones 1 and 5 are the ones that present the most differences, the same effect occurs when observing table 1. Under this study we can conclude that it is possible to mix fabrics from rolls 2, 3 and 4 and 5 and roll 1 should not be mixed (see graph 3).

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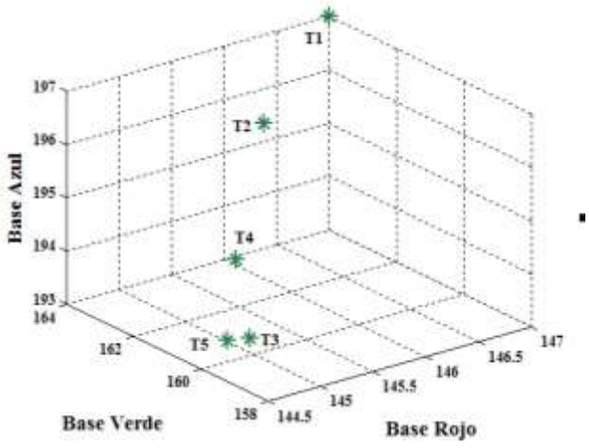

Graph 4 Swatches in RGB space for the color Bottle Green

According to graph 4, it can be seen that shades 3 and 5 show greater similarity, while shades 1, 2 and 4 are more different. We can conclude that the only possible combinations to ensure adequate quality are between rolls 3, 4 and 5 and between rolls 1 and 2.

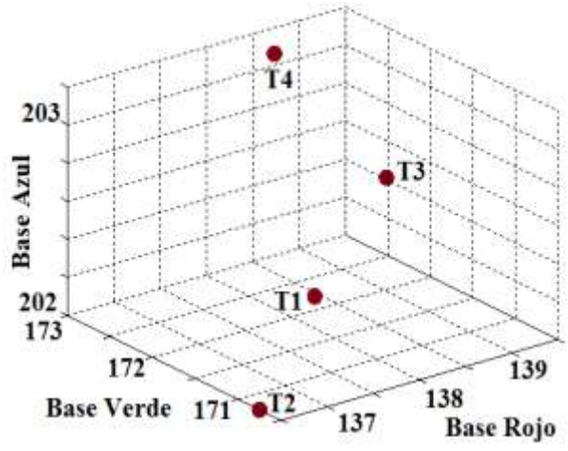

Chart 5 Samples in RGB space for the color wine

For the last case, it indicates that none of the samples show similarity between them. In the table of values it is observed that the numbers are very different from each other. Therefore, combinations between fabrics are not allowed.

After several studies, it was possible to conclude that to preserve the quality of the manufactured garments, the fabrics to be combined should not vary in a color between plus-minus between 1 value in any of the RGB primary colors.

Conclusions

It was possible to develop a prototype that reliably indicates the RGB colors of fabrics for the manufacture of clothing.

It was found that, in order to achieve color homogeneity in the manufacture of the fabric, in the RGB spectrum it must comply with The base color should not vary more than 1 With the application of the device, sales will be increased with quality products and processes will be streamlined for maquiladoras.

References

Begoña M., Window dressing and design of commercial spaces, Ed. Ediciones Paraninfo, SA ISBN: 8428335532, 2016, p. 138.

Diaz SanchezJ.,hillLourdes, Art, design and fashion. Confluence in the artistic system, Univ of Castilla La Mancha, 2013, ISBN: 9788490440315, p. 101.

Garcia HigueraAndrés, Automatic control in industry, Univ of Castilla La Mancha, 2005, ISBN: 9788484274056, pp. 17-18.

Lockuán Lavado Fidel, The textile industry and its quality control. Textile fibers, Creative Commons, 2012, page 44.

Patlán J., Delgado D., "The textile industry in Mexico; diagnosis, prospective and strategy", pp. 5-9, Mexico, DF, 2010.

Rhys O. Jenkins, Mercado García Alfonso, "Environment and industry in Mexico, trends, regulation and business behavior", Ed. Colegio de Mexico, ISBN: 978-968-12-1367-1, 2012, p. fifteen.

Sánchez MJ, Introduction to textile materials, products and processes, IC Editorial, 2013, ISBN: 8483648563, pp. 65-68.

Valero MunozAntonio, Principles of color and holopainting, Editorial Club Universitario, 2013, ISBN: 9788415787082, p. 103

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Smart traffic lights in sustainable urban logistics

Los semáforos inteligentes en la logística urbana sustentable

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Abstract

Due to the rapid growth of cities has the need for mobility of goods and people in less time. Primary roads are saturated by vehicles passing through them. The City of Veracruz, Mexico, this problem together with the topography and topology own territory has favored an elongated growth of the city, which journeys are getting longer. Transit through primary roads affected by poor automated control of road (traffic lights) which favors addition to huge losses in man hours (HH), further contamination by CO and CO2 due to timeouts motor for circulating. This research was conducted monitoring traffic volume on a road in the city reaching the proposed solution of an intelligent system of synchronized traffic lights. Any proposed solution will help to alleviate mobility problems currently affecting this city.

Intelligent traffic lights, Synchronized traffic lights, Monitoring

Resumen

Debido al rápido crecimiento de las ciudades tiene la necesidad de la movilidad de bienes y personas en menos tiempo. Las vías primarias están saturadas por el paso de vehículos. La Ciudad de Veracruz, México, esta problemática aunada a la topografía y topología propia del territorio ha favorecido un crecimiento alargado de la ciudad, en la cual los trayectos son cada vez más largos. El tránsito por las vías primarias se ve afectado por un deficiente control automatizado de la vialidad (semáforos) lo que favorece además de enormes pérdidas en horas hombre (HH), una mayor contaminación por CO y CO2 debido a los tiempos muertos del motor para circular. Esta investigación se llevó a cabo el seguimiento del volumen de tráfico en una carretera de la ciudad llegar a la solución propuesta de un sistema inteligente de semáforos sincronizados. La solución propuesta ayudará a aliviar los problemas de movilidad que actualmente afectan a esta ciudad.

Semáforos inteligentes, Semáforos sincronizados, Monitorización

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Introduction

The accelerated growth of modern cities is due to various factors, including commercial and industrial growth, migration from the countryside in search of satisfiers and comforts, etc. These cities have deficiencies in the planning of their growth that ends with a shortage of basic services or with an infrastructure that is inadequate for a demand requested by its inhabitants.

The area of analysis is the City of Veracruz, Ver., where the characteristic layout of the Greco-Roman models brought by the Spanish conquerors was maintained for many years as a perfect grid of a few blocks in both directions on the shores of the port, It is worth mentioning that it is one of the most important activities in the city, it began to be insufficient by the end of the 19th century and began its growth towards the southeast, bordering the coast and towards the south with the construction of the alameda that today bears the name Salvador Diaz Miron. Today the city has grown to the point of extending beyond the municipal territory, what we know as the City of Veracruz, is conurbated with three adjoining municipalities, Boca del Río, Alvarado and Medellín. With very specific urban settlements that demand great mobility from their inhabitants. The natural growth of the city has been sectorized by poor urban planning, or because the natural context of the area has dictated the parameters of extension and growth.

There are very well defined areas, to the south, bordering the beaches, there is the first level residential and commercial growth, to the west and south west are the residential settlements of medium interest and the industrial zones, to the north of the city the settlements of interest social and popular, leaving the center of the port and commercial traffic area related to this activity. This sectorization promotes the mobility of people from north to south and vice versa with journeys of 15, 20 and up to 25 km per day, from the residential areas in the north to the commercial areas in the center or south of the city or towards the west of the city to the industrial areas. The need for housing and the growth of subdivisions in the peripheries, It has not been accompanied by a study of the dimensions of the existing roadways or the creation of alternative routes that relieve traffic on the existing ones.

In addition, the layout of the roads has not been consistent with the growth of the city, for this reason we do not have roads that cross the city or peripherals that help decongest the interior roads. If we add to all this that the natural growth of the city with its respective need for mobility demands a greater number of transport options, which in this case is reduced to two, public transport by means of buses and public and private transport through cars. As background, smart traffic lights operating in the Netherlands are based on the premise that the red phase does not always need to last four seconds; Sometimes, depending on traffic conditions, it will be more effective to open the way in 3.2 seconds, for example, or in a little more time (López, 2016).

Due to recent advanced communication possibilities between traffic infrastructure, vehicles and drivers, optimization of traffic light control can be approached in a novel way. At the same time, this can introduce unexpected new dynamics into transport systems. Research has been conducted on how drivers and traffic light systems interact and influence each other when informed about driver and light behavior. Agent-based models have been developed to simulate transport systems with static and dynamic traffic lights and controllers using information about the behavior of traffic lights (Costalle et al., 2016). Proposals have been made for a new approach to dynamically manage signal cycles and phases at an isolated intersection.

It has an improved performance system called "off-the-shelf" it is flexible and can be implemented with the aim of avoiding complex and computationally expensive solutions. In these systems, traffic is monitored in real time with multiple fuzzy logic controllers. Implementing this device does not require powerful hardware and can be easily implemented in a low-cost device, thus paving the way for extensive use in practice (Collotta et al., 2015). It has an improved performance system called "off-the-shelf" it is flexible and can be implemented with the aim of avoiding complex and computationally expensive solutions. In these systems, traffic is monitored in real time with multiple fuzzy logic controllers. Implementing this device does not require powerful hardware and can be easily implemented in a low-cost device, thus paving the way for extensive use in practice (Collotta et al., 2015).

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To streamline vehicular traffic in the densely populated areas of Mexico City, Mexico developed a program based on the use of traffic lightsself-organizing at UNAM. These traffic lights do not depend on a central control but depend on the local conditions where an adaptive solution to the road traffic problem is found (Olivares, 2014).

In this article, a bibliographic review of the importance of an implementation of intelligent traffic lights in the routes of the main streets of the city is carried out. The methodology used to carry out a monitoring of the volume of vehicles (vehicle capacity) is described. The results section details what was obtained and the traffic light synchronization proposal.

Hypothesis

Carrying out an analysis of the delays that occur due to the bad synchronization of traffic lights in the city, you can save fuel use costs, less stress to get to the work zone and consequently less polluting emissions to the environment.

Problem Statement

The poor urban planning that has led to roads that are scarce for the volume of vehicular traffic generates several problems of great social, economic and environmental impact. Taking longer to travel the same distances involves investing more time in the simple activity of moving from one point to another, which reduces social coexistence in addition to translating into very high economic costs due to the loss of man hours (HH), which can be productive in other activities.

Downtime, where vehicle engines continue to run and release substances resulting from the combustion of diesel, gasoline, gas or any other hydrocarbon, translate into emissions of carbon monoxide CO and carbon dioxide CO2, among other pollutants, which they are expelled into the atmosphere without any benefit.

The Port of Veracruz in an elongated way without counting the construction of road axes, or primary roads with the capacity to relieve the vehicular load that little by little was loaded with the connection of secondary roads coming from the new housing centers, or from the need for mobility of people from one end of the city to the other using the same roads. You can talk about various solutions, an urban reordering, construction of road axes including starting with the "first floors", reorganizing public transport, using new technologies in engines that make them less polluting and thus reduce greenhouse gas emissions. greenhouse, in short, they are multiple and at the same time costly or difficult to implement.

Smart traffic lights

Part of the problem is the travel times, we could start by trying to make the transit of cars through these roads more fluid, and this can be obtained at a relatively low cost that consists of putting an automated traffic light system or commonly called " smart traffic lights. There are three main types of automated traffic lights, the first and the most economical, it consists of placing equipment that will be synchronized in such a way that when a vehicle starts with the first green light, it will always reach the green light at the next traffic light in the entire road going to the design speed, 40, 50 or 60 km/hr, this system also serves as a maximum speed controller.

Another system includes cameras and specialized sensors that measure the waiting queue and that, through software, change the stop light to continue, giving priority to the areas with the highest traffic loads.

The third system that also uses cameras is a central monitoring system, which in addition to having a traffic controller who will determine vehicle flow priorities, can act as an urban surveillance system.

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The more complex or sophisticated the system, the more expensive it is to implement and operate. However, the system of synchronizing, through software or a very simple programming, the turning on of the green lights in such a way that it respects a specified speed, will save a lot of time.

Methodology

A vehicle survey (Figure 1) was carried out on one of the busiest arteries in the city of Veracruz, Salvador Díaz Mirón Avenue, in the section from Parque Zamora to Simón Bolívar Avenue (Figure 2). It was found that in a section of approximately two kilometers, there are fourteen intersections (Figure 3) with their respective traffic lights, which are not synchronized, generating waiting times that vary depending on the time of day and the day on which the measurement is taken reading.

Figure 1 Road monitoring

Figure 2 View of the experimental road for vehicular traffic measurements

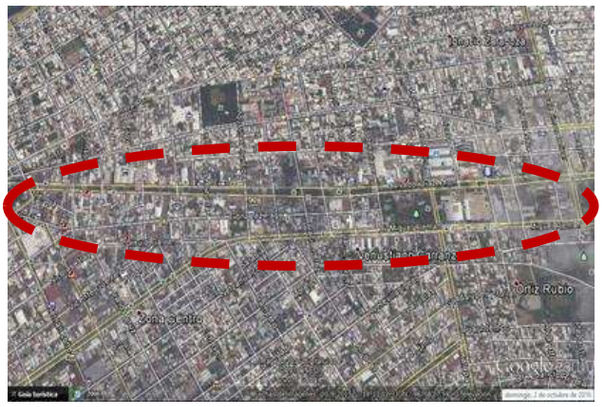

Figure 3 The experimental road, boulevard Salvador Díaz Mirón, where the section of analysis is found 14 intersections

Once the analysis of the traffic capacity was carried out, the data was analyzed and finally a proposal for the synchronization of the intelligent traffic lights in the experimental zone.

Results

In the analysis section, the results are a large accumulation of time for each stop in the interception lane, with a range that goes from 23 to 113 seconds.

At the intersection with Boulevard Simón Bolívar there is an estimated time of 113 seconds, which warrants taking up some other alternative solution, be it a bridge. In the case of the secondary streets of the experimental zone, there is a travel time of almost 10 minutes without counting areas of peak vehicular flow (Table 1).

Traffic lights	Intersection with Av. Salvador Diaz Miron	Time (sec.) Red	Green
one	Abasolo	36	50
two	Step and trunk	36	50
3	Virgilio Uribe	36	50
4	Jose Azueta	36	50
5	Turbide	36	50
6	Francisco J Mina	36	50
7	Alacio Perez	43	54
8	John Enriquez	43	54
9	Altamiran	43	54
10	Ignatius of the key	43	54
11	Molina Nuter	41	40
12	Orizaba	23	57
13	Red Cross	-------	-------
14	Simon Bolivar	113	36

Table 1 Travel time along Blvd Experimental on Av. Díaz Mirón

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Of the volumes of traffic measured, there is a total of 13,806 vehicles on a normal working day, with cars having the highest growth rate with 69%, in trucks (bus) there is 25%, while for cargo trucks and motorcycles 3% (Graph 1). From 00:00 to 06:00, the vehicular flow is low, increasing from 05:00 to 18:00; The hour of greatest vehicular influence is from 6:00 p.m. to 7:00 p.m. and a considerable decrease after 9:00 p.m. (Table 2).

Monday Friday	Car	buses	loads	motorcycles	Total
Hour	Vehicles / Hour				
00:00 - 01:00	46	0	1	0	47
01:00 - 02:00	19	0	0	0	19
02:00 - 03:00	20	0	1	0	21
03:00 - 04:00	21	0	0	1	22
04:00 - 05:00	55	0	1	1	57
05:00 - 06:00	153	189	12	5	359
06:00 - 07:00	389	204	20	6	619
07:00 - 08:00	486	214	28	14	742
08:00 - 09:00	483	229	37	16	765
09:00 - 10:00	443	204	35	14	696
10:00 - 11:00	404	177	33	11	625
11:00 - 12:00	501	190	43	20	754
12:00 - 13:00	599	203	55	30	887
13:00 - 14:00	686	219	30	30	965
14:00 - 15:00	612	201	25	27	865
15:00 - 16:00	578	197	23	26	824
16:00 - 17:00	576	180	21	25	802
17:00 - 18:00	682	210	19	30	941
18:00 - 19:00	797	232	18	36	1083
19:00 - 20:00	718	202	16	33	969
8:00 p.m. - 9:00 p.m.	680	195	20	14	900
21:00 - 22:00	334	188	9	20	542
22:00 - 23:00	167	0	2	6	175
23:00 - 24:00	125	0	2	1	127
Total Daily Traffic	9574	3434	441	357	13806

Table 2 Number of vehicles in a day taken in the experimental section

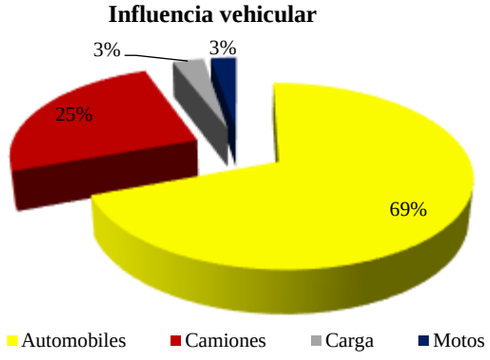

Figure 1 Vehicle influence in the experimental area

Two important results were obtained from the different gauging carried out: the daily average vehicular flow of 13,806 vehicles, and the average waiting time for each vehicle is two minutes and thirty seconds, 0.042 hours of waiting per vehicle, which would be covered in a time of 2 minutes with 50 seconds for the experimental analysis section, with a time saving percentage of approximately 70% (Table 3).

Traffic lights	Condition	Wait time
abasolo	Red	00:15:35
step and trunk	Green	-
Virgilio Uribe	Red	0:24:10
joseph azueta	Green	-
Iturbide	Green	-
francis j mine	Green	-
alacio perez	Red	00:18:30
John Enriquez	Red	00:34:15
Altamirano	Red	00:39:03
Ignatius of the key	Red	00:29:22
nut mill	Green	-
Orizaba	Green	-
Red Cross	Green	-
Simon Bolivar	Red	00:10:22
total time		**2:50:37**

Table 3 Time proposal to synchronize traffic lights

With these data we can calculate for a given number of vehicles the times lost in HH and the times of polluting gas emissions that could be reduced by simply synchronizing traffic lights and these results are shown in Table 4. For 100 vehicles taking into account Considering a waiting time of 0.04 hour, there is a CO2 emission to the environment of 10.50 kg, in the opposite case of 11,000 vehicles per day, there is 1155 kg of CO2 to the environment.

If we take into account the number of vehicles in the experimental zone of 13,806, we have a pollutant emission of 1,932.84 kg. Graph 2 shows the growth trend of contributions to the environment of pollutants, having a mathematical behavior of a potential type. This problem occurs in a section of the road, where it is important to pay attention to other important roads in the city of Veracruz, including the Mexican Army, Boulevard Simón Bolívar, Cuauhtémoc, Miguel Alemán, Rafael Cuervo, Ruiz Cortines, Juan Pablo Segundo. , among others, where there is no system of synchronized traffic lights and they are contributing large amounts of pollutants to the environment of the urban area. In the analysis of the HH for every 100 vehicles, there are losses of 294 pesos,

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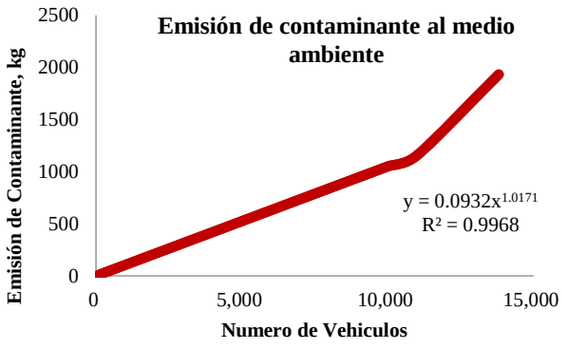
1	2	3	4	5	6	7
100	0.04	4.20	$70.00	$294.00	2.50	10.50
1000	0.04	42.00	$70.00	$2,940.00	2.50	105.00
2000	0.04	84.00	$70.00	$5,880.00	2.50	210.00
3000	0.04	126.00	$70.00	$8,820.00	2.50	315.00
4000	0.04	168.00	$70.00	$11,760.00	2.50	420.00
5000	0.04	210.00	$70.00	$14,700.00	2.50	525.00
6000	0.04	252.00	$70.00	$17,640.00	2.50	630.00
7000	0.04	294.00	$70.00	$20,580.00	2.50	735.00
8000	0.04	336.00	$70.00	$23,520.00	2.50	840.00
9000	0.04	378.00	$70.00	$26,460.00	2.50	945.00
10000	0.04	420.00	$70.00	$29,400.00	2.50	1050.00
11000	0.04	462.00	$70.00	$32,340.00	2.50	1155.00
13806	0.04	552.24	$71.00	$39,209.04	3.50	1932.84

Column 1: Number of vehicles
Column 2: Average wait time
Column 3: HH lost on hold per day
Column 4: Minimum daily wage
Column 5: Cost of waiting loss per day
Column 6: Average emission of pollutants in kg per hour of the vehicle.
Column 7: Emission of pollutants (kg) per day

Table 4 Analysis of pollutants to the environment by the number of vehicles



Graph 2 Potential growth of the emission of pollutants into the environment

Thanks

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Conclusions

The implementation of smart traffic lights speeds up the movement of goods and people to commercial and work places, obtaining optimal transfer results. The impact of intelligent traffic light systems directly impacts the environment where around 13,806 vehicles circulate daily in the experimental area, emitting 1,932.84 kg of pollutants into the environment, which verifies the importance of carrying out a program for the proper functioning of intelligent traffic lights.

In areas where there is a high concentration of vehicles in the cities. Carrying out an analysis of the delays that occur due to the bad synchronization of traffic lights in the city, you can save fuel use costs, less stress to get to the work zone and consequently less polluting emissions to the environment.

References

Costache LS, Viswanathan V., Aydt H., and Knoll A. (2016). Information dynamics in transportation systems with traffic lights control. Procedural computer science, ELSEVIER. Volume 80. Pages 2019-2029.

Collotta, M., Lo Bello L., and Pau Giovanni. (2015). A novel approach for dynamic traffic lights management based on wireless sensor networks and multiple fuzzy logic controllers. Expert systems with applications. ELSEVIER. Volume 42. Issue 13. pp. 5403-5415.

Lopez, N. (2016). This is how smart traffic lights work to avoid traffic jams. Autobild.es. http://www.autobild.es/noticias/asi-funcionan-los-semaforos-inteligentes-que-evitan-atascos-294085.

Olivares, E. (2014). UNAM researcher develops self-organizing traffic lights. The Online Day. http://www.jornada.unam.mx/ultimas/2014/02/16/desarrolla-investigador-de-la-unam-semaforos-auto-orgamizadores-1921.html

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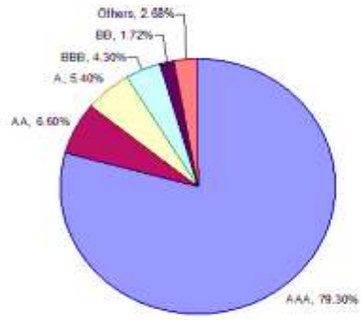

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