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# SMART MECHANISM FOR CHANGING STREET LIGHTS

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**Abstract**
Replacing failed bulbs of streetlights in a location can be very tasking and expensive if the optimal time for replacement is not determined. In this paper, a model has been developed that helps to establish the optimal time for the replacement of streetlight bulbs. Burnt-out bulbs are replaced individually when they fail, and group replacement is carried out on all bulbs after a specified time. The costs for both individual replacement and group replacement are determined. The developed model was applied to locally sourced data from a field survey of a streetlight installation at the University of Ilorin, Ilorin, North-central Nigeria. The model gave the optimum replacement time of burnt-out bulbs as the sixteenth week when applied to the data used in this work. The optimum replacement time will be dependent on the dataset used. This makes the developed model useful in establishing the optimal replacement time of any stochastically failing items that are in large quantities. The model will help to reduce maintenance costs for facility managers.

**Keywords**:,Streetlight bulbs, Optimal replacement time, Individual replacement, Cost optimization, Maintenance costs, Field survey,

## INTRODUCTION

Everything you need to know about Smart Street lighting everything you need to know about smart street lighting Reading this article will help you understand what smart street lighting is, how it evolved and what makes it "smart". You will also gain insight into what the future holds for smart street lighting and how it is a core element for building the smart cities of the future. An introduction to smart street lighting Street lighting infrastructure overview Smart street lighting control systems Smart street lighting controller types, form factors and installation options Communication technology Streetlight remote control software I 10 integration and Smart Cities of the future An introduction to smart street lighting It has been a while since artificial light has allowed us to see in the dark. We can now light the homes we live in, our workspace and, of course, the streets we wander. This invention has made our lives easier and, as public lighting has become a norm in most parts of the world, safer. Street lighting is now a core piece of urban and rural infrastructure, creating a safe environment for pedestrians and drivers alike. Costs for municipalities At local and municipal level, public authorities are in charge of providing street lighting as a key public service for citizens' safety. This, however, represents a major cost for the local government which can be challenging to accommodate and sustain. Moreover, it is still common for municipalities to use outdated and inefficient street lighting facilities which lead to a higher energy consumption and increased

maintenance costs. An obsolete lighting system can account for as much as 50% of a typical city's entire energy bill.

A light bulb change is something almost everyone will have done in his or her lifetime. Although the actual task of changing a bulb can be quick, it's important to understand how to identify potential hazards and how to mitigate them. As a whole, this procedure provides general guidelines to change a light bulb safely. This procedure applies to bulb changing in complex environments with a variety of hazards such as fall and electric shock. This procedure would not apply, for example, to changing a light bulb in a desk or floor lamp where the fixture can simply be unplugged.

**Objective**

- To understand the basic principal of the our project
- Describe the construction and working of various parts of our project
- Development of the working model of the our project
- To reduce time spent on this activity.
- To analyze the technology according to needs and capabilities.

**Problem Definition**

- Lack of self awareness : In our country while changing the street light bulb many risk are taken hence it is hard and injurious to human.
- Current may take place at this time.
- Use of boon cars with hydraulic lifts it consumes time as well as fuel is wasted.
- Needs more manpower.

**II. IDENTIFY, RESEARCH AND COLLECT IDEA**

S. Shirsale, P. Khillare, R. Steinbach, and M. Lokhande, "Street Lights Replacement System- A Key Necessity for Make in India Campaign," International Journal of Business and Management Invention, vol. 6, no. 1, pp. 39–44, 2017. [1]

• K. Subramanyam1 et al. [2], worked on intelligent Wireless street light control and monitoring system, which Integrates new technologies, offering ease of maintenance And energy savings. Using solar panel at the

• lamp post By using LDR it is possible to save some more power and Energy, and also we can monitored and controlled the street Lights using GUI application, which shows the status of the Lights in street or highway lighting systems. M. Usman and et al., presented the Replacing failed bulbs of streetlights in a location can be very tasking and expensive if the optimal time for replacement is not determined. In this paper, a model has been developed that helps to establish the optimal time for the replacement of streetlight bulbs. Burnt-out bulbs are replaced individually when they fail, and group replacement is carried out on all bulbs after a specified time. The costs for both individual replacement and group replacement are determined. The developed model was applied to locally sourced data from a field survey of a streetlight installation at the University of Ilorin, Ilorin, North-central Nigeria. The model gave the optimum replacement time of burnt-out bulbs as the eighteenth week when applied to the data used in this work. The optimum replacement time will be dependent on the dataset used. This makes the developed model useful in establishing the optimal replacement time of any stochastically failing items that are in large quantities. The model will help to reduce maintenance costs for facility managers

S. Shirsale, P. Khillare, R. Steinbach, and M. Lokhande, "Street Lights Replacement System- A Key Necessity for Make in India Campaign," International Journal of Business and Management Invention, vol. 6, no. 1, pp. 39–44, 2017. [3], in their work on Design of Wireless Framework for Energy Efficient Street Light Automation Suggested an Intelligent management of the lamp posts by Sending data to a central station by ZigBee wireless Communication. With the suggested system, maintenance can be easily and efficiently planned from the central station, allowing additional savings. Srikanth M et al. [4], in their Work on ZigBee Based Remote Control Automatic Streets Light System. This streetlight control system helps in energy Savings, detection of faulty lights and maintenance time and Increase in life span of system.

Lighting systems in the public sector are still designed According to the old standards reliability and they often do not have advantage of the latest technological development, the use of new technologies for the sources of light and also Combination of sensors. There are three areas to be Concentrate to achieve the high efficiency in the street lighting if the efficiency in each stage can easily achieve the Maximum efficiency in overall system development. The First one in this area, is to choose light emitting diode (LED) Technology, instead of sodium vapor lamp and

Boomsma and L. Steg, "The effect of information and values on acceptability of reduced street," Journal of Environmental Psychology, vol. 39, no. 1, pp. 22–31, 2014. Lighting systems in the public sector are still designed According to the old standards reliability and they often do not have advantage of the latest technological development, the use of new technologies for the sources of light and also Combination of sensors. There are three areas to be Concentrate to achieve the high efficiency in the street lighting if the efficiency in each stage can easily achieve the Maximum efficiency in overall system development. The First one in this area, is to choose light emitting diode (LED) Technology

A. Murray and X. Feng, "Public street lighting service standard assessment and achievement," SocioEconomic Planning Sciences, vol. 53, no. 1, pp. 14–22, 2016.

- J. Asalor and I. W. Ujevwerume, "Assessment of availability of street light system: A study of Warri, Delta State, Nigeria," Nigerian Journal of Technology, vol. 39, no. 2, pp. 536–541, 2020. [9] D. Preston and K. worked on GSM Based Remote Control System of High Efficiency Intelligent Street Lighting System Using A Zigbee Network of Devices and Sensor. New intelligent and smart street light system is designed with wireless technology for maintenance and Network of sensors for controlling. In which, they used high Efficiency LED lamp which consumes less energy with high Life time and which are supplied with renewable energy of Solar panels

Literature review is an assignment of previous task done some authors and collection of information or data from Research papers published in journals to progress our task. It is a way through which we can find new ideas, concept. There are a lot of literatures published before on same task. Some papers are taken into consideration from which idea of the project is taken.

## III. SCOPE OF THE PROJECT or OVERVIEW

## IV DETAILS OF DESIGN, WORKING AND PROCESSES

**Working :-**

In case if the streets lights are having fault, working of the light has been stop or the life of the light is finished.

➢ First we need to OFF the current supply from the mean switch box which is provided at the end of the pole and from where it gets current supply should OFF while changing blub.

➢ Once it is OFF we are safe for changing the blub.

➢ One pole fix on the ground and other pole is hanging on the fix pole attached with hinge or pivoted joint in middle portion and bottom side also fitted with nut bolts.

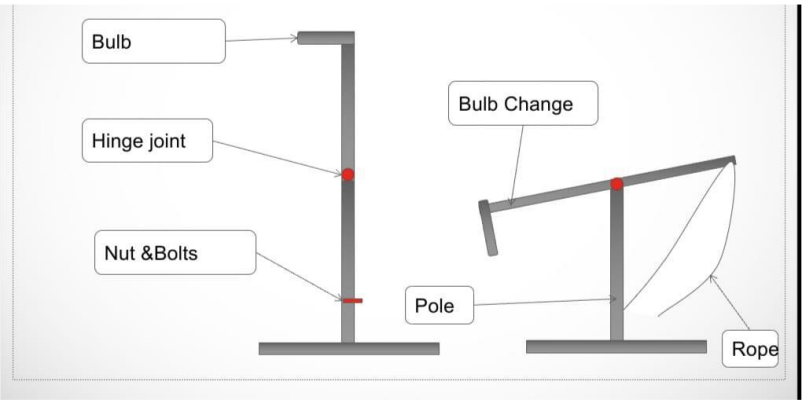
When changing the bulb bottom side nut bolts remove and with the use of the rope for tilting the pole we can change the bulb.

➢ Now again with the help of rope we have to fix the pole in the proper place with following all the safety rules.

➢ Hence, we have changed the blub now it time to ON the switch.

➢ Therefore in this way our project is working.

It includes the material in the form of the Material supplied by the "Steel authority of India limited" and 'Indian aluminum copper' as the round bars, angles, square rods, plates along with the strip material form. We have to search for the suitable available material as per the requirement of designed safe values.



| Sr. No. | Name of Resources | Specification |
|---|---|---|
| 1 | Nylon rope | 10 feet |
| 2 | M. S. steel rod | 8Feet |
| 3 | Battery | 1 |
| 4 | joint | 1 |
| 5 | Led bulb | 15 watt |

## V CONCLUSION

In this work, a model has been developed to establish the optimum time for the replacement of burnt-out bulbs in street lighting system. The model can be used to establish the optimum time for the replacement of any stochastically failing item. The group replacement method was adopted to carry out this analysis. The model developed was applied to real-life data. The optimum replacement time of burnt-out streetlight bulbs was subsequently determined. The survey conducted confirmed that the failure of bulbs is probabilistic, and all the bulbs may fail before the end of the manufacturer's specified lifetime, although some bulbs may work beyond the manufacturer's specified lifetime. The bulb is the most failing component in a streetlight. Replacement of failed bulbs in a streetlight installation requires proper planning. Otherwise, some areas may be poorly illuminated, therefore, increasing the risks of accidents and crime. The model proposed in this work has been able to establish the optimal time for the replacement of failed bulbs. A field survey was carried out to observe the failure rate of a set of streetlights whose bulbs were all replaced with new ones the same day. The bulbs were from the manufacturer; this was to help us determine their failure rate. The failure rates of the bulbs were stochastic. The developed model, although focuses on the replacement of burnt-out bulbs in a street lighting system, it can also be used for optimal replacement decision for any stochastically failing items. Determining the optimum replacement time for failing items is of great relevance to decision-makers in the field of management. Having an optimal replacement plan enhances

## VI RESULT AND APPLICATIONS

**Result:-**The results indicated that the optimum time for replacement is in the eighteenth week. It would be observed that the cost of replacement is very high in the first week and started to reduce from the second week. Comparing the results obtained from Policy I (Individual Replacement Policy) and Policy II (Group Replacement Policy), it is discovered that group replacement at any time from week five to week thirty-two is cheaper than individual replacement at failure. This shows that group replacement will be a better replacement policy for stochastically failing items like bulbs. However, the optimum replacement time is in the eighteenth week. This (eighteenth-week optimum time) is exclusively for the area surveyed in this work. The optimal replacement time will be dependent on the data set used on the model. This makes the model robust for determining the optimum replacement

time of any stochastically failing items once parameters like the failure rate, average life cycle, and replacement costs are known.

Final Model of Project

**Application:**

Our project should use for following various applications like as:

- Newly building apartment.
- Societies.
- Residencies.
- Various Companies such as Cummins India private limited.
- Highways.

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