

# Method Enlarge Intensity Illumination Without Adding Power Electricity

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**Abstract**— The savings in power electricity consumption should be done in order to be enjoyed by many people. Method lowering the location of the point of the lamp can increase the intensity of illumination and can increase the ability of the power of view from the eye. The length decrease the lamp point depending on the size of the subject anthropometry stood up hands grasping. From 6 lamps TL2x18 watt which mounted, generating intensity of illumination about 336.43 lux on the decline throughout the 90 cm and 344 lux along 99 cm. In Table 1 it appears that the intensity of illumination 344 lux and 336.43 lux can see with bright the letter height 2.2 cm and a width of 1 cm as far as 488 cm. This method can be used anywhere and can help in saving energy.

**Keywords:** *Electric Power, Methods*

## Introduction

Electric power used to support their daily activities and constitute the means the most important. Electric power is the longer becoming increasingly expensive, due to the difficulty in procurement. Electric power constitute energy is a very potential needed and very efficient to use. Until now the electric power is very dominating in its use. The dominance of electric power consumption demands that the user must be able to save electric power because the electric power are condemned to scarcity.

The addition of electric power consumption cause by the activities of man himself. Advances in technology and the need to carry out activities for the sake of for the betterment, made man must use the electric power as the main means of activity. To use the electric power is very easy to do, but the longer the electric power is difficult to obtain. To save the electric power consumption must be done in a way that can be used without having to increase the electric power[2]. Conserve the electric power is very need do because the electric power is already very difficult and expensive. Many the methods are used to save electric power, such as the creation of tools to save with electricity enlarge  $\cos \phi$  (Power Factor) using capacitors[3]. Way to save electricity power like this can not last long Because The tools used Easily damaged and the load on the power supply Also varies<sup>(1)</sup>. Because electric power is starting to costly and the electric power consumption is increasingly a lot of, especially load to lighting for the creation for work comfort, it is necessary done saving the electricity power with method decrease the lamp point. Decrease in lamp layout is one method of saving electricity power. Method lowering the location of the point of the lamp performed in order to obtain a greater light intensity. Methods with lowering the location of the point of the lamp done to get of the lighting in the room without adding electric power[7].

The saving of electric power by increasing the intensity of illumination do lowering the location of the point of the lamp light must done, because method lowering the location of the point of the lamp can give a good impact in the future. Shifting the location of the lights is done by providing an iron pole a few centimeters or in meters down appropriate the size of the user anthropometry.

### 1.2 Problem Formulation

From the above description can be made the formulation of the problem as follows :

1. What with method lowering the location of the point of the lamp can add the intensity of illumination?
2. What is the relationship of measure anthropometric the position stand the hand upward clench of subject with high the lights?
3. Does the addition of light intensity can increase the ability of see from eye?

### 1.3 Benefits of Research

The benefits of this research are:

1. The results of this study can be carried out on room anywhere.
2. The results research beneficial to reduce the cost burden which issued to add the intensity of illumination.
3. The results of this research provide a picture, if there is a turn of the lights off can be done immediately.

## 2. PROCEDURE RESEARCH

The material in this study was a laboratory and lamp the fluorescent 2x18 Watt as much as six (6) pieces which there are in Power Systems Laboratory, Faculty of Engineering Unibersitas Udayana. Preparing iron pipe 1\2 inci to put the fluorescent 2x18 watts. Preparing large the letters with a height of 2.2 cm and a width of 1 cm which will installed on wall on laboratory.

Method in this study is lowering the location of the point of lamp on the reseach place by providing a buffer iron on each lamp. Iron buffer will lowering the location of the point of lamp nears the point working and impacted provide illumination intensity which more light on the at the desired working point.

Procedure In this research are:

1. Measuring the intensity of light in laboratory of the Faculty of Engineering University of Udayana on the initial conditions.
2. Recalculation ulang of many the lights.
3. Measuring the intensity of lighting to each decrease layout the lamp.

## 3.RESULTS ANDDISCUSSION

### 3.1 Research Results

#### 3.1.1 Data the size hand to workers

##### 1) Results Calculation

Based on calculations, many lights are obtained is 12 units TL2x18 watt lamp, mounted based on rows and columns 3x4 so getting a light intensity of 250 lux with a ceiling height 3 m. The intensity of 250 lux illumination used is based on the minimum value of the intensity which the allowed. is 250-500 lux[4].

##### 2) Measurement results

Measurements were made to get the lighting intensity measurements, to compare the results of the calculation and measurement results. Measurement of light intensity 6 lights with two rows and three columns that have been attached in the laboratory TL2x18 watts equals 215.57 lux.

TABLE 1.  
INTENSITY ILLUMINATION THE RESULT MEASUREMENT OF THE LAMP AFTER DECLINE

Decrease (cm)	Illumination Intensity Measurement Results (lux) 12 Lamp	Ability Power See eye at a distance of 488 cm with high letters 2.2 cm and the width of the letter 1 cm
On Ceiling	215.57	Can not see the letters
15	233,57	Can not see the letters
35	241.14	Can not see the letters
45	254,29	Can not see the letters
65	291,43	Can not see the letters
90	336,43	Can see the letters
99	344,00	Can see the letters

Research conducted on the intensity of illumination is obtained based on the lowering the lamp which done with the provision that the work table as high as 90 cm.

##### 3) Size Anthropometry Subject

Anthropometric size the subjects with 10 peoples the samples, obtained as big as (see Table 2) [5]:

TABLE 2.  
SIZE ANTHROPOMETRIC SUBJECT (N = 10)

Amtopometri	Percentile		
	5	Percentile 50	Percentile 95
Body standing upright with his hands clenched to top	201.61	210	218.39

Body standing upright with his hands clenched to top of 10 samples were obtained to get average results percentile.

### 3.2 Discussion

#### 3.2.1 Method of decline the location of the point Lamp.

Method of decline the location of lamp which done can an increase in the intensity of illumination. Decline is done from a distance of 15 cm, 35 cm, 45 cm, 65 cm, 90 cm, and 99 cm and get the lighting intensity of 233.57 lux, 241.14 lux, 254.29 lux, 291.43 lux, 336.43 lux and 344 lux. Large the lighting intensity on each decrease in point of the lamp directly proportional to the length the decrease which is done. Decrease in light point will increase significantly the lighting intensity thus considered to be able to be applied in the workplace that require an increase in the lighting intensity.

Improve the light intensity by this method can be expected as a reference to be used as a model in the design of lighting installation without having to increase the electric power. Design an increase in the intensity of illumination should be done as a result of power shortages and assist in the implementation of energy saving[2,5].

#### 3.2.2 Relationship Anthropometry Subject With High Lights

Anthropometric size measured to obtain high the maximum of the lamp point which allowed. Anthropometric size with the number of subjects 10 peoples get the the average on position body of standing with hands grasping upwards obtained as big as 210 cm. The measure anthropometric must revamped into the form of a percentile in determining high the point of lamp based on data obtained from the subject.

Percentile size that is used as measure high the point of lamp using percentiles: percentile 5, 50 percentile and 95 percentile[5]. Percentile value in this study using the percentile 5 with value of 201.61 and the value of this percentile in accordance with high of the reach of all the subject. Value of this percentile is used so that the lamp there is on the reach of hand of the subject and the light intensity obtained is able to assist the subject in the work.

#### 3.2.3 Intensity Lighting Can Add Power Capability See From The Eye

Many use of the addition of lighting intensity in the human effort to improve performance. The addition of the lighting intensity can help subject in avoiding accidents from of environment conditions, can finish work quickly and accurately, can also provide comfort in work[4].

Optimal decline which performed based by percentile 5 with a mean value the lighting intensity 344 lux and decrease is at a point 99 cm. Decrease point optimal lights can add power of the eye to see the letters clearly at a distance of 488 cm with a height of 2.2 cm and width of the letter of 1 cm. Decrease lamp with distance to down 90 cm with the mean the lighting intensity 336.43 lux has been able to see the letters with high of 2.2 cm and a width of 1 m. Proven that the increase in the intensity of illumination with method decrease in light point besides can save energy but also can increase the ability of power eyesight[1,2].

## 4. CONCLUSION

1. Methode decrease location the point of lamp can giving donation the useful in energy saving, because the purpose of the method can increase the lighting intensity without adding electrical energy.
2. This method can be used anywhere, if do you like accentuate art then should be added the elements of art.

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### **AUTHOR PROFILE**

First author (single author): I Ketut Wijaya.



I was born : in Padangbai, Karangasem, Bali, Indonesia

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Education :

1. Education Strata 1: Institute of Technology Surabaya in Surabaya, Indonesia and Acquired degree which is Ir, 1986
2. Education Strata 2: Ergonomics of Work Physiology Udayana University in Denpasar, Bali, Indonesia, and degree which obtained is M.Erg (Master Ergonomics), 2007
3. Education Strata 3: Ergonomics of Work Physiology Udayana University in Denpasar, Bali, Indonesia, and degree which obtained is Dr (Doctor), in 2011

Often participated in the training, the writing and research national nor international.

Worked as a lecturer at the Faculty of Electrical Engineering University of Udayana Badung, Indonesia from 1987 to the present.