

# Methods Usage Computer for Security and User Convenience

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## ABSTRACT

Computer models equipment nowadays has been used widely and computers as work facility can't be separated from the use of electricity. The conditions of electricity that used with different loads, so the electric power through socket installed must go through a process of grounding (earthing) to minimize electrical field on computer loads facility.

The electric power that used must have a pretty good criteria with fitted earthing, in order to minimize the electric field on the computer. Earthing data obtained by measuring directly in the study where the system should be installed computer loads. Earthing that mounted on socket that has been installed which is used in the study with a computer has a data load electric field 20 volt / meter. socket without grounding (earthing) has the electric field of 650 volts / meter and has a body voltage of 25 volts is enough to make safe and comfortable. After repairs on grounding (earthing) with detainees of connection obtained 60 Ohm has the electric field of 7 volts / meter with body voltage drop to 3 volts.

The results showed that the grounding (earthing) attached to the socket working with computers will reduce the burden of the electric field and the voltage level of the body that affect the level of security and convenience for the computer users. The reduction of the electric field can be done by adjusting the eye's distance from computer.

## Keywords

Earthing (Ground), Electric Field, Safety And Convenience Work.

## 1. INTRODUCTION

Computer models are the means and tools which preferably people in Indonesia to be active and creative to improve the quality of life and business. Activity carried out an interrelationship activities (economy), trade business distance (on line). This activity does not end there but already far and even relate to private activities.

Computer models are items that are not expensive anymore in the size of the economy. Adding income or is a permanent establishment in order to live better in the future. Using computer models, can be done in the home office, office or usage can be a matter of hours or days depending on the quality of the tools which are used. The use of computer models in capacities of long time can cause a disturbance such as in the eye (aqueous or tired eyes). The use of computer models for a long time can cause irradiated the magnetic field emitted by the computer. The influence of the magnetic field by the computer until today not obvious against human influence. The computer model must be used widely and

must be provides a simple solution. Computer models is to review the influence of an electric field and determine how to reduce of an electric field emitted by a computer screen. The simplest way would be given to reduce the magnetic field and voltage body which affect the on a computer user's body through a study. Body voltage (volts) that comes out through the computer, if the hand touching the computer can make the wearer not comfortable. Voltage body which out through the computer, can make computer users become uncomfortable. Distance eye with a computer is very influential to the electrical field received the user<sup>(4,5,10,11)</sup>. Based on practical standpoint, the visibility on the eye to a computer is 45.7 to 71.1 cm has been recognized by the standards of ergonomics<sup>(8,12)</sup>.

Conducted a study to determine the effect of Earthing (grounding) which installed to reduce electric field and touch voltage issued by the computer. Result research will be a reference for the Computer User.

## 1.1 Problem Formulation

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

1. How large the electric fields on the earthing (grounding) who have been there before the repairs?
2. Is there any influence without earthing (grounding) of the electric field against Body User?
3. Does by making grounding (earthing) can be reduced the electric field of computer?
4. Is the an Electric field and voltage of body on computer in a mounting of socket can be improve security and user convenience Computer?

## 1.2 Benefits Research

1. Can dipergnakan reading materials by researchers for further research.
2. Can give a clear picture on use computer.

## 2. MATERIALS AND METHODS

The material in this study is the electric field of computer and earthing of electrical socket conducted in the laboratory of Electrical Engineering, Faculty of Engineering Unuversitas Udayana in Bukit Jimbaran.

The method used in solving the problem is with the way the earthing of electrical socket that is used for computer installations.

### 3. RESULTS AND DISCUSSION

#### 3.1 Results

The data is the result of the measurement after a study of the outlet socket in domestic installations. Measurements were made to obtain research data.

**Table 1. Data Result Research On Computer**

Position and Conditions socket stopcontacts Electric Field	Electric field
Earthing (grounding) that already exists	
1. Electric Field with Arde Already Installed (Volt/meter)	20
2. Body Voltage (volt)	15
Electric Field and Voltage Body Computer Without Arde	
1. Electric field (volts / meter)	650
2. Body Voltage (Volt)	25
After installation of earthing (grounding)	
1. Electric Field with Arde Installed custody 60 Ohm (Volt / meter), which is the result of research, Grounding 150 centimeters long with a diameter of 10 inches and liaison between the socket with earthing (grounding) using BC 6 inchi.	7
2. Voltage body into a (Volt)	3

#### Results Research (9)

Data generated from the measurements through the research results can give an idea to do a Repair of each installation of **the stop contact connected to the computer** generating an electric field to do work and effort.

**Table 2. Security and Convenience User Computer Before and After Repair**

No.	Data	Before Installed of earthing (grounding)		After Installed earthing (grounding)		Differ Ence (unit)	p
		Average	SD	Average	SD		
Security	30	25.88	5.18	40.93	3.87	15.06	0.000
Comfort	30	28.97	4.43	44.78	2.27	15.81	0.000

The result of the calculation of the safety and comfort before and after the improvements produce a significant difference.

### 3.2 Discussion

#### 3.2.1 Influence of earthing (grounding) Against Electric field.

The influence caused by the installation of the earthing (grounding) the electric field and body voltage can be seen in Table 1. Table 1 shows the results after the measurement of 20 volts / meter to earthing (grounding) which already existing and body voltage of 15 volts. Earthing (grounding) used is the overall earthing which installed on place where will done research. Earthing (grounding) serves as a conductor of electric current directly to the earth or ground because the leakage isolation caused sparks or short circuit<sup>(6,7)</sup>.

#### 3.2.2 With socket outlet of work without earthing (grounding)

With use of socket outlet of work in research without earthing (grounding) have electric field as big as 650 volts / meter and body voltage 25 volts. Electric field and voltage of body without earthing (grounding) greater compared with used the earthing (grounding). With a very big difference on electric field and voltage of body before and after earthing (grounding) then the use of computers becomes imperative to install grounding (earthing). Installation of earthing should be done at the same time the house was built, if installed after construction was completed a little difficult to install a good earthing and add costs that should not be done in ergonomics. In a electrical installations for home, earthing shall be installed as part of safety for the occupants of the house itself. Most people still do not understand how important installing an earthing to our safety<sup>(3)</sup>.

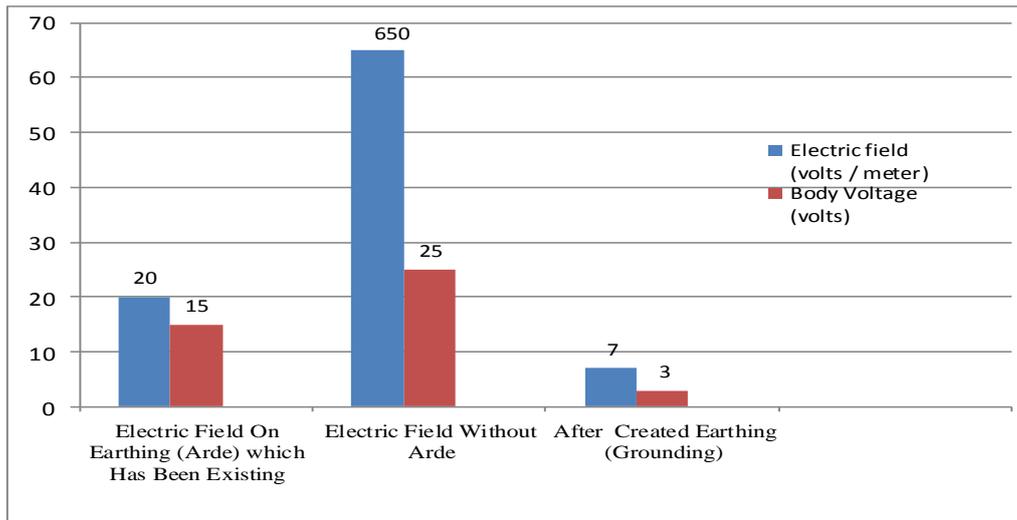
According PUIL (2000), the voltage of body 25 volt does not include dangerous voltage, because the generated voltage has not exceeded the voltage is 50 Volts (Voltage safe). Voltage 25 volts which shocking enough on the computer can lead did not feel safe and comfortable to perform work on the computer. On these conditions the expected computer users to install the security system of the most simple which connect socket outlet and (install) earthing<sup>(6)</sup>.

#### 3.2.3 Condition after installing outlet earthing at work.

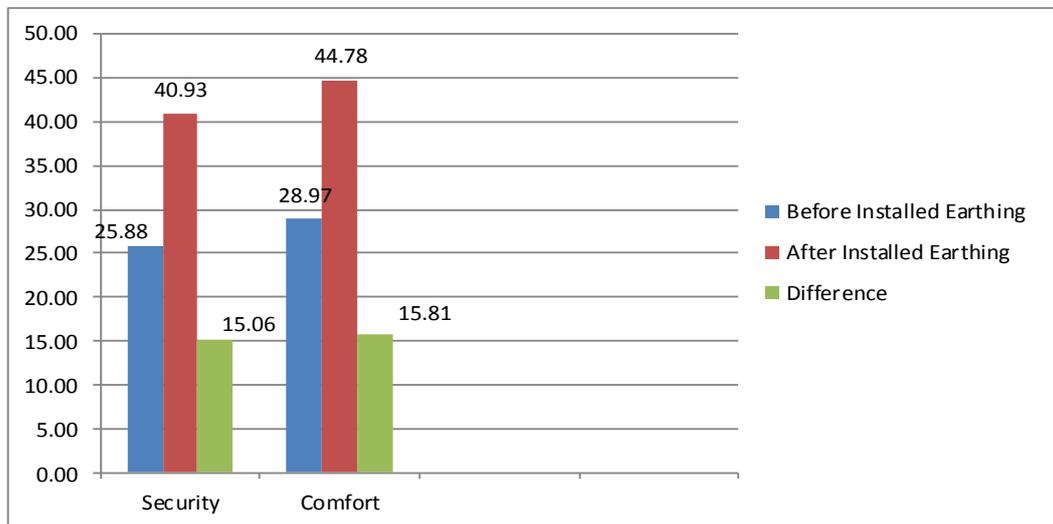
##### a. Earthing (Grounding) with land prisoner 60 Ohms

Mounting with earthing (grounding) on the socket outlet is a good thing to get the most from an electric field and the body voltage. Prisoners earthing (grounding) smaller used on the socket outlet to obtain the electric field and voltage smaller body. The smaller the prisoners which obtained on the earthing (grounding) will have better ability rate. If earthing (grounding) as safety against touch voltage, land prisoner maximum is on the 5 Ohm. The custody earthing (grounding) mounted, be measured and custody Obtained as big as 60 Ohm. The research done placed on the area of limestone Bukit Jimbaran, Badung, Bali. Mounting is done in a way to drilling with a special tool to break limestone. Earthing (grounding) which mounted with a length of 150 cm, diameter 10 inches and connected by wire BC 10 inches. Mounting earthing (grounding) in the socket outlet has a value of electric field as big as 7 volts / meter and body voltage as big as 3 volts.

Results research of three ways conducted in which it can be concluded that the mounting of the earthing with which do not mounting earthing have differences results pretty good. The third way much better, namely by mounting the earthing (grounding) is done to reduce the influence of an electric field and the body voltage. If in subsequent research can be done by fix earthing or improve prisoners ground into smaller it can be ascertained the influence of electric field and body voltage on the computer will be smaller again<sup>(1)</sup>.



Graph 1. Electric Field and Voltage Body On Compute



Graph 2. Security and User Convenience ComputerCompute

*b. Set distance of computer users and set lighting*

According to previous research the way to get the smallest influence of electric fields is done by adjusting the of distance of eyes with computer of corresponding anthropometry (4.5,11,12).

*3.2.4 Analysis of safety and comfort of computer users before and after being fitted earthing (grounding)*

After mounting of the earthing (grounding) on the socket-outlet and result decrease on the electric field, see on (Table 2) and resulted in increased safety and comfort. Enhanced of security and convenience of having a highly significant difference ( $p < 0.05$ ). This means that safety and comfort are achieved after installation the earthing (grounding) at the socket-outlet and reduce body voltage.

**4. CONCLUSION**

The conclusions that can be made from the above discussion are:

1. Stop-contacts work are connected to the computer should be given the earthing (grounding) in order to reduce the electric field and the body voltage which at computer. Earthing (Ground) which installed in the socket-outlet of computer work should have prisoners as small as possible ( $< 5 \text{ Ohm}$ ) to minimize the electric field and the body voltage which owned of computer dan affect the wearer. After do mounting installation of the earthing (grounding) at the socket-outlet and produce a reduction in body voltage of the computer causes an increase in safety and comfort on the computer user's.
2. In the use of computers long periods of time, you should not forget to set the distance (optimal) with the computer according to the anthropometry of the body and do break stolen.

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## 6. UPDATES THAT RETRIEVED FROM TITLE

This research can be continued to obtain a better method and must be disseminated to the public at large so that people know the dangers of using computers.

## 7. REFERENCES

- [1] Abdullah Iskandar, 2010. The reduction in Electricity Costs With usage Rods Electrodes on the socket-outlet. Lecturer Faculty of Engineering Department of Electrical Engineering, Journal of the Islamic University Lamongan. Accessed on 12 February, 2016.
- [2] Adyanto A., 2013. Installation of the Safe House Live from Fire Hazard. Accessed Date, July 4, 2016.
- [3] ILR, 2011. Earthing (Ground) for Electrical Installations House Live. Date accessed Desember 15, 2016.
- [4] I Ketut Wijaya. 2014. Lowering Location Of Lights, Repair Of Temperature, Repair Tables-Chairs, Setting Distance Eyes To Computer, And Adjustment Using Mouse To Improve Performance (Decrease Fatigue, Complaints And Pain Carpal Tunnel Syndrome (CTS)) On Computer Users In Company X.
- [5] I Ketut Wijaya, 2015. Effect Of Electric Field On The Computer Based On Review Aspects Of Ergonomics.
- [6] Margiono A., 2014. Resistivity Earthing (Earth Ground Resistance). Accessed, January 17, 2016.
- [7] Muhamad N. F., 2015. Earthing Meaning and Function Arde. Accessed Date 23 February 2016.
- [8] Sweere, H. C. 2012. *Ergonomic Factors Involved in Optimum Computer Workstation Design a Pragmatic Approach*. Available from URL=[http://www.ergotron.com/5\\_support/literature/PDF/ERGONOMIC\\_FACTORS.pdf](http://www.ergotron.com/5_support/literature/PDF/ERGONOMIC_FACTORS.pdf).
- [9] Wijaya, 2015. Hasil Penelitian Terhadap Arde dan Pengaruhnya Terhadap Medan Magnit. Penelitian dilakukan pada Tanggal 1 sampai 6 Juli 2016. Accessed Date 23 February 2016.
- [10] Wijaya. 2011. Redesign of Ergonomics Improve Student Performance And Utilization Efficiency Electricity Energy On Computer Laboratory The Department of Electrical Engineering University of Udayana. Dissertation 2011. University of Udayana. Dissertation.
- [11] Wijaya. 2012. Word Effect Of Temperature, The Lighting, Workload, Noise Against Eye Fatigue, General Fatigue And Stress Affect Learning Outcomes The Student Computer Users. International Journal Of Computer Application. Vol 58-Number 5. Date accessed 16 March 2016.
- [12] Wilkinson, B. 2006. *The Relationship Between Computers and Your Health*. Available from URL:<http://www.scsc.com/bkk/computer%Use%20and%20Your%20Health.pdf>. Diakses 18 Date accessed August 2016.