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Analysis Of Electrical Hazards In Construction Industries

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Abstract: *Construction is project based where different parties work together to achieve a common goal. The means of achieving this goal is fraught with hazards. In that major hazard is considered as electrical hazards. Electrical hazard is therefore a phenomenon or a process that can endanger construction worker and their environment. Consequently the study assessed the level of electrical hazard and safety measures awareness among electricity users in construction area. In this analysis shown how the electrical accidents occurs in the construction field and gathering the questionnaires implementing in hypotheses where formulated and tested. Questionnaires were the soul instrument used for the study to analysis the review in the method of Mean, standard deviation and Z- test. Causes of occurred accidents are identified during accident investigations. The identified causes are treated as accident risks in the prevention of further similar accidents.This review attempts to identify the health hazards, risks and causes of poor safety practices in construction sites. In addition, the differences in safety practices in both developed and developing countries and methods to improve construction site safety are discussed.*

Keywords: *electrical hazard, safety, Z-test, construction site*

I. Introduction

Construction industries are faced with numerous health and safety challenges this is as a result of electrical hazard inherent in construction activity. Comparing to the other industry hazards construction hazards more vulnerable to the peoples. Due to the technological development and the new equipments used in the construction with electricity because of the improper workmanship and the over confidence of the workers. Electricity is used in many ways such as lighting, cooling, heating and it is use to power or drive. Electrical equipment and machines. Electricity helps to facilitate economic development and it is a well-known fact that electricity is essential to everyday life, without it life will be boring both at home and at the work place.

Electricity passes more easily through some materials than others. Some substances such as metals generally offer very low resistance to the flow of electric current and such materials are called "conductors." Another conductor which is usually overlooked is the surface or subsurface of the earth. While insulator materials offer high resistance to the flow of electric current among the examples are rubber, dry wood, plastic and clothing. Electricity normally travels in closed circuits, through a conductor, but sometimes aperson's body which is an efficient conductor of electricity mistakenly becomes part of the electric circuit. This can lead to an electrical shock.Electric shocks occur when a person's body completes the current path having both wires of an electric circuit, one wire of an energized circuit, the ground and a metal part that accidentally becomes energized due to a break in its insulation or another "conductor" that is carrying a current.

II. Electrical Hazards

- Improper grounding
- Exposed electrical parts
- Inadequate wiring
- Overhead power lines
- Damaged insulation
- Overloaded circuits
- Wet conditions
- Damaged tools and equipment

III. Health Hazards And Risks

A hazard is a potential source of harm or an adverse health effect on persons. Risk is the likelihood that a person may be harmed or suffered from adverse health effects if exposed to a hazard. Therefore, risk can be minimized, although the hazard is there. Two major hazards that are common in construction sites have been identified.

IV. Physical Injury Hazards

Physical injury hazards are often caused by equipment used such as scaffolds, power access equipment, ladders, plant and machinery for excavation and processes such as manual handling, and roof work. These hazards can cause direct injury to workers at site and, if severe, it can even cause death. Different types of mechanical energy such as noise, vibration, radiation and temperature extremes (i.e. hot and cold) can also cause physical injury hazards. Noise is inevitable in constructionsites due to the nature of construction activities.

CHEMICAL HAZARD

However, in a previous study construction noise has been identified as one of the risks, which can cause hearing loss (one of the adverse health effects).Chemical hazards found in construction work include asbestos, welding fumes, spray paints, cutting oil mists, solvents and hexavalentchromium. Construction workers consider dust as the major chemical hazard. In addition, workers consider asbestos, cement and adhesives or solvents, to be the materials that can adversely affect their health. Effects of some health hazards are chronic while some are acute. Chronic effects usually develop slowly, and shall cause sickness or death after a certain period. For example, if a worker breathes small amounts of asbestos fibres, he may not notice the effect of that, because there are no acute effects. However, if the worker inhales small amount of asbestos fibres for prolonged time, the chances of getting asbestos related diseases (i.e., a lung cancer) will increase. Workers neglect the health hazards having chronic effects. Mostly reported chronic health hazards is "exposure to hazardous substances" (Table 1).Further, chronic health hazards include exposure to corrosive materials, skin sanitizers and irritants, that were also identified as risk factors in several previous studies.

IMPROPER GROUNDING

Grounding is the process used to eliminate unwanted voltage. A ground is a physical electrical connection to the earth. Electrical equipment must be properly grounded. Grounding reduces the risk of being shocked or electrocuted. The ground pin safely returns leakage current to ground.Neverremove the ground pin. Removing the ground pin removes an important safety feature. You can get shocked.

EXPOSED ELECTRICAL PARTS

Exposed wires or terminals are hazardous. Report these conditions to your supervisor. This electrical panel has missing circuit breakers. Never use a panel that has exposed wires. All openings must be closed. Outer insulation on electrical cords must be intact. On construction sites, temporary lighting must be properly guarded and protected to avoid contact with broken bulbs and avoid potential shocks.

INADEQUATE WIRING

Use properly rated extension cords. Make sure your power tools are being used with a properly rated Extension cord. Different types of wires with their electrical current rating.

DAMAGED INSULATION

Defective or inadequate insulation is a hazard. Insulation prevents conductors from contacting each other or you. Never attempt to repair a damaged cord with tape. Never use tools or extension cords with damaged insulation. Never hang extension cords from nails or sharp objects.

OVERLOADED CIRCUITS

Overloaded circuits can cause fires. Use proper circuit breakers. Never overload an outlet. Do not use power strips or surge protectors on construction sites. Use a 3-way extension with a GFCI instead.

DAMAGED TOOLS AND EQUIPMENT

Do not use electric tools that are damaged. You may receive a shock or be electrocuted. Double insulated tools are labeled. It will be marked "Double Insulated".

WET CONDITIONS

Wet conditions are hazardous. Damaged insulation increases the hazard. Always avoid using tools in wet locations. Water increases the risk of electric shock.

OVERHEAD POWER LINES

Survey the site for overhead power lines. Never store materials or equipment under overhead power lines Maintain a distance of at least 10' between tools and equipment and overhead power lines. Shocks and electrocutions occur where physical barriers are not in place to prevent contact with the wires. Maintain safe

distances between scaffolding and overhead power lines. Overhead power lines are very dangerous. Never attempt to contact an overhead power line.

HYPOTHESES

The following null hypotheses was stated and tested at $P < 0.05$ level of significance in order to guide the study:

Ho1: There is no statistical significant difference between the mean responses of Male electricity users and Female electricity users with respect to their perceptions on level of electrical hazards awareness among electricity users.

Ho2: There is no statistical significant difference between the mean responses of Male electricity users and Female electricity users with respect to their perceptions on level of safety measures awareness among electricity users.

V. Methodology

The research design used in carrying out this study was a survey method. Survey research is one in which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group to determine the level of electrical hazards and safety measures awareness among electricity user's in APL. This study covers APL a capital town of Chennai. The study utilized electricity user's as the population. Purposive sampling was adopted as the populations of the electricity users were not known. 250 male electricity users and 210 female electricity users were used in APL in Chennai metro. The questionnaire was the sole instrument developed by the researcher for the collection of data and was validated by Lecturers in Electrical and Electronics Engineering and Industrial and Technology Education Department. The analysis of data for the research questions and hypotheses were accomplished using frequency counts, mean, standard deviation and Z – test at .05 level of significant. The mean value of 2.50 was used as a decision point at four point rating scale and any item that has it mean rating of 2.50 and above was considered aware or knowledgeable and any item that has the mean item below 2.50 was considered not aware and not knowledgeable. For hypotheses testing the Z- critical value of 1.98 was used at 458 degree of freedom. Any hypothesis having Z – calculated of 1.98 and below was considered accepted and above 1.98 was considered rejected.

VI. Conclusion

The study revealed the level of awareness of electrical hazards and safety measures knowledge among electricity users in APL. From the study it has become cleared that many users of electricity are not well inform or aware about electricity hazards and safety measures. No wonder the implications of these is been seen in numbers of electricity accidents witness in homes and work places. To avoid all forms electricityaccident witness in APL metropolis all hands must be on deck to see that electricity users have adequate awareness of electricity hazards and safety.

References

[1]. Bakshi, U.A., and Bakshi, V. U. (2009). Basic electrical engineering. Pune, India. Technical publications.
[2]. Cardick, J., Capelli-Schellpfeffer, T. and Neitzel, D.K., (2006). Electrical safety handbook. New York MC Graw-Hill Companies, Inc.
[3]. Floyd, L., Rogers, M., and UzoKa, U (2008). Home electricity safety retrieved on July, 15 2013 from http:/www.safeelectricity.org/new/news.room
[4]. Janick, C. A. (2008). Occupational Fatalities due to Electrocutions in the Construction Industry. Journal of Safety Research, 39: 617-621.
[5]. Kolak, J. (2007). Electrical Safety: Elements of an effective program. Professional Safety. 52(2):18-24.
[6]. MacKinnon, J.T (2010). Important electrical and fire safety tips for families. Publication of Plymouth Utilities
[7]. Networks (n.d). The safe use of electricity in the home. Retrieved on May, 13 2013 from http:/www.esb.ie/esbnetworks
[8]. OSHA, (2009). Occupational Safety and Health Association fact file 2002-2009, retrieved on August, 10 2013 from www.cdcgov/osha.com.
[9]. Selp, G.G. (2000). Electrical installation handbook.Werbeagentur, John Wiley and Sons Chichester Publisher
[10]. Smith, A.M., (2006). Assessment of the injured athlete. In J. Crossman (ed) Coping with sports injuries: Psychological strategies for rehabilitation. New York: Oxford University Press.