A FRAMEWORK FOR ASSESSING THE WORK ENVIRONMENT RISKS AMONGST ELECTRICIAN IN JOHOR

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ABSTRACT
This study aims to build a framework of work environment risks in the course of work activities in public installation wiring. The research design is quantitative, and a questionnaire is developed as a data collection instrument. The questionnaire consists of 36 assessments which are 4 of high risks, 26 of medium risks, and 6 of low risks. The research samples were among electrician in the State of Johor. A total of 225 questionnaires were distributed. However, only 99 responses were received back by the researchers. From the analysis, a framework for assessing work environment risks has been established. It would allow the electrician to assess the work environment risks before any electrical installation job being executed.

Keywords: Work Environment Risks, Safety and Health, Electrical Wiring

INTRODUCTION
Electricians often exposed to work hazards due to the high risks at their work place which could affect their health and life. The hazards are in form of dusty air, slow air ventilation and heat issues, either it too hot or too cold. This risk arises when the management failed to foresee the working environment of employees which could contribute to bad work environment (Romuald, 2010). A working environment which involving lighting and acoustics could also bring stress to the human. In addition, a warm environment, noisy, poor air flow, noise, and work in confined spaces can also cause health problems in the long term.

This situation stems from the company which does not carry out safety assessment. The reason is the lack of training and skills to manage situations in industrial safety (Ashraff & Naseem, 2003). According to Bhutto (2004), safety and health management system that practiced by the contractors could still be considered weak. This is due to the lack of knowledge and training on how to conduct risk analysis, and safety procedures either by the employers or employees. Therefore, the focus of this study is to ensure that they are able to assess the level of risks potentially occur in their work place, and take necessary actions or precautions to prevent any injury or accidents.

Hence, this research is aim to produce a framework of work environment risks in the course of work activities in electrical installation work. Hopefully, this would help contractors to manage the work environment risks at the project site accordingly. It also gives insight into the electrical wiring contractors, to identify risks, and control the risks.

METHODOLOGY
This study will use a combination of methods (mix method), which are quantitative and qualitative. The method will allow the problem of the study to be described in more detail. This research started with the quantitative method to identify the working environment factor risks that possibly face by the electrical wiring workers during the course of their work. Types of working environment which might be undergone by the electrical wiring workers are extreme heat, slow air ventilation, narrow work space, working at height, poor lighting, and noise disturbance. These working environment factors are

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measured in six work stations which have risks of giving harmful effect to the workers. The Workstation is represented by the letters a, b, c, d, e, and f. It is based on Figure 1 and indicators as shown below:

Figure 1. Types of work station in the workplace

The questionnaire is developed and later distributed to electricians across the state of Johor to get feedback on the possible risks that might occur when they engaged in the electrical wiring jobs. The State of Johor is chosen because it was reported to have the highest accidents or injury during the job undertaking from 2002 to 2010 as recorded by Suruhanjaya Tenaga Malaysia. A total of 225 questionnaires were distributed, however, only 99 respondents sent back their responses. Subsequent to this, interviews sessions involving three experienced contractors had been undertaken to obtain information on risk control activity that carried in their companies.

RESULTS AND ANALYSIS
This section report the findings of the data analysis. The findings is displayed in form of a framework (Figure 2) that featuring six types of works and by six working environment factor for each workstation.

Figure 2. Framework of work environment risks for electrical work place assessment

Analysis of work environment risks according to the first workstation is a [on the ceiling (in the house)]. Results show that four high risk work environment factors and two factors work environment
is moderate risk. High risk work environment are extreme heat, ventilation slowly, working in confined spaces, and work in higher positions. Work environment factors moderate risk are poor lighting and noise disturbance.

According to the second workstation (work station b) [under the ceiling (in the house)]. Results show that the six risk factors work environment is moderate. Work environment are extreme heat, ventilation slowly, working in confined spaces, working in high positions, poor lighting, and noise interference.

Analysis to the third workstation (work station c) [on the wall (of the house)]. Results show that the six risk factors work environment is moderate. Work environment are extreme heat, ventilation slowly, working in confined spaces, working in high positions, and noise interference.

Analysis of work environment risks according to the fourth workstation (work station d) [middle wall (indoors)]. Results show that the six work environment risks is moderate. Work environment factors are extreme heat, ventilation slowly, working in confined spaces, working in high positions, and noise interference.

Analysis of work environment risks according to the fifth workstation (work station e) [top wall (outdoors)]. Results show that four medium risk work environment and two factors working in the low risk environment. High risk work environment factors are extreme heat, working in confined spaces, working in high positions, and noise interference. Factor of low risk work environment are: slow ventilation and poor lighting.

Analysis of work environment according to the sixth workstation (work station f) [middle wall (indoors)]. Results show that two medium risk work environment and four other low risk environmental. Moderate risk work environment are extreme heat and noise disturbance. Factor of low risk work environment are: slow ventilation, work in confined spaces, working in high positions, and poor lighting.

DISCUSSION

The first work environment factor risk at work is overheating. The risk control that needs to be undertaken by the contractor is to do the wiring before the ceiling is installed. This is to avoid the condition of working in an enclosed space. However, if the space has been closed, open the roof by pushing a few pieces of the roof plate in order to allow the steamy air flow to move out. This is because the air temperature is one of the most important factors that influence thermal comfort (Melikov, 2010). The contractor must also ensure that the employees wear a thin or bright shirt during such condition. Choosing the appropriate time or weather to do the work is also essential for example, heavy work to be done during early morning where the surrounding temperature is lower.

Slow air ventilation is the second work environment factor risk that might occur at work place. The possible risk control that could be done is by pushing a few pieces of the roof in order to let the air flow passes out. It provides effective ventilation in the work area as well as providing fresh air (Health Safety Executive, 2007). As an alternative, the contractor may also use temporary ventilation system for air flowing into the ceiling. However, it suitability need to be considered as the strong air flow will cause wind noise disturbance.

The third working environment factor risk is working in narrow spaces. The recommended risk control that could be undertaken is by providing fishing tool design type equipment such as traction hook method, pole design and etc. The aim is to avoid workers from being in a narrow space when connecting conduits or wires.

Working in high positions is the fourth working environment factor risk. The necessary risk control need to be carried out are to make sure the workers wear appropriate footwear, and always moved on a platform. The aim is to reduce the risk of stepping on dangerous objects such as cables leak, wood chips, nails and others which could bring injury to the workers. Employers also need to ensure that workers wear safety attire such as safety harness before they start doing any high place job.
The fifth working environment factor risk is poor lighting. In most of the situation the natural light creates a comfortable working environment. While, poor lighting conditions are often the factors that contribute to accidents and increase visual fatigue. According the Health Safety Executive (2007), adequate lighting should allow employees to work and move about safely. Hence, installing concentrated lights in the area is necessary when local and general lighting is not sufficient.

And finally, the sixth working environment factor risk is the distorted sound. Ensuring workers to wear ear protective device is one of the necessary risk control that need to be emphasised. Several types of ear protective devices are often used among acoustic gloves and earplugs. Sheath or sleeve acoustic ear is very effective for reducing the level of noise but can still hear the conversation for receipt of information for security purposes.

CONCLUSION
The findings indicated that the issue of security and safety management can be reduced to a smaller number if proper risk management process were implemented. Through this study, the electrical wiring contractor can conduct health and safety risks assessment at work place for the workers. It will provide to the employers and employees about the level of risks that might lead to accidents or injury at the work place. This assessment will allow the employers and the employees to take precaution and necessary action in avoiding any accidents during work.

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