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ASSESSMENT OF RISK AMONG STUDENTS IN ENGINEERING WORKSHOP

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Abstract:

Day by day activities could pose great danger for handlers of engineering workshop equipment. The study therefore examined the assessment of risk among students in engineering workshop. The study specifically described incidence of occurrence of hazard in the workshop and risk score of hazardous incidence in the workshop. The study employed multistage random sampling technique to select 100 Engineering Students. The data for the study were obtained through the use of structured questionnaire. The data were analyzed with descriptive statistics such as frequency count, percentage, mean and standard deviation while Tobit regression was used to test t Most (62%) of the respondents stated that eye strain was the incidence of occurrence of hazard in the workshop. irritation (3.71) had the highest mean risk score. This implies that the respondents often expose their skin to dangerouse materials and/or occurrence such heat, blasting, chemical among others. The coefficients of bone breaking and skin damage were positive and significant at 1 percentage level. This implies that as the bone breaking and skin damage increases, the risk score of hazardous incidence increases. Also, the coefficient eye strain was positive and significant at 5 percentage level. This implies that as the eye strain increases, the risk score of hazardous incidence increases. he null hypothesis.

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Keywords: Equipment, Hazard, Incidence, Risk, Workshop.

1. Introduction:

There are many tools available to help with risk analysis and assessment. Risk analysis involves gaining an understanding of the risk components – probability and consequences. Probability pertains to the failure of systems, humans, equipment, etc., and in many instances is readily quantifiable (Charles et al., 2018). Some data are available generically, but the most pertinent data are often found in a company's maintenance records, operational logs and incident investigation reports.

There also exist a number of methodologies to quantify the consequences of many of the hazards encountered in engineering practice, such as fires (thermal radiation and smoke), explosions (blast wave overpressures), toxic cloud dispersion, toxic exposures, lethality, noise, water pollution, etc Mathiassen et al, 2013. Once the probability and severity of consequences are known and the risk estimated, risk assessment is conducted to determine whether the risk is acceptable or not.

Risk factors well associated with the development and aggravation of WMSDs have been shown to be primarily of a biomechanically stressful nature, such as awkward postures, high muscular load, repetitive movements (Buckle and Devereux, 2002; Da Costa and Vieira, 2010; Punnett, 2014) and vibrations (Charles et al., 2018). However, an association with psychosocial stress, such as high work demands, lack of autonomy or job control and social support (Bongers et al., 2006; Devereux et al., 2002; Gerr et al.,2014) and organisational work factors, such as opportunity for rest allowances, variation in work performance and recovery time, has been found to interact in the development of WMSDs (Mathiassen et al, 2013; Srinivasan and Mathiassen, 2012). In terms of exposure to physical risk factors: more than 60% of the workers in EU report that they are exposed to repetitive hand- or arm movements at least a quarter of their working day, almost 50% report tiring and painful positions, and over 30% report carrying or moving heavy

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loads.

Below, primary risk factors for biomechanical exposure are described in more detail, together with examples of dose-response association.

- **Objectives:**

examined incidence of occurrence of hazard in the workshop of respondents in the study area;

assess risk score of hazardous incidence in the workshop of respondents in the study area;

Hypothesis:

$H0_1$: There is no significant relationship between risk score of hazardous incidence in the workshop and incidence of occurrence of hazard in the workshop of respondents in the study area.

2. Methodology:

The study was carried out in Oyo State. It lies between latitude 70^0N and 190N of the equator and between 2.5^0E and 5^0E of the prime meridian. The State has a total population of 5.6 million going by the provisional population figure of 2006 (National Population Census, 2006), and a land area of 27,140,000 square kilometer. Annual mean rainfall ranges above 1000mm; rainy season in the state averages eight months in a year. Rains start in Oyo State during the first week of March with storms. Mean temperature varies from daily minimum of 18.9^0C to a daily maximum of 35^0C. Humidity is quite high in Oyo State. Relative humidity in the State is 70 percent with a maximum of about 60 percent in the evening and a maximum of around 80 percent in the morning. The settlement pattern shows that so many people of different Nigerian ethnic background reside in Oyo State. The Yoruba ethnic group constitutes the majority of the population living in Oyo State. There are also non-Nigerians who live in Oyo State.

International Educational Applied Research Journal

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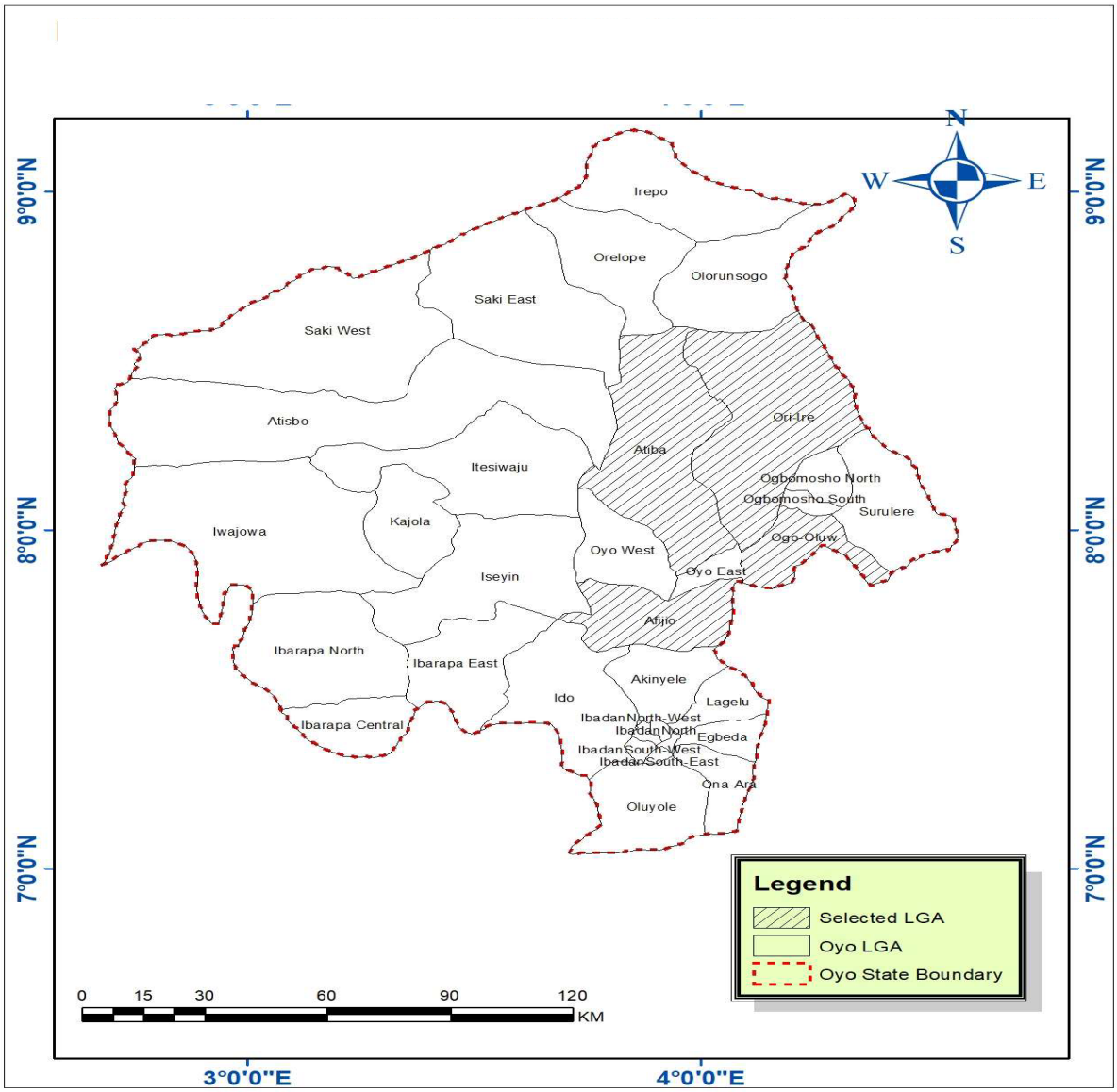

Figure 1: Map of Oyo State showing study areas

Population of this study involved all the mechanical Engineering students who has done practical work in the workshop in Ladoke Akintola University of Technology (LAUTECH), Ogbomoso,

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Nigeria. The study involved random selection of a total of 100 mechanical Engineering students in LAUTECH, Ogbomoso, Oyo State, Nigeria.

Primary data were collected by the use of semi structured interview schedule. The interview schedule which contained both open and close ended questions which aided the collection of relevant information on the objectives of this research work. The design that was adopted for this study was quantitative approaches. The quantitative method was carried out through regressional and descriptive research design. The statistic analytical tools that were used for this study include both descriptive and inferential statistical tool (Tobit regression) was used for the formulated hypothesis of the study.

3. Results and discussion:

Table 1 presented the incidence of occurrence of hazard in the workshop. Most (62%) of the respondents stated that eye strain was the incidence of occurrence of hazard in the workshop. This may be probably because bare eyes are often used my student and workshop worker to view dangerous lighting occurrence in the workshop.

Table 1: Incidence of occurrence of hazard in the workshop

Incidence of occurrence of hazard	Frequency	Percentage
Crushing		
Yes	33	33.00
No	67	67.00
Bone breaking		
Yes	11	11.00
No	89	89.00
Damage of hearing		
Yes	17	17.00

International Educational Applied Research Journal

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No	83	83.00
Skin irritation		
Yes	56	56.00
No	44	44.00
Skin damage		
Yes	24	24.00
No	76	76.00
Eye strain		
Yes	62	62.00
No	38	38.00

Source: Field Survey, 2017.

In Table 2, risk score of hazardous incidence in the workshop were presented. Skin irritation (3.71) had the highest mean risk score. This implies that the respondents often expose their skin to dangerouse materials and/or occurence such heat, blasting, chemical among others.

Table 2: Risk score of hazardous incidence in the workshop

Incidence of occurrence of hazardous	**Mean Risk score**
Crushing	1.64
Bone breaking	1.18
Damage of hearing	1.24
Skin irritation	3.71
Skin damage	2
Eye strain	1.99

Source: Field Survey, 2017.

Test of Hypothesis:

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

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Table 3 presented the relationship between risk score of hazardous incidence and hazardous incidence in the workshop. The coefficients of bone breaking and skin damage were positive and significant at 1 percentage level. This implies that as the bone breaking and skin damage increases, the risk score of hazardous incidence increases. Also, the coefficient eye strain was positive and significant at 5 percentage level. This implies that as the eye strain increases, the risk score of hazardous incidence increases.

Table 3: Relationship between risk score of hazardous incidence and hazardous incidence in the workshop

Independent variable	**Dependent variables**	**Coefficient**	P > | *t* |
Risk index	Crushing	– 0.617	0.456
	Bone breaking	5.607	0.000
	Damage of hearing	0.104	0.916
	Skin irritation	– 0.343	0.625
	Skin damage	7.145	0.000
	Eye strain	1.615	0.025
	Constant	8.805	0.000

Source: Field Survey, 2017.

In conclusion, eye strain was the most prominent incidence of occurrence of hazard in the workshop. Skin irritation had the highest mean risk score. The eye strain increases, the risk score of hazardous incidence increases.

Therefore, protective workshop eye glasss should be used by every user of the workshop. Also, fire, heat and chemical repellant long gloves should be used by the workshop users. These could protect the eyes and skin of the user of the laboratory.

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