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## Awareness of Occupational Safety and Health Issues on Roadway Maintenance Works in Nyeri County, Kenya

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### **Abstract:**

*The nature of the construction industry combined with the required physical demands and rigorous work processes, make it an industry that faces several safety and health issues and thus higher risk of ill health, injury or fatality. Many road maintenance operations are potentially dangerous both to the maintenance workers and to the road users. This research work aimed at finding out the level of awareness of occupational safety and health issues in roadway maintenance works among road contractors. Questionnaires were administered to 122 contractor workers of ongoing class A, B and C road maintenance projects in Nyeri county during the data collection phase. Thereafter, the data was analysed using SPSS software, descriptive and inferential statistical analysis were carried out, data was presented in various forms and finally conclusions and recommendations were drawn. The targeted outcome of this research was that the results will provide important information that is the first step necessary to ensure that safety and health which is a legal requirement is observed at every workplace. The study has established that half (50%) of the site agents agreed that Crew sizes need to be increased to accommodate lookout personnel and to improve quality of work. However an equal number (50%) was undecided. The findings of this study contradict with the provisions of OSHA, 2007 which states that there should be creation of a safe culture at work places through education and training in OSH. 67% of the respondents disagree to have previously received any training on OSH. In this study, male staff were found to know more about OSH issues than their female counterparts. Age had a strong positive correlation ( $r=0.64$ ,  $p=0.00$ ) with OSH awareness at 95% confidence levels. This study recommends that follow-up be done to ensure at least one employee for every contractor who will be responsible for OSH. Contractors/ site agents should also ensure that all new employees are inducted on safety and that OSH trainings are carried out periodically.*

**Keywords:** Roadway maintenance, OSH Awareness, OSH legal requirements

### **1. Introduction**

'Safety' is defined as freedom from the risk of injury and 'health' as freedom from the risk of illness. A safe and healthy workplace is therefore one in which those hazards that pose a potential risk to the health and safety of workers and others in the workplace are eliminated or controlled effectively.

The goal of maintenance is to preserve the asset, not to upgrade it. Unlike major road works, maintenance must be done regularly. Road maintenance comprises "activities to keep pavement, shoulders, slopes, drainage facilities and all other structures and property within road margins as near as possible to their as-constructed or renewed condition". It includes minor repairs and improvements to eliminate the cause of defects and to avoid excessive repetition of maintenance efforts (Hadayeghi et. Al, 2009).

Workers on site need to be instructed about potential hazards and be issued necessary protective gear, thereby reducing the risks of accidents. Many road maintenance operations are potentially dangerous both to the maintenance workers and to the road users. To reduce the risk of accidents where road works take place, it is necessary to have some understanding of these risks. Occupational health deals with not only the health of the workers but also the overall well-being of the workers and their families.

Managed well, occupational safety and health will nurture an efficient workforce and reduce overhead expenditure on accidents. Occupational safety and health ought not to be viewed as a mere management technique but also as a legal obligation the employer has towards the workers based on several legislations in force by the Government of Kenya (OTM, 2014).

This research aimed at finding out the level of awareness of occupational safety and health issues in roadway maintenance works among contractor workers.

## 2. Materials and Methods

This section outlines the methodology that was adopted for the study. The methodology involved collecting data from the target population. The data was then organized, collated, analyzed, interpreted and presented.

### 2.1. Study Design

The research design was descriptive in nature because it involved observation and permitted the use of questionnaires administered to a sample quickly. Descriptive research is suitable when one studies things as they are in the field and it gives views and feelings from the respondents (Babbie, 2002).

The tools used to report summary data from the descriptive survey were: measures of central tendency including the mean, median, mode, deviance from the mean, variation, percentage, and correlation between variables (Mugenda & Mugenda, 2012).

### 2.2. Study Area and Population

The study area was Nyeri county. Nyeri county is located in the former Central Province of the Country Kenya, about 150 kilometres north of Nairobi. It covers an area of 3,337 square kilometres. Nyeri shares its borders with five other counties; Kirinyaga to the East, Nyandarua to the West, Muranga to the South, Laikipia to the North and Meru to the North East.

The study population comprised of all the class A, B and C roads that were undergoing maintenance works during the data collection phase (August, 2016 to December, 2016) as per the KeNHA work plan of the financial year 2016/ 2017. The roads covered were two class A roads (Sagana – Marua and Marua - Karishen), one class B road (Nyeri – Wiyumererie) and one class C road (King’ong’o – Kiganjo).

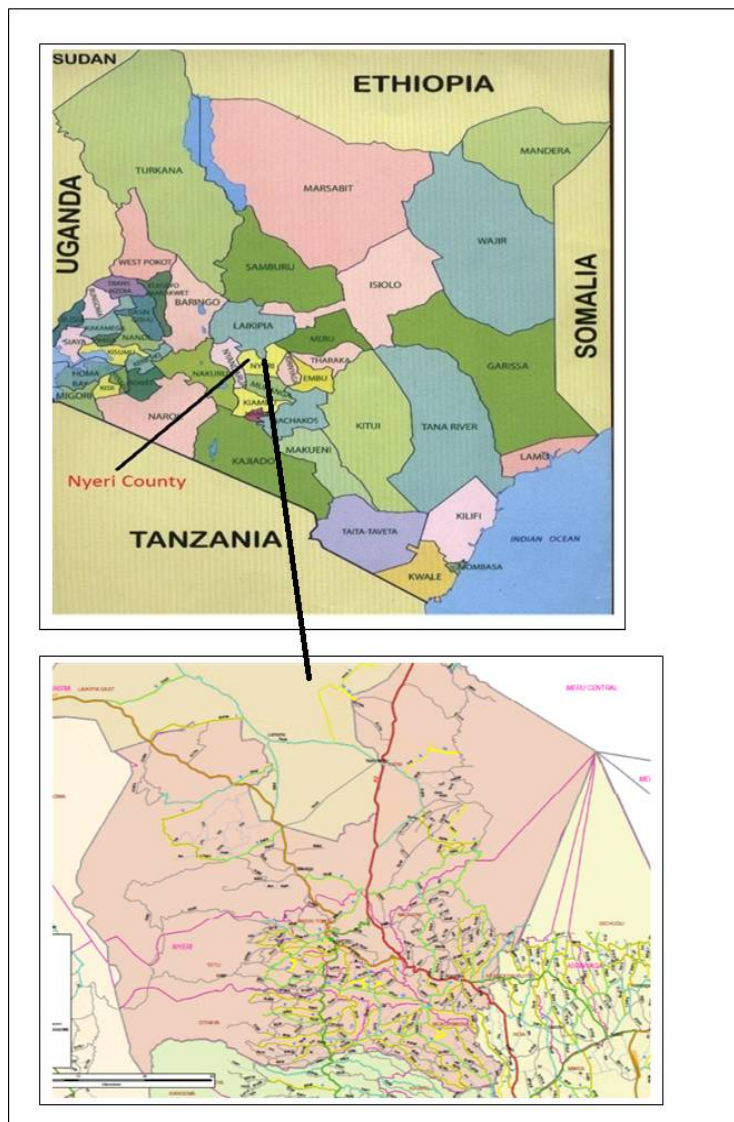


Figure 1: Nyeri county road network Source: KeRRA website: [www.kerra.co.ke](http://www.kerra.co.ke)

2.3. Sampling Frame

A sample frame is a list of all participants in a study. A previous pilot study revealed active participants on a roadway construction/ maintenance site to be site agents, foremen, operators (plant and machinery), drivers and casual labourers.

2.4. Sampling Method

Data was sampled from all the road maintenance works ongoing during the data collection period since road maintenance activities are temporary and short lived. Purposive sampling was used to select roads under maintenance in Nyeri county. For the purpose of this study, only class A, B and C roads were considered.

2.5. Sample Size Determination

In determining the sample size, the researcher purposively narrowed down to all class A, B and C roads that were undergoing maintenance works in Nyeri county during the data collection phase (August, 2016 to December, 2016) as per the KeNHA work plan of the financial year 2016/ 2017. All the roads under maintenance formed 100% of the sample. The sample of respondents in this study was purposive, i.e. 100% of the target population (contractor workers).

2.6. Research Instruments

The measurement tools designed to obtain data from the research subjects were structured questionnaires which were used to collect quantitative data. Data collected from the respondents was on socio-demographic characteristics and OSH awareness. Secondary data was obtained by review of existing literature.

2.7. Data Processing and Analysis

The data collected from the field was summarised and a trend / pattern of the results from the studied roads established using the Statistical Package for Social Sciences (SPSS) software. Quantitative data from the questionnaires was coded, tabulated and analyzed. For the purpose of analysis using SPSS, the data was coded as Agree=1, Neutral=2, Disagree=3 and I Don't Know=4. Bivariate Pearson's Correlation analysis of the study variables was used to determine the relationship between the variables. The results were organised and presented in form of tables, bar graphs, pie charts among others. A thorough discussion of the results was done which led to the reporting of research findings and finally recommendations.

3. Results and Discussion

The researcher visited 4 roads which constituted 100% of the sample population. 112 out of 122 respondents returned their questionnaires. Table 1 below shows the response rate of the distributed questionnaires.

Respondents	Questionnaires Distributed	Questionnaires Received	Response Rate
Site agents	4	4	100%
Casuals	92	85	92%
Operators	8	7	88%
Drivers	11	9	82%
Foreman	7	7	100%
Total	122	112	92%

Table 1: Response rate

The average response rate was 92% which is well above the 70% threshold recommended by Mugenda and Mugenda (2012).

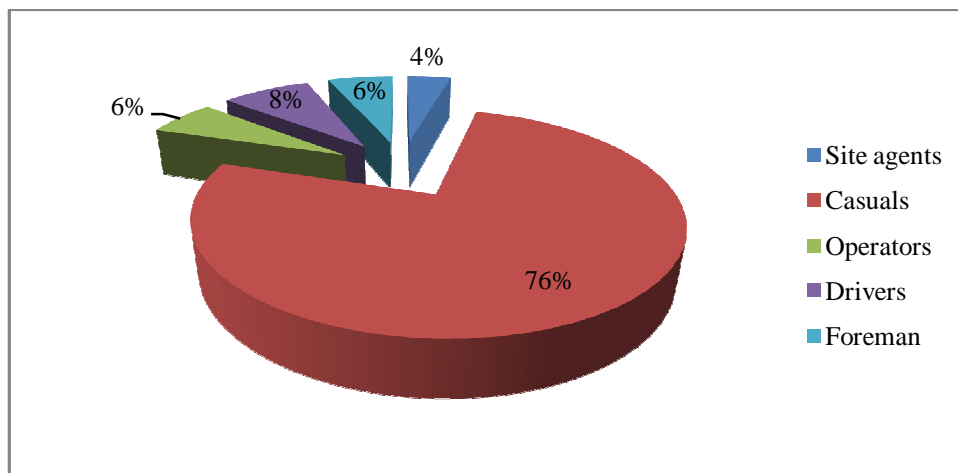


Figure 2: Distribution of respondents by job titles

Majority (76%) of the respondents in the study were casuals. 8% were drivers, 6% were foremen while an equal number (6%) were plant/ machinery operators. The least of the respondents were plant/ machinery operators at 4%.

### 3.1. Respondents' Socio-demographic Characteristics

#### 3.1.1. Distribution by Gender

The gender distribution of respondents was assessed.

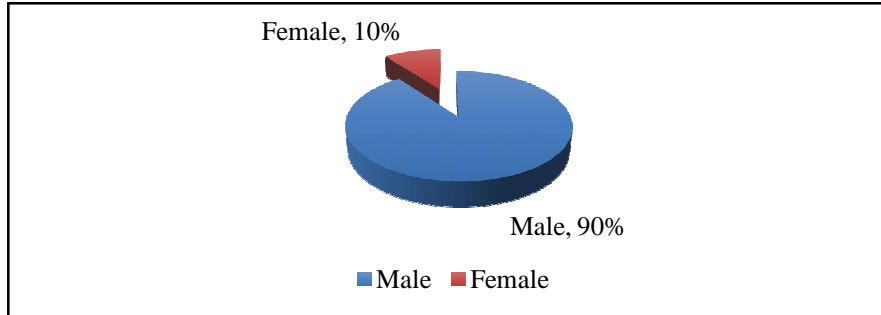


Figure 3: Gender distribution of respondents

(90%) of the respondents in the study were male as shown in Figure 3.

#### 3.1.2. Distribution by Age

Figure 4 shows the distribution of respondents by their age.

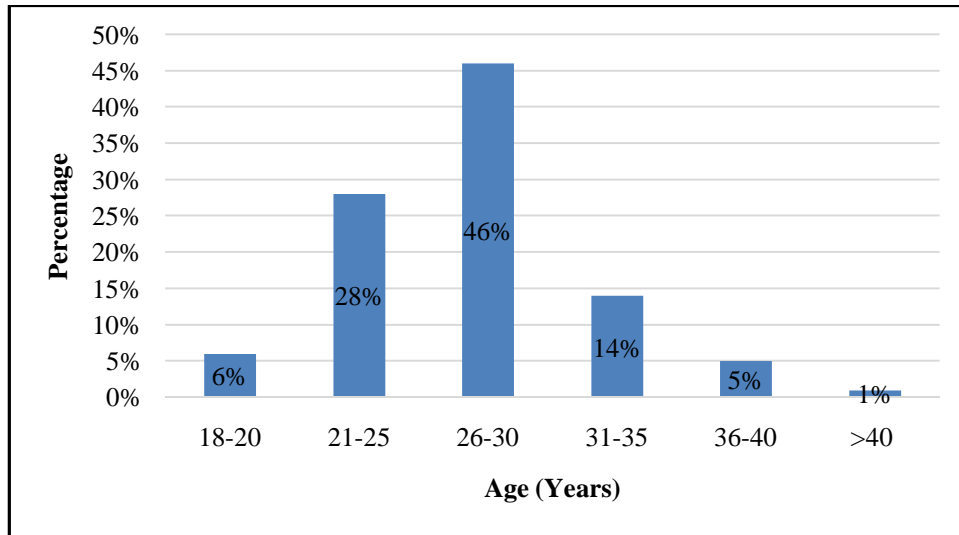


Figure 4: Age distribution of respondents

Findings in Figure 4 show that 6% of the respondents were aged between 18 and 20 years, 28% were aged between 21 and 25 years. The majority who made up 46% of the respondents were aged between 26 to 30 years old. The least represented were respondents aged above 40 years who only made up 1%. The results show that productivity was highest among workers aged between 26 to 30 years old.

#### 3.1.3. Distribution by Education Levels

The academic achievements of respondents were assessed.

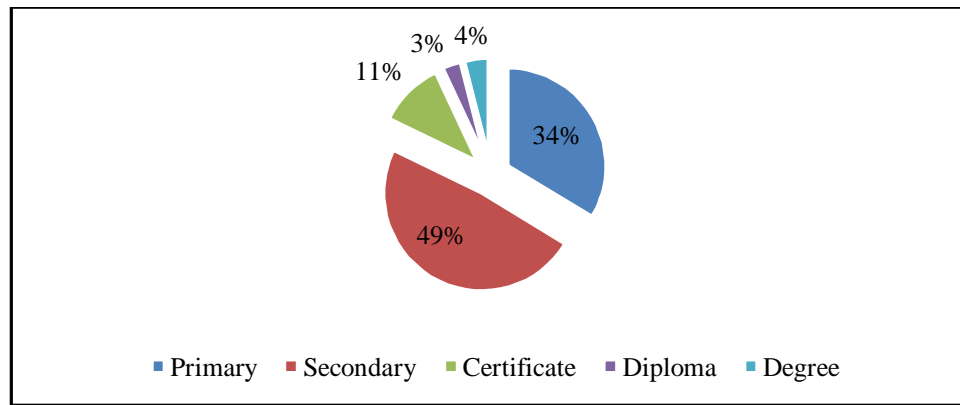


Figure 5: Education levels of respondents

Findings in Figure 5 show that 49% of the respondents had achieved secondary education, 34% had an acquired primary education, 11% were certificate holders, 4% were degree holders while 3% were diploma holders. Most of the respondents in the Secondary School category were dropouts in either form 1, 2 or 3 with very few having completed their ‘A’ levels. This was the same trend observed from the respondents falling in the primary school category where there were school drop outs from as low as class 3 with very few in this category having completed their full primary education. All the certificate, diploma and degree holding respondents had fully completed their studies.

3.2. Level of Awareness on OSH Issues

The study sought to assess the level of awareness on occupational safety and health issues in roadway maintenance works as the first objective. The findings are presented in this section.

3.2.1. Site Agents Responses on Awareness of OSH Issues

Site agents in the study were asked a number of questions relating to occupational safety and health issues to gauge their awareness on the same. The findings are presented in Tables 2 (a –e) below.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
After the road maintenance activities, the road surface should be cleared of all loose screenings.	4	100%	0	0	0	0	0	0	1.00	0.00
Cones should be used to demarcate the work zone and the demarcation should include the approach area and the termination area.	4	100%	0	0	0	0	0	0	1.00	0.00

Table 2(a): Site agent's responses on Transport Safety awareness

100% of the site agents agreed to knowledge of the aspects of transport safety which could be due to higher education levels as compared to other respondents.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
Sensors and/ or cameras should be mounted on the rear of the equipment	4	100%	0	0	0	0	0	0	1.0	0.000
Working with defective equipment is not allowed under any circumstances.	3	75%	1	25%	0	0	0	0	1.50	0.707

Table 2(b): Site agent's responses on Machinery Safety awareness

All the site agents agreed that plant/ machinery rears should be mounted with sensors and/ or cameras to allow for view of what is behind the machinery during movement and thus avoid accidents. 75% of the site agents agreed that defective equipment should not be found in use on site while one site agent was neutral/ undecided on the issue indicating that he could allow or refute faulty machinery working on site depending on circumstances present.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
There is need for construction sensitive abilities monitoring at least once a year.	3	75%	0	0	1	25%	0	0	2.0	1.414
Continuous regular exposure to heavy lifting, un-natural postures and repetitive motions is harmful	3	75%	0	0	1	25%	0	0	1.50	0.707
Workers involved in operation of vibratory/ compaction equipment should be rotated	3	75%	1	25%	0	0	0	0	1.50	0.707

Table 2(c): Site agent's responses on Ergonomics awareness

With regards to ergonomic awareness in table 2(c), there was a 75% general awareness level from the site agents. 25% of the site agents disagreed that continuous heavy lifting is harmful to one's health. More than 50% awareness levels under ergonomics is satisfactory.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
There is need for flagmen to wear reflective attire and use STOP and GO signs	4	100%	0	0	0	0	0	0	1.0	0.00
It is necessary for all workers to be in reflective attire at the worksite.	4	100%	0	0	0	0	0	0	1.00	0.00
It is important to wear the necessary PPE when exposed to hazardous conditions	4	100%	0	0	0	0	0	0	1.00	0.00

Table 2(d): Site agent's responses on Clothing and PPE awareness

All the site agent's responses agreed to 100% levels of awareness with regards to PPE. It is expected that with such levels of awareness, the practices and provision of necessary safety attire to workers should be high too.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
Crew sizes need to be increased to accommodate lookout personnel and to improve quality of work.	2	50%	2	50%	0	0	0	0	2.0	0.00
There is need for availability of first aid kits on site.	4	100%	0	0	0	0	0	0	1.0	0.00
There is need for a person responsible for handling first aid on site.	3	75%	0	0	1	25%	0	0	2.0	1.414
All injuries and accidents however minor should be reported to the supervisor	3	75%	1	25%	0	0	0	0	1.50	0.707
All maintenance workers should understand basic hand signals	4	100%	0	0	0	0	0	0	1.50	0.707
There is need for availability and selection of PPE.	4	100%	0	0	0	0	0	0	1.00	0.00
Every worker should take care of his/ her own safety.	4	100%	0	0	0	0	0	0	1.00	0.00
Every worker should take care of the safety of other workers and anyone else surrounding him / her.	4	100%	0	0	0	0	0	0	1.00	0.00
Training and supervision of inexperienced workers on matters of safety and health should be carried out.	4	100%	0	0	0	0	0	0	1.00	0.00

Table 2(e): Site agent's responses on Construction Safety awareness

Findings in Table 2 (e) shows that half (50%) of the site agents agreed that Crew sizes need to be increased to accommodate lookout personnel and to improve quality of work. However an equal number (50%) was undecided. Nevertheless, the site agents were in agreement to the knowledge of most OSH matters that need to be taken to account during road construction and maintenance. This is an impressive trend considering that the site agents are in the management level among the respondents and are thus able to take the necessary action to ensure OSH awareness among other employees of various categories. Awareness marks the first stage towards proper OSH implementation in a work place.

### 3.2.2. Foremen Responses on Awareness of OSH Issues

Foremen were asked a number of questions in the study relating to occupational safety and health issues to gauge their awareness. The findings are presented in Tables 3(a-d)



	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
High noise levels on site is dangerous to your health.	2	29%	1	24%	0	0	4	57%	3.1	1.197
With high levels of noise, one should wear earmuffs or earplugs.	4	57%	0	0	0	0	3	43%	2.2	0.909

Table 3(a): Foremen responses on Noise Safety awareness

An average of 43% of the foremen agreed to noise safety awareness, 24% were neutral on knowledge on noise safety while an average of 50% did not know about noise safety.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
A lot of heavy lifting is harmful to your health.	3	43%	1	24%	0	0	3	43%	2.3	1.302
Long periods of vibration are harmful to one's health.	1	24%	0	0	4	57%	2	29%	3.4	1.56
Breathing in dust is harmful to one's health.	4	57%	3	43%	0	0	0	0	1.8	0.837

Table 3(b): Foremen responses on Ergonomic awareness

On ergonomics, an average of 42% of the foremen responded in agreement to awareness, an average of 24% did not know what ergonomics in a workplace meant. 57% (4 out of 7) of the foremen disagreed that long periods of vibration are harmful to one's health. This shows that these foremen are not likely to rotate workers who work under vibrations because of ignorance that this could cause harm to the worker's health. This could cause the exposed workers to develop occupational diseases later in life.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
I know how to use a fire extinguisher.	0	0	7	100%	0	0	0	0	2.0	0.101
All injuries and accidents should be reported to my supervisor.	0	0	5	71%	0	0	2	29%	2.3	1.504
I understand the hand signals used to communicate on site.	3	43%	3	43%	1	24%	0	0	2.1	0.937
I have been trained on safety and health on site.	1	24%	2	29%	4	57%	0	0	2.8	0.837
I know how to use items provided by my employer	4	57%	3	43%	0	0	0	0	1.6	1.202

Table 3(c): Foremen responses on Construction Safety awareness

The research found out that 100% of all the foremen knew what a fire extinguisher is but they did not agree or disagree on their knowledge of how to operate it. Only one out of the 7 foremen agreed to have been trained on OSH matters on site. 57% of the foremen disagreed to have previously had any training with regards to safety and health on site. 29% of the foremen seemed not to know that all injuries and accidents should be reported to the immediate supervisor as per the OSHA, 2007 Act. 24% of the foremen disagreed to have an understanding of the hand signals used for communication on site. This shows that hand communication on site could easily be misinterpreted which is potentially dangerous.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
The road surface should be swept clean after work has been done.	0	0	0	0	1	14%	6	86%	3.4	1.430
Cones should be used to demarcate the work zone and the demarcation should include the approach area and the termination area.	7	100%	0	0	0	0	0	0	1.00	0.00

Table 3 (d): Foremen responses on Transport Safety awareness

86% of the foremen did not know that the road is supposed to be swept clean of the loose screenings which could well be a source of distractions and possible accidents to the motorists as they fly to the windscreens of vehicles. All the foremen were aware that safety cones should be used to demarcate the working area to avoid trespass of traffic and thus protect workers in that area.

### 3.2.3. Machinery Operators Responses on Awareness of OSH Issues

Machinery Operators were asked a number of questions in the study relating to occupational safety and health issues to gauge their awareness. The findings are presented in Table 4

47% of the machinery operators on average responded in agreement to awareness of OSH issues, 24% were neutral on average in that they did not agree nor disagree to know about safety on roadway works while an average of 19% of the machinery operators did not know what roadway safety was all about. Only an average of 10 % disagreed on selected aspects of roadway safety awareness. This trend shows a satisfactory awareness level of 47% among plant operators who are in the roadway works.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
Breathing in dust is harmful to one's health.	4	57%	3	43%	0	0	0	0	1.9	0.803
High noise levels on site is dangerous to your health.	5	71%	2	29%	0	0	0	0	1.5	1.342
With high levels of noise, one should wear earmuffs or earplugs.	3	43%	3	43%	1	14%	0	0	2.6	1.607
The road surface should be swept clean after work has been done.	6	86%	1	14%	0	0	0	0	2.1	0.903
I know how to use a fire extinguisher.	2	29%	2	29%	0	0	3	43%	3.0	1.411
All injuries and accidents should be reported to my supervisor.	3	43%	1	14%	1	14%	2	14%	2.9	1.211
I understand the hand signals used to communicate on site.	3	43%	0	0	1	14%	3	43%	3.1	1.2
A lot of heavy lifting is harmful to your health.	5	71%	0	0	0	0	2	29%	1.8	1.622
Long periods of vibration are harmful to one's health.	2	29%	2	29%	3	42%	0	0	2.1	1.503
I have been trained on safety and health on site.	1	14%	1	14%	0	0	5	72%	2.6	0.936
I know how to use items provided by my employer	2	29%	3	42%	2	29%	0	0	2.4	1.211

Table 4: Machinery operator's responses on awareness on OSH issues

### 3.2.4. Drivers Responses on Awareness of OSH Issues

Drivers were asked a number of questions in the study relating to occupational safety and health issues to gauge their awareness. The findings are presented in Table 5 below.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
Breathing in dust is harmful to one's health.	5	56%	2	22%	2	22%	0	0	1.6	0.936
High noise levels on site is dangerous to your health.	6	67%	3	33%	0	0	0	0	1.4	0.982
With high levels of noise, one should wear earmuffs or earplugs.	6	67%	2	22%	0	0	1	11%	1.2	1.456
The road surface should be swept clean after work has been done.	4	44%	2	22%	2	22%	1	12%	2.4	1.437
I know how to use a fire extinguisher.	3	33%	3	33%	0	0	3	33%	2.6	1.671
All injuries and accidents should be reported to my supervisor.	4	44%	0	0	4	44%	1	12%	2.9	1.403
I understand the hand signals used to communicate on site.	5	56%	0	0	4	44%	0	0	1.8	1.673
A lot of heavy lifting is harmful to your health.	6	67%	0	0	2	22%	1	11%	1.7	0.876
Long periods of vibration are harmful to one's health.	7	78%	0	0	2	22%	0	0	1.4	1.643
I have been trained on safety and health	3	33%	3	33%	3	33%	0	0	2.6	0.543
I know how to use items provided by my employer	6	67%	0	0	3	33%	0	0	2.1	1.234

Table 5: 3Drivers responses on awareness of OSH issues



The highest positive percentage (78%) of drivers were in concurrence that long periods of vibrations are harmful to one's health. This could be that because automobiles are prone to a lot of vibrations, this exposure to long driving hours to and from site could have caused them to experience harm and come to the realisation that vibrations are health detrimental. 67% of the drivers were in agreement to noise safety awareness. 11 % did not know whether a lot of heavy lifting is harmful to one's health. 33% of the drivers disagreed to have previously been trained on safety and also the same fraction disagreed to know how and when to use PPE provided to them.

The results show that more than half of the drivers (56%) positively reported OSH awareness. On average, there was a low fraction (7%) of drivers who were totally unaware of some OSH issues.

### 3.2.5. Casuals Responses on Awareness of OSH Issues

Casuals were asked a number of questions in the study relating to occupational safety and health issues to gauge their awareness. The findings are presented in Table 6

81% of the casuals reported to know how to use PPE items provided to them, a high of 78% agreed that all accidents and injuries should be reported to the immediate supervisor. 91% agreed that the road surface should be swept clean after working in that area is complete. 5% did not know that a lot of heavy lifting is harmful to one's health and the same percentage also reported that they did not know how to use a fire extinguisher. 14% of the casual labourers disagreed that breathing in dust is harmful to one's health while 2% did not know whether breathing in dust is harmful to one's health. There was an average of 72% awareness among the casuals on roadway OSH issues. Only a low of 3% on average did not know selected aspects of OSH. This could be attributed to the daily routine work he casuals are exposed to making them internalise what is required and thus grasp OSH requirements.

	Agree (1)		Neutral (2)		Disagree (3)		Don't know (4)		Mean	Standard Deviation
	N	%	N	%	N	%	N	%		
Breathing in dust is harmful to one's health.	53	62%	18	21%	12	14%	2	2%	2.3	0.986
High noise levels on site is dangerous to your health.	48	56%	19	22%	18	21%	0	0	2.0	1.327
With high levels of noise, one should wear earmuffs or earplugs.	62	73%	0	0	20	24%	3	4%	1.9	1.202
The road surface should be swept clean after work has been done.	77	91%	3	4%	5	6%	0	0	1.6	1.020
I know how to use a fire extinguisher.	64	75%	11	13%	6	7%	4	5%	2.3	0.974
All injuries and accidents should be reported to my supervisor.	66	78%	9	11%	8	9%	2	2%	1.9	1.543
I understand the hand signals used to communicate on site.	54	64%	24	28%	4	5%	3	4%	2.6	1.345
A lot of heavy lifting is harmful to your health.	63	74%	18	21%	0	0	4	5%	2.4	1.247
Long periods of vibration are harmful to one's health.	70	82%	10	12%	3	4%	2	2%	1.8	1.023
I have been trained on safety and health on site.	44	52%	23	27%	11	13%	7	8%	2.5	1.44
I know how to use PPE items provided by my employer	69	81%	14	16%	0	0	2	2%	2.0	0.937

Table 6:4 Casuals responses on awareness of OSH issues

### 3.2.6. Association between Socio-demographic Characteristics and Awareness of OSH

Correlation analysis were conducted between the socio-demographic characteristics of respondents and their awareness of occupational safety and health issues.

Characteristic	Category	Awareness of OSH			Correlation coefficient (R)
		High	Moderate	Low	
Gender	Male	78%	20%	2%	r = -0.62, p = 0.001
	Female	32%	16%	52%	
Age	21-25	24%	30%	46%	r= 0.64, p=0.00
	26-30	66%	24%	10%	
	31-35	72%	20%	8%	
	36-40	82%	18%		
Education	Primary	30%	54%	16%	r= 0.87, p=0.047
	Secondary	44%	40%	16%	
	Certificate	54%	32%	14%	
	Diploma	68%	22%	10%	
	Degree	76%	24%		
Working experience	1-5	12%	44%	44%	r=0.71, p=0.00
	6-10	18%	50%	32%	
	11-15	32%	48%	20%	
	>20	48%	30%	22%	

Table 7: Association between socio-demographic characteristics and awareness of OSH

As for gender, male staff were found to know more about OSH issues than their female counterparts. Age had a strong positive correlation ( $r=0.64$ ,  $p<0.05$ ) with awareness of occupational safety and health issues. This means that increasing age was correlated with increasing with awareness. Education had a strong positive correlation ( $r=0.87$ ,  $p<0.05$ ) with awareness of occupational safety and health issues. The higher an employee's education was, the more likely it was that they knew about occupational safety and health issues. Working experience had a strong positive correlation ( $r=0.71$ ,  $p<0.005$ ) with awareness of occupational safety and health issues. The more years worked in the in industry, the more likely the respondents knew about occupational safety and health issues.

#### 4. Conclusions and Recommendations

##### 4.1. Conclusions

The objective of the study established that there was a 90% level of awareness among the site agents while the employees (Foremen, casuals, operators and drivers) reported 38% average awareness levels on OSH issues present in road maintenance works. This goes out to prove that with low levels of formal education together with lack of OSH trainings among workers, there is a low level of safety awareness. Society expects that the higher the level of education a person has, the more aware he/she is in all aspects of life. The study concluded that the level of awareness on OSH among the low cadre of employees was inadequate.

##### 4.2. Recommendations

The study recommended the following:

- The study recommends that follow-up be done to ensure at least one employee for every contractor who will be responsible for OSH.
- The contractors/ site agents should ensure that all new employees are inducted on safety and that regular OSH trainings are carried out periodically.
- Directorate of Occupational Safety and Health Services undertake OSH awareness programs within the construction sector.

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