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Awareness and Compliance of Construction Employers with the National Occupational Safety and Health (OSH) Regulation of Rwanda

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Abstract

The construction industry is an important sector of every economy as it contributes to the continual growth of developing and developed countries. It is however challenged by many issues that lead to poor project performance. One of such challenges is the perennial occurrence of accidents and fatalities on construction sites due to lack of awareness and compliance with relevant OSH regulations. This study investigates the level of awareness and compliance of construction employers with the national OSH regulation of Rwanda. The quantitative survey research design was adopted for the study. The study's questionnaire was distributed to 178 construction employers using the random sampling technique. The result indicated that construction employers are aware of the OSH regulation but are only compliant to nine of the nineteen items in the OSH regulation. There is also no significant difference in the level of awareness of the respondents of OSH regulation. However, there is a significant difference in the level of compliance of the consulting and contracting organisations with the OSH regulation. Also, there is a significant relationship between the awareness and compliance of construction organisations with the OSH regulation. It was recommended that the government should introduce stricter laws to enforce compliance with the OSH regulation and other construction stakeholders should prioritise health and safety practices on construction site.

Keywords: Construction employers, Construction industry, Rwanda, Occupational health and safety, Health and safety regulation

1. Introduction

The construction industry is generally widely recognized as being both economically and socially important to the growth of developed and developing nations. In Rwanda, the industry plays an important role through its contribution to the national economy and employment creation (Dosumu et al. 2021). As one of the key sectors of Rwanda's economy, data from the past five years shows that the industry contributes about 7 per cent to national Gross Domestic Product

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(which is higher than the global average of 6 per cent) and 8 per cent to national employment (Gahigi, 2017). However, the industry is equally considered as the most hazardous and contributor to environmental degradation and climate change (Dosumu and Aigbavboa, 2018).

Global estimates indicate that Occupational Safety and Health (OSH) issues in the construction industry are more extensive than previously recorded (International Labor Organization, 2019). Over 100,000 annual fatalities which is approximately 30-40% of the world's work-related fatal injuries is responsible for the continual poor performance of the industry (Bureau of labour Statistics, 2023). Smallwood and Haupt (2006) opined that the construction industry hinged its performance on the traditional parameters of cost, time and quality which is responsible for the increasing rate of construction accidents. This situation is not different for developing countries like Rwanda that have suffered human and financial losses because of poor health and safety management in the construction industry (Alkilani et al. 2013). In 2012, Rwanda reported a total of 482 non-fatal accidents among 130 study respondents in a 780 man-month period in the construction industry (Tutesigensi and Cokeham, 2013).

To ameliorate the spate of these injuries and accidents in the construction and other sectors of the Rwanda's economy, the government enacted the national Occupational Safety and Health (OSH) regulations in 2015 and accompanied it with the national Occupational Safety and Health (OSH) implementation strategy (2019-2024). The OSH regulations of 2015 covered 21 sectors of Rwanda which include agriculture, plantation, and other rural sectors; construction and infrastructure sector; mining (coal and other mining) sector; informal economy sector; food, drink, tobacco sector; forestry, wood, pulp and paper sector, oil and gas production and oil refining sector; basic metal production sector; chemical industries sector; mechanical and electrical engineering sector; transport equipment manufacturing sector; textiles, clothing, leather, and footwear sector; health services sector; public services sector; utilities (water, gas, electricity) sector; education and research sector; commerce sector; financial services sector; professional services sector, hotel, catering, and tourism sector; media, culture, and graphical sector; postal and telecom services sector; shipping, port, fisheries, inland waterways sector and transport (civil aviation, railway and road) sector.

The OSH regulation for the construction and infrastructure sector contains 19 key items (as indicated in Table 2 to Table 5) that must be implemented by construction employers. While the Rwanda's national Occupational Safety and Health (OSH) implementation strategy was designed to cover 2019 to 2024, the extent of compliance of construction employers with the regulation is unknown. Also, there is no empirical evidence to assess that the rate of occurrence of accidents and fatal injuries on construction sites. Similarly, there is paucity of research to establish the level of awareness and compliance of construction employers with the OSH regulation for the construction and infrastructure sector. Therefore, the gap to be filled by this study is the determination of the level of awareness and compliance of construction organisations with the Rwanda's OSH regulation. This study will not only complement the existing studies on OSH, but it will also be useful to policymakers, employees, and organisations in the construction industry.
The construction industry is generally adjudged to be risky, having frequent and high accidents rate, and ill-health problems to workers, practitioners, and end users (Muiruri and Mulinge 2014). This situation has been linked with many factors of which lack of awareness and compliance with OSH regulation are atop (Diugwu et al. 2012). In developing countries, safety rules seem not to exist and where they do, the regulatory authority is usually weak in effectively implementing the regulations (Alhajeri, 2011). Enacting laws without adequate effort to disseminate them to the

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public is as a good as not formulating any law (Umeokafor et al. 2014). International contractors and subcontractors lack OHS Workers' templates for their international operations to improve consistency, enhance learning and spread good practices in developing countries (Smyth et al. 2019).

The causes of the poor awareness and compliance with OSH regulations have been traced to technical failure, inadequate training, harsh work environment, and unsafe methods of working (Othman, 2012). Windapo and Oladapo (2012) argued that lack of knowledge and understanding of OSH regulations in the South Africa's construction industry determined the low level of compliance with the regulations. Idubor and Osiamoje (2013) buttressed the argument by noting that OSH information dissemination by the Nigeria's government is ineffective and has minimal impact on the target groups. Umeokafor et al. (2014) explained that if workers do not know or understand the OSH regulations, they will not know when their rights have been violated and vice versa. Therefore, the awareness of OSH regulations especially in developing countries is limited. This situation may not be different in the Rwanda's construction industry that appear not to have empirical data to substantiate the level of awareness and compliance of its organisations with the national OSH regulation.

Human behaviour is a major contributor to construction accidents and the presence of good safety behaviour reflects good safety compliance. Safety issues cannot be tackled effectively without the positive involvement of employers with a particular pattern of behaviours (Jacobi, 2012). Formal institutions in the construction industry play a major role in promoting safety and well-being practices which are driven by people's increasing awareness of personal health and safety concern (Smyth et al. 2019). Chiocha et al. (2011) revealed that organisations are unable or reluctant to allocate adequate budget to investigate and implement health and safety issues. Eyiah et al. (2019) discovered that the existing OSH legal and regulatory framework is barely effective, and not specifically applicable to the construction industry.

Further, it was observed that the extent of incorporation of OSH regulations into construction contracts in Ghana was basic and only clauses relating to first aid, welfare and clients' indemnity are often included in the bills of quantities. Umeokafor (2014) noted that the Federal Ministry of Labour and Productivity that oversees OSH regulation in Nigeria is inefficient (due to inadequate funding, lack of basic resources and training) thus leading to non-compliance with the regulation. In Libya, Al-Kilani (2011) claimed that there was a lack of commitment from the government, insurance companies, ministry of labour, clients, consultants, and the contractors to improving safety performance on construction sites.

Moreover, while some employers view the implementation of OSH as "going the extra mile", employees did not fully understand the existing laws and assumed the application of the OSH is solely the responsibility of the employers (Adeogun and Okafor, 2013). Cooney (2016) noted that contractors that ignore health and safety issues are chosen simply because of their low bids. Adu-Boateng (2015) and Okeola (2009) stated that ignorant behaviours and attitudes of the employers and employees contribute to the rising issue of non-compliance with OSH regulations. Mohammed (2014) affirmed that there is little or no supervision from authorized health and safety experts to monitor the adherence of employees and employers to OSH regulations. Okoye et al. (2016) found that there was a moderate level of OSH awareness and a low level of OSH compliance among building construction workers.

From the foregoing, the level of awareness and compliance with OSH regulations appears to be relatively low in developing countries. In Rwanda, there is little or no empirical evidence to

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substantiate the level of awareness and compliance of construction organisations with the nation's OSH regulation. In view of this, it is imperative to determine the level of awareness and compliance of construction organisations with OSH regulations. This will assist researchers to build on the result of this study to conduct further studies. It will also create awareness for construction employers to understand their level of compliance with the OSH regulation. Further, it will assist policymakers to decide on the need to promulgate further OSH laws and provide means to enforce compliance.

2. Materials and Methods

This study adopted the cross-sectional survey research method which involves the adoption of a close-ended questionnaire to elicit relevant data from construction employers. Hence, the population of this study is the construction organisations in the Rwandan construction industry. The proprietors or the representatives of the construction organisations are the respondents of the study. The list of registered construction organisations in the field of building and civil engineering works was obtained from the record of the Rwanda Public Procurement Authority (RPPA) as of November 2023. The list classified construction organisation into building; roads and bridges; dam; marshland development and hillside irrigation; and drinking water supply. The study adopted construction organisation that fall under the building classification.

Further, organisations that fall under the building classification were categorised into six. Category A (can tender for jobs over 2 billion Rwandan Francs) has 39 organisations, category B (can tender for contracts between 1.5 and 2 billion Rwandan Francs) has 16 organisations, category C (can tender for jobs between 800m and 1.5 billion Rwandan Francs) has 41 organisations, Category D (can tender for jobs between 300m and 800 million Rwandan Francs) has 136 organisations, category E (can tender for jobs between 100m and 300 million Rwandan Francs) has 84 organisations, and category F (can tender for jobs below 100 million Rwandan Francs) has 3348 organisations. Based on the assertion in the literature that small construction organisations do not prioritise compliance with OSH regulation, this study excludes the category F construction organisations because they can only execute small contracts of less than 100 million Rwanda francs and thus jettison compliance with OSH regulation.

Therefore, the sample frame of the study is the category A to E construction organisations registered with the RPPA as of November 2023 which totals 316. The sample size of the study was calculated with the use of the sample size calculator (https://www.calculator.net/sample-size-calculator.html) developed by Maple Technology International LLC (2022) with population size (N) = 316, population proportion (p) = 50%, margin of error (e) = 5%, and confidence level (α) = 96%, thus giving 174 construction organisations. The random sampling technique was adopted for the study to give every organisation an equal opportunity to be selected for the study.

The questionnaire for the study was divided into two sections which include the general questions (demographic information of the respondents and their organisations) and the specific questions on the level of awareness and compliance of respondents with the national OSH policy of Rwanda. While the scale of measurement for the demographic information was nominal, that of the specific questions were ordinal and based on a five-point Likert scale of 1 = Not Aware/No Compliance, 2 = Slight Awareness/Compliance, 3 = Average awareness/Compliance, 4 = Aware/Compliant, 5 = Very Aware/Compliant. The questionnaire was prepared in google forms and distributed to the respondent through emails, shared links, and other available social media

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platforms. Out of the 174 questionnaires that were sent to respondents, 68 (which gives 39 per cent response rate) were filled, returned, and used for the analysis of the study. The data was collected over a period of two months from May 2024 to July 2024.

The reliability of the variable's constructs for the level of awareness and compliance with OSH policy was assessed with Cronbach's Alpha coefficients. The results indicate that the level of awareness of OSH regulation based on the 19 items of investigation had Cronbach Alpha coefficient of 0.879 and the level of compliance with OSH regulation based on the 19 items of investigation had Cronbach Alpha coefficient of 0.936. Hence, the constructs are reliable since the Cronbach's Alpha are greater than the established 0.7 value (Dosumu and Uwayo, 2023). The data was analysed with frequencies, percentages, mean scores, t-test statistics, and Pearson correlation.

3. Results

Table 1 presents the demographic information of the respondents which indicates that 44.1% were from the public sector and 55.9% were from the private sector. Also, 27.3% of the respondents had executed residential projects, 11.7% had executed road projects, 11.7% had executed factory projects, 27.3% had handled commercial projects, and 22% had handle institutional projects. Since respondents are engaged on many projects, they were given the option to select as many projects as they had executed. Further, the highest educational qualifications of the respondents indicated that 11.8% had advanced level certificate, 2.9% had diplomas, 76.5% had bachelor's degree, 5.9% had master's degree and 2.9% had PhD. Also, 41.2% of the respondents had less than 2 years of experience, 41.2% had 2-5 years of experience, 11.8% had 6-9 years of experience, and 5.9% had more than 10 years of experience. The demographic data of the respondents were stratified and used for the analysis of the study. For instance, nature of respondents' job was used to compare the opinions of the consultants with those of the contractors. The same is repeated for the sector of respondents' organisations. The work experience of the respondents investigated to ascertain that the respondents had the capacity to give quality information.

Table 1: Profile of respondents and their organisations

Statement	Option	Frequency	Percent
Sector of organisation	Public	30	44.1
	Private	38	55.9
	Total	**68**	**100.0**
Type of projects executed	Residential Project	42	27.3
	Road Project	18	11.7
	Factory Project	18	11.7
	Commercial Project	42	27.3
	Institutional Project	34	22.0
	Total	**154**	**100.0**
Nature of Job	Contracting	24	35.3
	Consulting	44	64.7
	Total	**68**	**100.0**
Educational Qualification	Advanced Level	8	11.8
	Diploma	2	2.9

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	Bachelors	52	76.5
	Masters	4	5.9
	Doctorate	2	2.9
	Total	**68**	**100.0**
Work Experience	1-2 years	28	41.2
	2-5 years	28	41.2
	6-9 years	8	11.8
	Above10 years	4	5.9
	Total	**68**	**100.0**

Table 2 and 3 presents the level of awareness of the respondents of the national OSH policy of Rwanda based on the sector of the organisations and the nature of their jobs. The respondents jointly ranked that they were aware of the national OSH regulation of Rwanda in the order of "provide precautionary measures and means for the implementation of employee protection measures (4.41, aware), ensure employees' compliance with the regulations of this policy (4.32, aware), identify potential hazards which may be present while work is being done (4.12, aware), ensure that contingency officers are equipped with first aid kits that would be accessible to all employees in case of emergency (4.06, aware), ensure employee trainings and understanding of the job risk and implementation and maintenance of OSH precautionary measures (3.97, aware), appointment of a person for health and safety (3.94, aware), protect employee's health and safety against hazards that may result from production (3.88, aware), consultation with workers in health and safety (3.85, aware), provide appropriate protective equipment and ensure proper use (3.79, aware), provide and maintain an adequate supply of drinking water conveniently accessible to all persons employed, and free of charge (3.65, aware), and internal rules and regulations shall be required for every firm with more than ten (10) workers (3.56, aware)".

Further, the respondents indicated an average awareness of "putting at the disposal of workers, at employer's own cost, an emergency box of first aid needed in case of accident, as well as ensure proper hygiene and comfort in meal places at work (3.45), providing effective noise control devices to decrease the intensity of noise such that it does not go beyond 85 decibels (3.24), providing workers with change rooms separated by sex and equipped with sufficient number of seats and individual lockable or pad lockable wardrobes for keeping the clothes that are not worn during working hours (3.06), reviewing or assessing the results of preventive measures (3.06), providing workers whose work is done standing with suitable facilities for sitting (2.97), and making medical test of the employees before, during and after employment (2.56)". The independent samples t-test was used to determine the difference between consultants' and contractors' organisations in the level of awareness of construction companies of the Rwanda OSH policy. Results indicated in all cases that there is no significant difference in the level of awareness of consultants and contractors of the national OSH regulation of Rwanda ($p > 0.05$).

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Table 2: Level of awareness of consultants and contractors of the national OSH regulation

Employers' obligation in the OSH policies	Cons	R	Cont	R	Overall mean	LoA	R	Sig	Sig
Provide precautionary measures and means for the implementation of employee protection measures.	4.41	1	4.42	1	4.41	A	1	0.979	NS
Ensure employees' compliance with the regulations of this policy.	4.41	1	4.17	2	4.32	A	2	0.467	NS
Identify potential hazards which may be present while work is being done.	4.18	3	4.00	4	4.12	A	3	0.519	NS
Ensure that contingency officers are equipped with the first aid kit that would be accessible to all employees	4.18	3	3.83	7	4.06	A	4	0.397	NS
Ensure employee trainings and understanding of the job risk.	3.86	7	4.17	2	3.97	A	5	0.457	NS
Implementation and maintenance of Occupational Safety and Health precautionary measures	4.05	5	3.83	7	3.97	A	5	0.522	NS
Appointment of a person for health and safety	3.95	6	3.92	5	3.94	A	7	0.927	NS
Protect employee's Health and Safety against hazards that may result from the production.	3.85	10	3.92	5	3.88	A	8	0.899	NS
Consultation with workers in health and safety	3.86	7	3.83	7	3.85	A	9	0.939	NS
Provide appropriate protection equipment and ensure proper use.	3.86	7	3.67	10	3.79	A	10	0.640	NS
Provide and maintain an adequate supply of drinking water	3.77	11	3.42	12	3.65	A	11	0.408	NS
Internal rules and regulations shall be required for every firm with more than ten (10) workers.	3.55	13	3.58	11	3.56	A	12	0.929	NS
Put at the disposal of workers an emergency box of first aid	3.50	14	3.36	13	3.45	AA	13	0.802	NS
Ensure proper hygiene and comfort in meal places at work.	3.76	12	2.92	16	3.45	AA	13	0.050	NS
Provide effective noise control devices	3.32	15	3.08	14	3.24	AA	15	0.610	NS
Provide workers with change rooms separated by sex and equipped with enough needed facilities	3.14	17	2.92	16	3.06	AA	16	0.704	NS
Review or assessment of the results of preventive measures.	3.32	15	2.58	19	3.06	AA	16	0.130	NS
Provide workers whose work is done standing, suitable facilities for sitting.	2.91	18	3.08	14	2.97	AA	18	0.727	NS
Make medical test of the employees before, during and after employment	2.45	19	2.75	18	2.56	AA	19	0.522	NS

Note: a. <1.5 = Not Aware (NA), 1.5-2.49 = Slightly Aware (SA, 2.5-3.49 = Averagely Aware (AA), 3.5-4.49 = Aware (A), 4.5 and above = Very Aware (VA). Cons = Consultants, Cont = Contractors, R = Rank, LoA = Level of awareness, Sig = Significant

b. NS = No significant difference between consultants and contractors in the level of awareness of the OSH regulation of Rwanda (p>0.05)

c. S = There is a significant difference between consultants and contractors in the level of awareness of the OSH regulation of Rwanda (p<0.05)

Table 3 indicates the difference in the level of awareness of public and private construction organisations of the Rwanda OSH policy. Results showed that there is no significant difference in the level of awareness of public and private organisations of the national OSH regulation of Rwanda ($p > 0.05$) except for the appointment of a person for health and safety with p-value of 0.022 (significant).

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Table 3: The level of awareness of public and private organisations of the OSH regulation

Employers' obligation in the OSH policies	Private	R	Public	R	Overall mean	LoA	R	Sig.	Dec
Provide precautionary measures and means for the implementation of employee protection measures.	4.33	2	4.38	1	4.41	A	1	0.873	NS
Ensure employees' compliance with the regulations of this policy.	4.33	2	4.31	2	4.32	A	2	0.945	NS
Identify potential hazards which may be present while work is being done.	4.27	4	3.92	4	4.12	A	3	0.256	NS
Ensure that contingency officers are equipped with the first aid kit that would be accessible to all employees	3.80	10	4.08	7	4.06	A	4	0.536	NS
Ensure employee trainings and understanding of the job risk.	4.20	5	3.54	2	3.97	A	5	0.148	NS
Implementation and maintenance of Occupational Safety and Health precautionary measures	4.00	7	3.77	7	3.97	A	5	0.534	NS
Appointment of a person for health and safety	4.40	1	3.54	5	3.94	A	7	0.022	S
Protect employee's Health and Safety against hazards that may result from the production.	4.00	7	3.69	5	3.88	A	8	0.587	NS
Consultation with workers in health and safety	4.07	6	3.62	7	3.85	A	9	0.245	NS
Provide appropriate protection equipment and ensure proper use.	4.00	7	3.38	10	3.79	A	10	0.197	NS
Provide and maintain an adequate supply of drinking water	3.60	11	3.46	12	3.65	A	11	0.773	NS
Internal rules and regulations shall be required for every firm with more than ten (10) workers.	3.47	13	3.92	11	3.56	A	12	0.292	NS
Put at the disposal of workers an emergency box of first aid	3.50	12	3.31	13	3.45	AA	13	0.728	NS
Ensure proper hygiene and comfort in meal places at work.	3.29	14	3.46	16	3.45	AA	13	0.722	NS
Provide effective noise control devices	2.87	16	3.46	14	3.24	AA	15	0.211	NS
Provide workers with change rooms separated by sex and equipped with enough needed facilities	2.93	15	3.15	16	3.06	AA	16	0.727	NS
Review or assessment of the results of preventive measures.	2.80	18	3.15	19	3.06	AA	16	0.507	NS
Provide workers whose work is done standing, suitable facilities for sitting.	2.87	16	3.15	14	2.97	AA	18	0.602	NS
Make medical test of the employees before, during and after employment	2.60	19	2.62	18	2.56	AA	19	0.977	NS

Note: LoA = Level of Awareness; R = Rank; Sig. = Significance; Dec. = Decision

Table 4 presents the result of the level of compliance of respondents with the OSH regulation of Rwanda. From the results, the order of compliance with employers' obligation is "provide precautionary measures and means for implementation of employee protection measures (3.91, aware); ensure employees' compliance with the regulations of this policy (3.88, aware); identify potential hazards which may be present while work is being done (3.76, aware); ensure that contingency officers are equipped with the first aid kit that would be accessible to all employees in case of emergency (3.68, aware); ensure employee trainings and understanding of the job risk (3.65, aware); implement and maintain OSH precautionary measures and appoint a person for

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health and safety (3.56, aware); protect employees' health and safety against hazards that may result from production (3.53, aware); and consult with workers in health and safety (3.50, aware).

Further, the organisations were slightly aware of "provide appropriate protection equipment and ensure proper use (3.41); provide and maintain an adequate supply of drinking water conveniently accessible to all persons employed, and free of charge (3.38); internal rules and regulations shall be required for every firm with more than ten (10) workers (3.33); put at the disposal of workers, at employer's own cost, an emergency box of first aid needed in case of accident (3.31); ensure proper hygiene and comfort in meal places at work (3.29); provide effective noise control devices to decrease the intensity of noise such that it does not go beyond eighty five (85) decibels (3.26); provide workers with change rooms separated by sex and equipped with sufficient number of seats and individual lockable or pad lockable wardrobes for keeping the clothes that are not worn during working hours (3.21); review or assessment of the results of preventive measures (3.12); and provide workers whose work is done standing, suitable facilities for sitting (2.79)".

Further, the independent sample t-test was used to determine the difference between the consulting and contracting organisations in their level of compliance with the national OSH regulation of Rwanda. Results indicate that there is significant difference ($p < 0.05$) between the consulting and contracting organisations in their level of compliance with the national OSH regulation of Rwanda except for "provide precautionary measures and means to implement the measures that are necessary for any equipment, which is being used to protect employees against hazards ($p = 0.487$), internal rules and regulations shall be required for every firm with more than ten (10) workers ($p = 0.284$), ensure that each employee is trained and understands hazards associated with the work he/she is performing ($p = 0.275$), provide workers with change rooms separated by sex and equipped with enough seats and individual lockable or padlock able wardrobes for keeping the clothes that are not worn during working hours ($p = 0.711$), depending on the work schedule and the nature of work, every employer shall provide workers whose work is done standing, suitable facilities for sitting ($p = 0.172$), provide effective noise control devices to decrease the intensity of noise such that it does not go beyond eighty five (85) decibels ($p = 0.209$), and make medical test of the employees before they are employed, during their employment and after the termination of their employment ($p = 0.808$).

Table 4: Level of compliance with the OSH policy

Employers' obligation in the OSH policies	Cont.	R	Cons.	R	Overall mean	LoC	R	Sig.	Dec
Ensure that contingency officers are equipped with the first aid kit	4.36	1	3.08	3	3.91	C	1	0.001	S
Take measures to protect employee's Health and Safety against hazards	4.14	2	3.42	2	3.88	C	2	0.028	S
Provide precautionary measures and means to implement the measures that are necessary for any equipment	3.86	10	3.58	1	3.76	C	3	0.487	NS
Identify potential hazards	4.00	3	3.08	3	3.68	C	4	0.027	S
Consultation with workers in health and safety	3.95	4	3.08	3	3.65	C	5	0.056	S
Ensure that every employee complies with the requirements of this Policy.	3.95	4	2.83	10	3.56	C	6	0.002	S
Ensure that Occupational Safety and Health precautionary measures are implemented and maintained.	3.91	8	2.92	7	3.56	C	6	0.017	S
Provide and maintain an adequate supply of drinking water	3.95	4	2.75	11	3.53	C	8	0.011	S

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Ensure that places reserved for taking meals, are maintained in perfect	3.91	8	2.75	11	3.50	C	9	0.013	S
Appointment of a person for health and safety	3.95	4	2.42	17	3.41	AC	10	0.001	S
Put at the disposal of workers first aid needed in case of accident.	3.77	11	2.67	13	3.38	AC	11	0.043	S
Review or assessment of the results of preventive measures	3.76	12	2.58	16	3.33	AC	12	0.018	S
Internal rules and regulations shall be required for every firm with more than ten (10) workers.	3.50	14	2.90	9	3.31	AC	13	0.284	NS
Put at the worker's disposal all necessary and appropriate protection equipment and look after their correct use.	3.64	13	2.67	13	3.29	AC	14	0.013	S
Ensure that each employees are trained and understands hazards associated with the work thy are performing.	3.45	15	2.92	7	3.26	AC	15	0.275	NS
Provide workers with change rooms separated by sex and equipped with enough needed facilities.	3.29	17	3.08	3	3.21	AC	16	0.711	NS
Provide workers whose work is done standing, suitable facilities for sitting.	3.36	16	2.67	13	3.12	AC	17	0.172	NS
Provide effective noise control devices to decrease the intensity of noise	3.00	18	2.42	17	2.79	AC	18	0.209	NS
Make medical test of the employees before, during and after their employment.	2.36	19	2.25	19	2.32	SC	19	0.808	NS

Note:

a. <1.5 = Not Compliant (NC). 1.5-2.49 = Slightly Compliant (SC). 2.5-3.49 = Averagely Compliant (AC). 3.5-4.49 = Compliant (C). 4.5 and above = Very Compliant (VC). R = Rank, LoC = Level of Compliance, Sig = Significant

b. NS = No significant difference between public and private organisations in the level of compliance with the OSH regulation of Rwanda (p>0.05)

c. S = There is a significant difference between public and private organisations in the level of compliance with the OSH regulation of Rwanda (p<0.05)

Table 5 indicates the result of the independent sample t-test that was adopted to determine the difference between the public and private organisations in their level of compliance with the national OSH regulation of Rwanda. In all cases, the result indicated that there is no significant difference in the level of compliance of public and private organisations with the national OSH regulation of Rwanda.

Table 5: The level of compliance of public and private organisations with the OSH policy of Rwanda

Employers' obligation in the OSH policies	**Cons**	**R**	**Cont**	**R**	**Overall mean**	**LoC**	**R**	**Sig. (2-tailed)**	**Dec**
Ensure that contingency officers are equipped with the first aid kit	3.73	2	4.00	1	3.91	C	1	0.570	NS
Take measures to protect employee's Health and Safety against hazards	3.93	1	3.69	3	3.88	C	2	0.534	NS
Provide precautionary measures and means to implement the measures that are necessary for any equipment	3.60	3	3.77	2	3.76	C	3	0.714	NS
Identify potential hazards	3.53	4	3.54	7	3.68	C	4	0.991	NS
Consultation with workers in health and safety	3.40	7	3.62	6	3.65	C	5	0.681	NS
Ensure that every employee complies with the requirements of this Policy.	3.20	11	3.69	3	3.56	C	6	0.261	NS
Ensure that Occupational Safety and Health precautionary measures are implemented and maintained.	3.40	7	3.69	3	3.56	C	6	0.520	NS

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Provide and maintain an adequate supply of drinking water	3.40	7	3.38	8	3.53	C	8	0.978	NS
Ensure that places reserved for taking meals, are maintained in perfect	3.47	5	3.23	11	3.50	C	9	0.669	NS
Appointment of a person for health and safety	3.47	5	3.00	17	3.41	AC	10	0.416	NS
Put at the disposal of workers first aid needed in case of accident.	3.20	11	3.38	8	3.38	AC	11	0.750	NS
Review or assessment of the results of preventive measures	3.00	14	3.15	13	3.33	AC	12	0.783	NS
Internal rules and regulations shall be required for every firm with more than ten (10) workers.	3.31	10	3.15	13	3.31	AC	13	0.804	NS
Put at the worker's disposal all necessary and appropriate protection equipment and look after their correct use.	3.13	13	3.15	13	3.29	AC	14	0.963	NS
Ensure that each employees are trained and understands hazards associated with the work thy are performing.	2.93	16	3.38	8	3.26	AC	15	0.424	NS
Provide workers with change rooms separated by sex and equipped with enough needed facilities.	3.00	14	3.15	13	3.21	AC	16	0.791	NS
Provide workers whose work is done standing, suitable facilities for sitting.	2.93	16	3.23	11	3.12	AC	17	0.601	NS
Provide effective noise control devices to decrease the intensity of noise	2.21	18	3.00	17	2.79	AC	18	0.103	NS
Make medical test of the employees before, during and after their employment.	2.20	19	2.54	19	2.32	SC	19	0.506	NS

Table 6 indicates the relationship between the level of awareness (denoted with A) and compliance (denoted with C) of construction organisations with the OSH regulation of Rwanda using the Spearman's rank correlation. Hence, the results established significant correlation between A1 & CI, C6, C7; A2 & C9; A3 & C1; A5 & C7, C9; A6 & C4, C8, C17, C18; A7 & C3, C17; A8 & C8; A9 & C9, C17; A12 & C15; A13 & C1,C6,C8, C9, C12, C13, C14, C15, C17, C18; A14 & C1, C2, C3, C5, C6, C7, C9, C13, C14, C15, C16, C18; A15 & C3, C4, C8, C9, C11, C12, C13, C14, C15, C19; A17 & C1, C3, C4, C6, C8, C17; A18 & C1, C2, C3, C4, C5, C6, C7, C8, C9, C11, C14, C17, C18, C19; and A19 & C4, C8, C14, C18, C19. The interpretations of the acronyms are available in the appendix to table 6. The result of the table indicates that there is a significant relationship between the awareness of OSH policies and the compliance with it. Therefore, if compliance with OSH policies is to be improved, there is a need to invest in awareness creation across the country. This is possible through investments in education programs, professional bodies, government parastatals and incentives.

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Table 6: Relationship between the awareness and compliance of construction organisations with national OSH

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
A1	**0.031**	0.292	0.314	0.350	0.234	**0.025**	**0.037**	0.799	0.118	0.459	0.708	0.709	0.097	0.289	0.895	0.530	0.109	0.519	0.43
A2	0.568	0.379	0.235	0.638	0.082	0.637	0.357	0.912	**0.031**	0.943	0.287	0.457	0.467	0.355	0.748	0.295	0.812	0.231	0.140
A3	**0.044**	0.562	0.113	0.433	0.417	0.193	0.172	0.529	0.519	0.146	0.105	0.997	0.717	0.898	0.735	0.753	0.477	0.758	0.657
A4	0.759	0.666	0.325	0.399	0.491	0.139	0.883	0.632	0.897	0.623	0.198	0.267	0.915	0.736	0.242	0.750	0.876	0.741	0.233
A5	0.113	0.632	0.241	0.368	0.231	0.098	**0.024**	0.815	**0.009**	0.573	0.652	0.685	0.334	0.285	0.774	0.093	0.052	0.411	0.776
A6	0.314	0.360	0.097	**0.036**	0.363	0.111	0.343	**0.002**	0.051	0.271	0.418	0.056	0.095	0.086	0.120	0.475	**0.006**	**0.012**	0.100
A7	0.692	0.841	**0.033**	0.239	0.264	0.622	0.527	0.405	0.105	0.435	0.313	0.065	0.149	0.338	0.802	0.167	**0.038**	0.285	0.096
A8	0.320	0.204	0.563	0.221	0.773	0.087	0.785	**0.003**	0.688	0.481	0.866	0.106	0.747	0.349	0.220	0.667	0.617	0.733	0.214
A9	0.786	0.520	0.105	0.484	0.392	0.929	0.667	0.326	**0.020**	0.864	0.253	0.109	0.572	0.471	0.902	0.125	**0.007**	0.134	0.203
A10	0.911	0.503	0.906	0.980	0.551	0.585	0.136	0.424	0.889	0.336	0.783	0.298	0.981	0.100	0.053	0.721	0.533	0.346	0.183
A11	0.599	0.517	0.545	0.504	0.880	0.540	0.368	0.464	0.458	0.432	0.847	0.094	0.702	0.231	0.934	0.814	0.443	0.614	0.479
A12	0.471	0.725	0.481	0.628	0.343	0.290	0.232	0.135	0.140	0.552	0.434	0.052	0.204	0.066	**0.010**	0.573	0.226	0.285	0.589
A13	**0.025**	0.058	0.167	0.165	0.224	**0.009**	0.118	**0.000**	**0.016**	0.120	0.098	**0.008**	**0.002**	**0.002**	**0.011**	0.147	**0.002**	**0.000**	0.291
A14	**0.009**	**0.027**	**0.040**	0.105	**0.006**	**0.015**	**0.000**	0.420	**0.002**	0.959	0.156	0.180	**0.004**	**0.000**	**0.006**	**0.004**	0.181	**0.046**	0.064
A15	0.056	0.072	**0.033**	**0.002**	0.105	0.081	0.051	**0.000**	**0.043**	0.211	**0.018**	**0.029**	**0.024**	**0.030**	**0.013**	0.221	0.308	0.148	**0.009**
A16	0.968	0.213	0.288	0.313	0.239	0.955	0.609	0.391	0.945	0.531	0.164	0.984	0.751	0.084	0.907	0.136	0.269	0.395	0.713
A17	**0.027**	0.091	**0.043**	**0.001**	0.203	**0.008**	0.059	**0.013**	0.148	0.599	0.243	0.907	0.080	0.645	0.333	0.111	**0.020**	0.217	0.550
A18	**0.018**	**0.001**	**0.046**	**0.011**	**0.046**	**0.028**	**0.001**	**0.000**	**0.013**	0.056	**0.036**	0.062	0.056	**0.002**	0.078	0.086	**0.019**	**0.000**	**0.010**
A19	0.123	0.085	0.206	**0.033**	0.931	0.656	0.155	**0.001**	0.404	0.282	0.226	0.172	0.380	**0.030**	0.248	0.152	0.357	**0.037**	**0.009**

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4. Discussion of Findings

This study investigated the level of awareness and compliance of construction organisations with the OSH regulation of Rwanda. The respondents indicated that their construction organisations are aware of 13 out of the 19 employers' obligations in the OSH regulation of Rwanda. Inferential statistics established that there is no significant difference in the level of awareness of consulting and contracting organisations in Rwanda of the national OSH regulation. There is also no significant difference in the level of awareness of public and private organisations of the national OSH regulation except in the "appointment of a person for health and safety practices". That is, the private organisations are more aware of the need to appoint a health and safety officer in their organisation. Hence construction organisations are aware of their obligation in the national OSH regulations.

The findings of the current study are not consistent with the study of Okoye et al. (2016) and Eyiah et al. (2019) which found that there was a low level of health and safety knowledge and compliance among building construction workers in Nigeria. The argument of Windapo and Oladapo (2012) that the lack of awareness of OSH regulation in the South Africa's construction industry is responsible for the low level of compliance with the regulations is also not consistent with the result of this study. The results of Idubor and Osiamoje (2013) that OSH information dissemination by the Nigeria's government is ineffective and does not agree with the finding of this research that construction organisations are aware of the OSH regulations among construction organisations. Therefore, the situation in Rwanda appears to be slightly different from other developing countries in Africa because construction organisations are aware of the national OSH regulation.

Further, the result of the study indicated that construction organisations in Rwanda only comply (but not very compliant) with nine out of the nineteen employers' obligation in the national OSH regulation. The t-test statistics indicated that there is no significant difference in the level of compliance of private and public construction organisations with the national OSH regulation of Rwanda. However, there is significant difference in the level of compliance of consulting and contracting organisations with the national OSH regulation except for "provision of precautionary measures and means to implement the measures that are necessary for any equipment, which is being used to protect employees against hazards; internal rules and regulations being required for every firm with more than ten (10) workers; ensuring that each employee is trained and understands hazards associated with the work he/she is performing; providing workers with change rooms separated by sex and equipped with enough seats and individual lockable or pad lockable wardrobes for keeping the clothes that are not worn during working hours; depending on the work schedule and the nature of work, every employer shall provide workers whose work is done standing, suitable facilities for sitting; providing effective noise control devices to decrease the intensity of noise such that it does not go beyond eighty five (85) decibels; and making medical test of the employees before they are employed, during their employment and after the termination of their employment.

Hence, despite the awareness of construction organisations with OSH regulation, compliance has remained average rather than high. This finding is consistent with the research of Mohammed (2014) which affirmed that there is little, no real supervision or an authorized health and safety experts on worksites to monitor whether the workers are adhering to and implementing the health and safety regulations. It is also in agreement with Geller (2000) which concluded that contractors are non-compliant with safety regulations in China. Similarly, Okoye et al. (2016) and Eyiah et al. (2019) found that there was a low level of health and safety knowledge and compliance among building construction workers in Nigeria.

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The study correlated the awareness and compliance of construction organisations with the national OSH regulation and discovered significant relationship between them in many cases. Although. studies that investigated the relationship between these constructs seem to be scarce, Windapo and Oladapo (2012) discovered that non-compliance with OSH regulations and practice in South Africa is largely due to the lack of awareness of the regulations. Similarly, in this study, the awareness of the OSH regulation is significantly correlated with compliance. However, the "provision of precautionary measures and means to implement the measures that are necessary for any equipment, which is being used to protect employees against hazards (A4); every employer shall provide effective noise control devices to decrease the intensity of noise such that it does not go beyond eighty-five (85) decibels (A10); employers must put at the disposal of workers, at his/her own cost, an emergency box of first aid needed in case of accident (A11); and appointment of a person for health and safety (A16)" were found not to have any significant relationship with any compliance parameter in the study. The reasons for the lack of significant relationship between these variables and compliance variables are not investigated in the study and may be subjected to further study.

5. Conclusion and Recommendation

Based on the findings of this research, it is concluded that construction organisations in Rwanda are aware of the national OSH regulations in Rwanda. Also, there is no significant difference in the level of awareness of private and public organisations of the OSH regulation. There is also no significant difference in the level of awareness of consulting and contracting organisations of the OSH regulation. Despite the awareness of construction organisations of the national OSH regulation, the level of compliance has remained average and there is no significant difference in the level of compliance of private and public organisations with the OSH regulation. However, there is a significant difference in the level of compliance of consulting and contracting organisations with the OSH regulation. There is a significant positive relationship between the level of awareness and the level of compliance of construction organisations with the national OSH regulation.

Further, the provision of precautionary measures and means to implement the measures that are necessary for any equipment used to protect employees against hazards; provision of effective noise control devices to decrease the intensity of noise to below eighty-five (85) decibels; putting at the disposal of workers, an emergency first aid box in case of accident; and appointment of a person for health and safety are exclusive of the positive significant relationship between awareness and compliance with OSH regulation.

The study recommends stricter enforcement of the OSH regulation by the responsible government body on the consulting and contracting organisations in the public and private sector. Also, the construction organisations should prioritise the health and safety of workers by making conscious effort to implement the OSH regulation. The academia should direct research efforts towards establishing the implication of non-compliance with OSH regulation on the health and safety of workers and its implication for the industry and the nation.

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APPENDIX
Interpretation of the awareness and compliance components of the Rwandan OSH regulation

A	OSH regulations	C	OSH regulations
A1	Take measures to protect employee's Health and Safety against hazards that may result from the production, processing, use, handling, storage, or Transportation of articles/substances i.e. anything that employees encounter at work	C1	Take measures to protect employee's Health and Safety against hazards that may result from the production, processing, use, handling, storage, or Transportation of articles/substances i.e. anything that employees encounter at work
A2	Ensure that contingency officers are equipped with the first aid kit that would be accessible to all employees in case of emergency	C2	Ensure that contingency officers are equipped with the first aid kit that would be accessible to all employees in case of emergency
A3	Identify potential hazards which may be present while work is being done,	C3	Identify potential hazards which may be present while work is being done,
A4	Provide precautionary measures and means to implement the measures that are necessary for any equipment, which is being used to protect employees against hazards.	C4	Provide precautionary measures and means to implement the measures that are necessary for any equipment, which is being used to protect employees against hazards.
A5	Take steps to ensure that every employee within his/her employment complies with the requirements of this Policy, enforce the necessary control measures in the interest of Health and Safety	C5	Take steps to ensure that every employee within his/her employment complies with the requirements of this Policy, enforce the necessary control measures in the interest of Health and Safety
A6	Ensure that each employee is trained and understands hazards associated with the work he/she is performing	C6	Ensure that each employee is trained and understands hazards associated with the work he / she is performing
A7	Ensure that Occupational Safety and Health precautionary measures are implemented and maintained	C7	Ensure that Occupational Safety and Health precautionary measures are implemented and maintained
A8	Every employer shall make medical test of the employees before they are employed, during their employment and after the termination of their employment. These tests shall be paid by the employer	C8	Every employer shall make medical test of the employees before they are employed, during their employment and after the termination of their employment. These tests shall be paid by the employer
A9	The employer shall put at the worker's disposal all necessary and appropriate protection equipment and look after their correct use.	C9	The employer shall put at the worker's disposal all necessary and appropriate protection equipment and look after their correct use.
A10	Every employer shall provide effective noise control devices to decrease the intensity of noise such that it does not go beyond eighty-five (85) decibels	C10	Every employer shall provide effective noise control devices to decrease the intensity of noise such that it does not go beyond eighty-five (85) decibels
A11	The employer must put at the disposal of workers, at his/her own cost, an emergency box of first aid needed in case of accident	C11	The employer must put at the disposal of workers, at his/her own cost, an emergency box of first aid needed in case of accident
A12	The employer shall provide workers with change rooms separated by sex and equipped with enough seats and individual lockable or padlock able wardrobes for keeping the clothes that are not worn during working hours.	C12	The employer shall provide workers with change rooms separated by sex and equipped with enough seats and individual lockable or padlock able wardrobes for keeping the clothes that are not worn during working hours.
A13	Every employer shall provide and maintain an adequate supply of drinking water conveniently accessible to all persons employed, and free of charge.	C13	Every employer shall provide and maintain an adequate supply of drinking water conveniently accessible to all persons employed, and free of charge.

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A14	Every employer shall ensure that places reserved for taking meals, if available at workplace, are maintained in perfect state of cleanliness and such places shall meet the satisfactory standards of comfort and hygiene.	C14	Every employer shall ensure that places reserved for taking meals, if available at workplace, are maintained in perfect state of cleanliness and such places shall meet the satisfactory standards of comfort and hygiene.
A15	Depending on the work schedule and the nature of work, every employer shall provide workers whose work is done standing, suitable facilities for sitting	C15	Depending on the work schedule and the nature of work, every employer shall provide workers whose work is done standing, suitable facilities for sitting
A16	Appointment of a person for health and safety	C16	Appointment of a person for health and safety
A17	Internal rules and regulations shall be required for every firm with more than ten (10) workers	C17	Internal rules and regulations shall be required for every firm with more than ten (10) workers
A18	Review or assessment of the results of preventive measures	C18	Review or assessment of the results of preventive measures
A19	Consultation with workers in health and safety	C19	Consultation with workers in health and safety

A = Awareness; C = Compliance

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