

# Relevance of Electrical Services Engineers in Construction and Building Services

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*Abstract:* - It is now a common phenomenon in building services that some builders/clients call for the services of the electrical contractor/technicians to carry out an electrical installation without the provision or availability of standard electrical services drawings, at times due to the negligence of the builder/client about the importance of electrical services drawings or in other to reduce cost, which is detrimental and hazardous to the building, pieces of equipment installed or the occupants in the future. This paper analyses the relevance of electrical services engineers in construction and building services. A well-structured online survey was adopted and shared with different engineering platforms where building and construction professionals are to know the practice at various building and construction sites, and a total of 230 responses were collected, the data collected were examined using the descriptive statistics method with good pictorial representation. The result of the survey shows that 20% of the respondents complained about the absence of electrical services drawings, 38% complained that the electrical services drawings provided are not practicable, and 42% of the respondents talked about the availability of relevant electrical services drawings. The analysis from this study confirms that several electrical installations were carried out without the provision of practicable electrical services drawings, especially in domestic installations. It is recommended that the services of qualified electrical services engineers should be employed for standard electrical services drawings, which will give detailed information about the method of wiring, the suitable size/type of distribution, and the protection scheme for lighting and power installations in conformity with the appropriate standard and regulations for effective and well-balanced electrical services.

*Key-Words:* - Building services, construction, design, installation, electrical, service engineer

Received: September 28, 2021. Revised: October 24, 2022. Accepted: November 19, 2022. Published: December 31, 2022.

## 1 Introduction

The rate of accidents and electrical safety-related issues in building services has prompted the need for a holistic approach to tackle and correct the anomalies in building and construction services. A building edifice is just a carcass without the infrastructures that made it livable, secure, functional, efficient, and comfortable for social and recreational activities [1-3], this service is not achievable without a proper building services

engineer. However, building services engineers play a pivotal role in the design of a building with major services such as mechanical, electrical, and plumbing popularly called MEP services. Consequently, designs for building installations involve various calculations based on several factors which include; the type of building, the purpose of the building, and physical building parameters [4]. Ideally, standard electrical services drawings must be provided before any electrical installation is

carried out [5]. Electrical services drawings are sometimes referred to as wiring diagrams that provide visual representations describing electrical systems or circuits. Similarly, it is also known as the process that involves planning, creating, installing, and testing electrical equipment following the appropriate regulations. Electrical services include lighting, power, automated control, heating, load distribution systems, operation of machines, etc [6], it serves as a guide to electrical contractors/electricians or other workers who will use it to achieve energy efficiency management and for easy maintenance services when the need arises. However, energy efficiency is a concept that involves the utilisation of energy-efficient loads in the most economical way for efficient service delivery [7, 8], for effective energy efficiency management, the electrical service engineers must analyse the power requirements of the equipments/appliances in the building before specifying the suitable electrical installation method to be adopted [9]. Consequently, the adoption and enforcement of standard energy codes will reduce energy consumption and mitigate the impacts of climate change [10, 11], and money saved on energy bills by consumers and businesses can help the economy grow [12]. It is alarming that some builders/clients call for the services of the electrical contractor/technicians to carry out an electrical installation without the provision or availability of standard electrical service drawings, this is detrimental and hazardous to the building, equipment installed, or the occupant in the future. It is pertinent that all electrical services engineers should possess the following major qualities as shown in Fig. 1. for the effective delivery of world-class services drawings.



Fig. 1: Qualities of an Electrical Services Engineer

## 2 Materials and Methods

This paper analyses the relevance of electrical services engineers in construction and building services. A well-structured online survey was adopted and shared with different engineering platforms where building and construction professionals are to know the practice at various building and construction sites, and a total of 230 responses were gathered from the online survey. The descriptive statistics of data analysis method was adopted to evaluate the data collected and examine the need for electrical services engineers with good pictorial representation.

The study aimed to answer the following research questions.

- How often is electrical services drawings provided?
- How accurate is the electrical services drawings provided?
- Do you think there is a need for electrical services drawings before an electrical installation is carried out?

## 3 Results and Discussion

Table 1 shows the characteristics of respondents with three major variables; the respondents' age which is classified into three groups, the respondent's gender, and the respondents' area of specialisation.

Table 1: Characteristics of the Respondents

Variable		Frequency (n = 230)	Percentage (%)
Age	Below 20	8	3.48
	21 - 30	75	32.61
	Above 30	147	63.91
Gender	Male	202	87.83
	Female	28	12.17
Area of Specialisation	Architecture	19	8.26
	Civil/Building	38	16.52
	Electrical	142	61.74
	Quantity Surveyour	16	6.96
	Safety	10	4.35
	Others	5	2.17

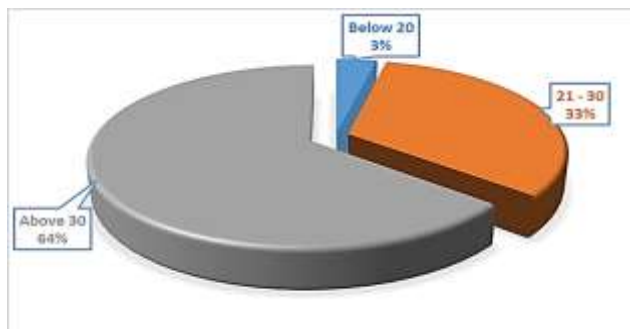


Fig. 2: Percentage Showing Age Range of Respondents

Fig. 2 illustrates the age range of respondents in percentage. 64% of the respondents were above 30 years of age, with 33% of the respondents between the age range of 21-30 years, compared to 3% of the respondents below 20 years of age. This shows that a substantial number of the respondents are above 30 years of age and fall into the categories of experienced personnel.

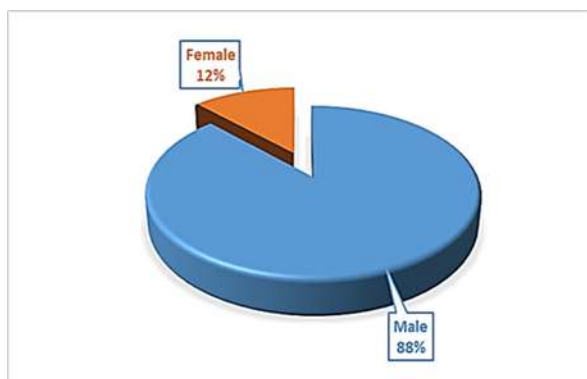


Fig. 3: Percentage Showing Gender of Respondents

Fig. 3 displays the percentage of respondents by their gender. With 88% of male respondents while only 12% of the respondents are female. This shows that a larger percentage of male respondents participated in the survey. This can be attributed to the fact that fewer female is into construction and building services.

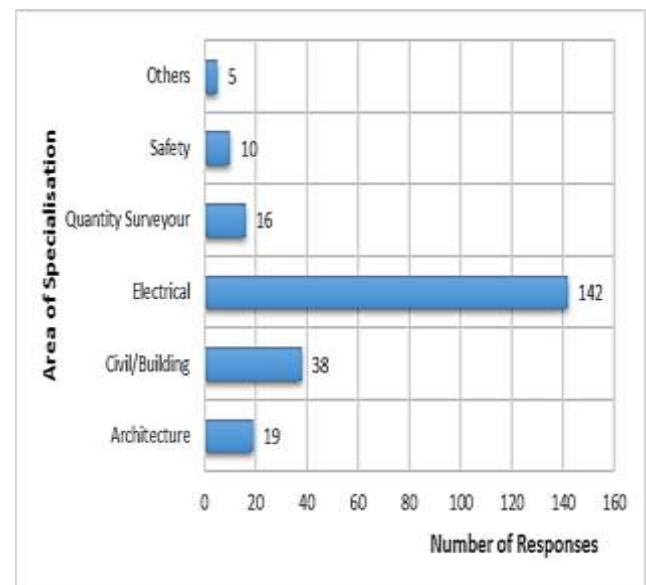


Fig. 4: Chart Showing Respondents' Area of Specialisation

Fig. 4 illustrates the chart of respondents with their respective areas of specialisation. 142 of the respondents were Electrical engineers, followed by civil/building engineers with 38 respondents, while 19 numbers of respondents were architects, 16 numbers were Quantity Surveyour, with only 10 safety personnel, and 5 respondents were from other fields related to the construction and engineering sector. This shows that majority of the respondents

are electrical engineers which is good for robust and detailed feedback about what is obtainable at different construction and building services.

Table 2: Respondents' View to Research Question A

Research Question	Always	Occasionally	Not at all	Total Number of Respondents
How often electrical services drawings provided?	52	130	48	<b>230</b>

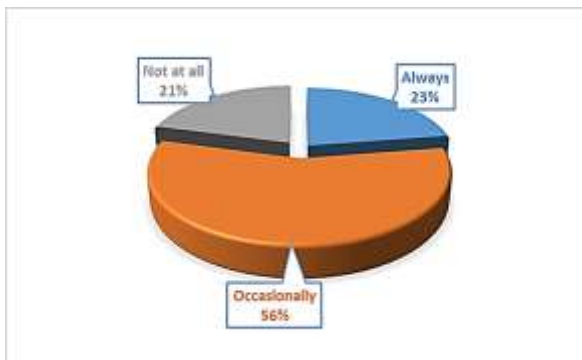


Fig. 5: Percentage of Respondents View to Research Question A

Fig. 5 illustrates the respondent's view to Research Question A on how often electrical services drawings are provided. 56% of the respondents stated that electrical services drawings were provided occasionally, 23% stated that relevant drawings were provided always, and 21% of the respondents complained about the absence of electrical services drawings which makes the electrical contractor/technicians to use their discretion in carrying out electrical installation services. It was observed that the majority of respondents complained about the absence of electrical services drawings mostly in a domestic installation.

Table 3: Respondents' View to Research Question B

Research Question	Always	Occasionally	Not at all	Total Number of Respondents
How accurate is the electrical services drawings provided?	97	88	45	<b>230</b>

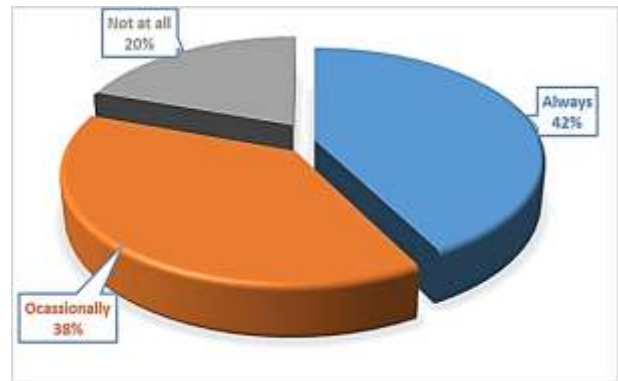


Fig. 6: Percentage of Respondents View to Research Question B

Fig. 6 illustrates the respondent's view to Research Question B on how accurate is the electrical services drawings provided. The result shows that 20% of the respondents complained about the absence of electrical services drawings, 38% complained that the electrical services drawings provided are not practicable, and 42% of the respondents talked about the availability of relevant electrical services designs. The comments from the respondents show that some electrical services engineers with computer-aided design and drafting knowledge have little technical know-how or practical knowledge, while those with technical know-how about electrical installation services cannot use computer-aided design and drafting software.

Table 4: Respondents' View to Research Question C

Research Question	Agree	Disagree	Undecided	Total Number of Respondents
Do you think there is a need for electrical service drawings before electrical installation is carried out?	199	5	26	<b>230</b>

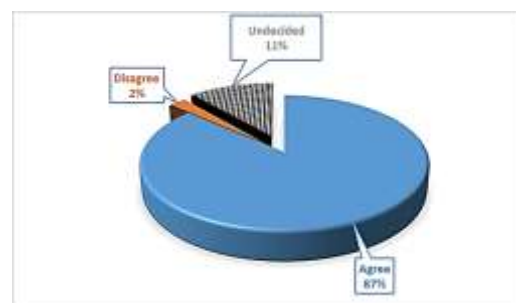


Fig. 7: Percentage of Respondents' View to Research Question C

Fig. 7 illustrates the respondent's view to Research Question C on the need for electrical services drawings before an electrical installation is carryout. The result shows that 87% of the respondents agreed to the need for the provision of relevant electrical services drawings before any electrical installation is carryout, 11% of the respondents were undecided whether it is important or not, while only 2% of the respondents disagree on the need for electrical services designs before electrical installation is carryout. It can be deduced that those with a contrary opinion on the need for electrical services designs are those with over-dependence on their electrical contractor/technicians or in order to save the cost of consultancy services which most times is detrimental and hazardous in the future.

#### 4 Conclusion

It is evident that electrical services engineers play a vital role in the construction and building services, the personnel will ensure compliance with relevant electrical building and installation codes and also eliminates tendencies of overloading the existing or future load demand. The result shows the majority of electrical installations carried out in domestic buildings were without electrical services drawings, while those with electrical services drawings in most construction and building sites just requested for it without any proper supervision or enforcement by the electrical service engineers that prepare the drawings. It is recommended that the service of a qualified electrical services engineer should be employed for standard electrical service drawings in order to give detailed information about the method of wiring, the suitable size, and type of distribution, and the protection scheme for lighting and power installations in conformity with the appropriate standard and regulations for effective and well-balanced electrical services. Consequently, the electrical services drawings will make maintenance work easier from an informed point of view and enable professionals and regulatory bodies to advise the public appropriately on energy efficiency and conservation.

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#### **Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)**

Najeem O. Adalakun carried out the analysis of the data.

Matthew B. Olajide worked on the methodology.

Najeem O. Adalakun & Matthew B. Olajide organised and worked on results and discussion section.

Samuel A. Omolola worked on the conclusion.

Najeem O. Adalakun & Samuel A. Omolola was responsible for the proofreading of the manuscript.

#### **Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself**

The authors received no financial support for the research, authorship, and/or publication of this article. Furthermore, on behalf of all authors, the corresponding author states that there is no conflict of interest.

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