



# Factors Associated With Avoidance Of Safety Equipment By Construction Workers In Construction Projects

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## Abstract:

Safety is a major issue in the construction industry for both unskilled and skilled workers. Accidents occur frequently every year in the construction industry due to lack of personal protective equipment (PPE) and poor wearing of the provided PPE. The objective of this paper is to identify the key factors related to "Prevention of Safety Gear by Construction Workers" in construction projects. Questionnaire survey method was used for the primary data collection process. As part of the study, 277 samples were collected from respondents across various construction sites. SPSS software was used for descriptive statistics, t-tests, and one-way analysis of variance. The results showed that "negligence regarding PPE, lack of interest in wearing PPE, wrong size of PPE, workers often avoid PPE during rainy season, and ignorance regarding PPE" were the most important factors in this study.

**Keywords** – construction safety, hazardous confined space, Personal Protective Equipment

## I.0 INTRODUCTION:

In construction sites, personal protective equipment plays a vital role in protecting overall health and safety. Various reports have revealed that workers in construction sites in Nigeria often do not wear personal protective equipment (PPE), putting their overall health and safety at risk and leading to various injuries. This study focuses on factors that influence the use of personal protective equipment (PPE) in construction sites in Nigeria, including availability, maintenance, ease of use, and PPE training. (Tanko and Anigbogu, 2012).

There are many reasons for the increase in accidents and one of the defense mechanisms used to limit accidents is personal protective equipment. (Saudi et al., 2020). Non-fatal occupational injuries are common among this group of construction workers and are closely associated with long working hours, lack of safety, and other risk factors (Abas et al., 2013). Construction workers are more prone to certain health problems and diseases than workers in other industries. Little is known about the work-related health, risks, and psychosocial issues of these workers, especially in Asian countries such as India. (Jayakrishnan et al., 2013).

## II. LITERATURE REVIEW

Yahr (1980) concluded that increasing the use of personal protective equipment in hazardous work environments would significantly reduce the number of fatal workplace accidents. Oja et al. (1983) discussed personal protective equipment and rescue in the event of a workplace accident leading to disability. They concluded that personal protective equipment such as helmets, face shields, work shoes, and gloves are very important and improved rescue preparedness in companies would also help reduce the number of serious workplace accidents.

Nigbogu et al. (2012) discussed factors such as proper sizing and protection from heat and injury. These factors affect construction workers. Their conclusion was that the majority of construction workers are aware of the need for personal protective equipment and want to be protected from accidents, discomfort, and health hazards. Salim et al. (2014) discussed the awareness of construction workers regarding the use of safety equipment in construction sites. A questionnaire method was adopted in this article. The important factors listed were negligence in the use of PPE, workers' knowledge about PPE, and provision of PPE to workers. The paper concluded that the awareness and knowledge of workers regarding the proper use of PPE was moderate and that the number of accidents in construction sites could be further reduced by using PPE properly.

Edom et al. (2014) concluded that implementing injury prevention measures, using safety equipment, providing training in safety and accident prevention, ensuring a safe working environment, and enforcing safety rules are beneficial. Adrain et al. (2015) discussed the perception of construction workers towards occupational diseases and injuries in the construction industry. They concluded that any kind of injury suffered by workers during work should be minimized as much as possible. Mohammed et al. (2015) pointed out factors related to PPE such as "safety shoes, inadequate gloves and face protection". The study found



that there are many safety issues in the construction industry such as lack of knowledge about PPE and how cables are protected from mechanical damage.

Dagnachew Israel et al. (2016) discussed occupational accidents and lack of personal protective equipment, factors that greatly affect construction workers. The researchers found a relatively high injury rate among construction workers compared to other studies, and therefore concluded that there is a need to provide safety training, encourage the use of personal protective equipment, and monitor substance abuse in the workplace.

Giriji et al. (2016) discussed safety measures against occupational hazards among construction workers. In this article, simple random sampling method was used. They concluded that proper engineering controls should be the primary goal to prevent hazards and that construction workers should implement them to reduce accidents. (2016) revealed that poor enforcement of regulations, unfounded attitudes towards health and safety, and unavailability of PPE are the main reasons for inadequate use of PPE by workers on construction sites. This article is based on field observations and personal interviews. They concluded that optimal use is important to rescue workers in case of accidents during construction work.

Alege et al. (2017) discussed factors related to the use of PPE by construction workers, such as prior knowledge of safety measures and safety training. They concluded that the use of PPE in construction projects is low. Sawitri et al. (2017) concluded that a positive climate towards safety among construction workers is likely to increase compliance in the use of PPE, whereas a negative climate decreases compliance in the use of PPE. Ee Jiah et al. (2018) discussed the effectiveness of personal protective equipment in construction sites. Uncomfortable to sit on, too heavy, no instructions, poor appearance, wrong size, etc., these factors have a significant impact on construction workers.

Pasha Nur Fauzania et al. (2018) stated that "not all workers understand the importance of occupational safety and health." Therefore, they rarely wear protective clothing for their own safety. Ahmed and Hoque (2018) stated that in a study investigating the causes of accidents in construction projects, 77 passive causes were identified in 14 major groups and ranked using a relative importance index. The five main passive causes are ignorance of safety-related issues, lack of personal protective equipment, lack of safety, improper equipment, and lack of knowledge and training on the use of equipment.

Mamin et al. (2019) concluded that construction workers are not fully aware of health and safety issues that affect them. Addisu et al. (2020) reported that the use of personal protective equipment and related factors was low among construction workers in Addis Ababa, Ethiopia. The rate of PPE use among construction workers in Addis Ababa was low. The study found that only 38% of workers wore PPE.

### III. METHODOLOGY

The objective of this study is to identify the factors that lead construction workers to not use safety accessories during construction projects. The study surveyed 21 job types based on the factors that lead construction workers to not use safety equipment during construction projects. Questionnaire method was used for primary data collection. As part of the study, 277 samples were collected from respondents from different construction sites. SPSS software was used for descriptive statistics, t-test and one-way analysis of variance.

### IV. DATA ANALYSIS AND INTERPRETATION

#### **Descriptive statistics of factors related to the avoidance of safety accessories by construction workers in the construction projects:**

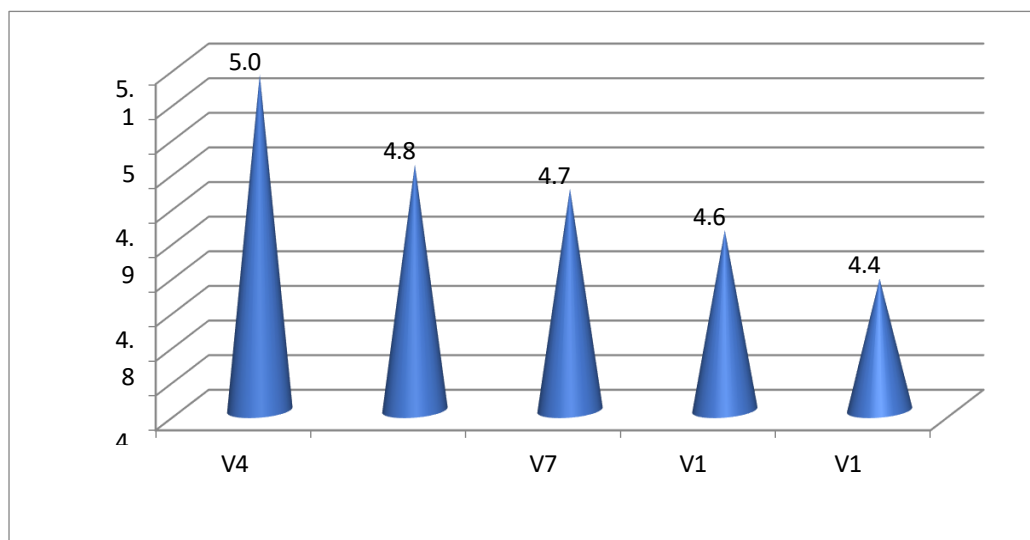
Table 1 shows the descriptive statistics of the factors related to the avoidance of safety accessories by construction workers in the construction projects. The mean of response and standard deviation of the various factors are given below in the table 1.

**Table 1: Descriptive Statistics of Factors related to the avoidance of safety accessories by construction workers in the construction projects**

S. No.	Factors	Mean	Std.Deviation	Ranks
V1	Workers feel uncomfortable when using welder helmets during long working hours.	4.29	1.40	7
V2	Workers feel uncomfortable when using gloves during long working hours.	3.97	1.57	9
V3	Workers feel irritations when wearing the gloves at the construction workplace.	3.93	1.59	10
V4	Workers are not interested to wear PPE most of the time during the summer seasons.	5.07	1.60	1
V5	Workers feel irritating when wearing the face shield in the workplace is the reason for avoidance.	4.23	1.66	8



V6	The weights of PPEs are too heavy is the reason for avoidance.	3.90	1.56	11
V7	The PPEs size is not suitable for many workers.	4.74	1.57	3
V8	Workers are not willing to wear PPE for longer than two hours because Heat & dehydration were a major issues.	4.33	1.68	6
V9	Injuries are the reasons for avoidance of PPE.	3.51	1.77	12
V10	Ignorance is the major reason for not wearing PPE at the workplace.	4.48	1.47	5
V11	Carelessness is the reason for the avoidance of PPE at the workplace.	4.81	1.75	2
V12	Workers mostly avoid PPE during the rainy seasons.	4.62	1.64	4



**Fig.1: Top Five Factors based on its Mean Value**

Above table 1 and figure, 1 show the most influencing factors of worker avoidance of PPE at the construction site. The results of the descriptive analysis are shown in the above column table. "Workers not interested to wear PPE most of the times at the summer seasons." contain higher mean and standard deviation values ( $5.07 \pm 1.60$ ). The higher mean value shows the rank order of the factor contains "1" and workers agree with the Workers not interested to wear PPE most of the time during the summer seasons. Similarly "the Carelessness is the reason for the avoidance of PPE at the workplace." contains the rank order of "2" and this mean and the standard deviation value of ( $4.81 \pm 1.75$ ) and the workers agree the Carelessness is the reason for the avoidance of PPE at workplace. "The PPEs size is not suitable for many workers." contains the rank order of "3" and this mean value is 4.74 and standard deviation value is 1.57. The workers agree The PPEs size is not suitable for many workers.

"workers mostly avoiding PPE at the rainy seasons contain "4th" rank order in the group and its means and standard deviation value of ( $4.62 \pm 1.64$ ) and the workers agree climatic changes is also the reason for the worker avoidance of PPE." Ignorance is the major reason for not wearing PPE at the workplace" placing the fifth rank in the group and its mean value and standard deviation value are  $4.48 \pm 1.47$ . Hence, workers agree that the Ignorance is the major reason for not wearing PPE at the workplaces.

**Table 2: T-test based on respondents' gender**

S. No.	Factors	t-value	Sig.
V1	Workers feel uncomfortable when using welder helmets in long working hours.	4.011	<b>0.002</b>
V2	Workers feel uncomfortable when using gloves in long working hours.	2.212	<b>0.046</b>
V3	Workers feel irritations when wearing the gloves at construction workplace.	3.219	<b>0.013</b>
V4	Workers are not interested to wear PPE most of the times at the summer seasons.	4.855	<b>0.001</b>
V5	Workers feel irritating when wearing the face shield in workplace is the reason for avoidance.	2.680	<b>0.016</b>
V6	The weights of PPEs are too heavy is the reason for avoidance.	3.960	<b>0.002</b>
V7	The PPEs size is not suitable for many workers.	3.394	<b>0.054</b>
V8	Workers are not willing to wear PPE for longer than two hours because Heat & dehydration were a major issue.	0.007	<b>0.995</b>
V9	Injuries are the reasons for avoidance of PPE.	0.315	<b>0.759</b>
V10	Ignorance is the major reason for not wearing PPE at workplace.	4.948	<b>0.001</b>
V11	Carelessness is the reason for the avoidance of PPE at workplace.	5.419	<b>0.006</b>



V12	Workers are mostly avoiding PPE at the rainy seasons.	7.290	<b>0.001</b>
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Table 2 shows the t-value of Factors Affecting the Unawareness Use of Personal Protective Equipment in Construction Project on the basis of their gender. But this difference is statistically proved, as they obtained t-value is significant at 0.01 levels. So it is concluded that, there is a significant difference between the respondents Factors Affecting the Unawareness Use of Personal Protective Equipment in Construction Project on the basis of their gender.

Based on the respondents' gender, it is observed that the safety management factors did affect significantly the use of PPE among construction workers. Workers feel uncomfortable when using welder helmets in long working hours (V1). Workers feel uncomfortable when using gloves in long working hours (V2). Workers feel irritations when wearing the gloves at construction workplace (V3). Workers are not interested to wear PPE most of the times at the summer seasons (V4). Workers feel irritating when wearing the face shield in workplace is the reason for avoidance (V5). The weights of PPEs are too heavy is the reason for avoidance (V6). The PPEs size is not suitable for many workers (V7). Ignorance is the major reason for not wearing PPE at workplace (V10). Carelessness is the reason for the avoidance of PPE at workplace (V11). Workers are mostly avoiding PPE at the rainy seasons (V12).

Based on the respondents' gender, it is observed that the safety management factors didn't affect significantly the use of PPE among construction workers. Workers are not willing to wear PPE for longer than two hours because Heat & dehydration were a major issue (V8). Injuries are the reasons for avoidance of PPE (V9).

**Table 3: ANOVA test based on Workers Experience**

S. No.	Variables	F-value	Sig.
V1	Workers feel uncomfortable when using welder helmets during long working hours.	3.778	<b>0.011</b>
V2	Workers feel uncomfortable when using gloves during long working hours.	0.823	<b>0.482</b>
V3	Workers feel irritations when wearing gloves at the construction workplace.	3.748	<b>0.015</b>
V4	Workers are not interested to wear PPE most of the time during the summer seasons.	4.884	<b>0.013</b>
V5	Workers feel irritating when wearing the face shield the workplace is the reason for avoidance.	5.599	<b>0.016</b>
V6	The weights of PPEs are too heavy is the reason for avoidance.	3.430	<b>0.023</b>
V7	The PPEs size is not suitable for many workers.	3.560	<b>0.015</b>
V8	Workers are not willing to wear PPE for longer than two hours because Heat & dehydration were a major issues.	1.748	0.157
V9	Injuries are the reasons for avoidance of PPE.	3.257	<b>0.022</b>
V10	Ignorance is the major reason for not wearing PPE at the workplace.	0.904	0.440
V11	Carelessness is the reason for the avoidance of PPE at the workplace.	4.492	<b>0.001</b>
V12	Workers mostly avoid PPE during the rainy seasons.	2.956	<b>0.012</b>

Table 3 shows the Factors related to the avoidance of safety accessories by construction workers in the construction projects based on their Workers Experience. But this difference is statistically proved, as they obtained F-ratio is significant at 0.01 levels. So it is concluded that there is a significant difference between the respondent's Factors related to the avoidance of safety accessories by construction workers in the construction projects based on their Workers Experience.

In this study, the following factors are significantly different on the experience group: Workers feel uncomfortable when using welder helmets during long working hours (V1), Workers feel irritations when wearing gloves at the construction workplace (V3), Workers are not interested to wear PPE most of the time during the summer seasons (V4), Workers feel irritating when wearing the face shield in the workplace is the reason for avoidance (V5), The weights of PPEs are too heavy is the reason for avoidance (V6), The PPEs size is not suitable for many workers (V7), Injuries are the reasons for avoidance of PPE (V9), Carelessness is the reason for the avoidance of PPE at the workplace (V11) & Workers are mostly avoiding PPE during the rainy season (V12).

In this study, the following factors are not significantly different on the experience group: Workers feel



uncomfortable when using gloves during long working hours (V2), Workers are not willing to wear PPE for longer than two hours because Heat & dehydration were a major issue (V8) & Ignorance is the major reason for not wearing PPE at the workplace (V10).

## V. CONCLUSION

The objective of this study is to identify the factors that lead construction workers to not use safety accessories during construction projects. The study surveyed 21 job types based on the factors that lead construction workers to not use safety equipment during construction projects. Questionnaire method was used for primary data collection. As part of the study, 277 samples were collected from respondents from different construction sites. SPSS software was used for descriptive statistics, t-test and one-way analysis of variance.

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