

Evaluation of the Occurrence of Construction Accidents Associated with Carpenters in Osogbo

Julianah O. Adeosun¹, Olubimbola Oladimeji², Kazeem D. Musbau³ & Adetomi O. Abegunde⁴

^{1,2,3,4}Department of Building, Osun State University Osogbo, Osun State, Nigeria.

Abstract

Over the years, a lot of people in the construction business have been interested in the problem of workplace accidents. Frequent accidents on construction sites have resulted in losses of life, property, labor, funds, supplies, and time. This study aimed at evaluating the carpenter-related building accidents in Osogbo, Osun State, Nigeria in order to enhance construction safety management. Purposive sampling technique was used to gather data from carpenters based on relevant predefined criteria, resulting in a sample size of 37. Population for the study comprise of the members of the association of carpenters in Osogbo. The collected data were examined using, mean score, standard deviation, frequency, percentages and chi square. Stepping on sharp objects, falling from a height, musculoskeletal illness, and back pain are the most frequent accident kinds among carpenters in Osogbo. A few of the factors that lead to accidents on construction sites are workers on tall buildings not having personal protective equipment, defective tools and equipment, and safety laws being violated. It was observed that time overrun is likely influence by fall from height; reduced quality of work by and inhaling/expose to wood particles; and time overrun by slip. Assessment of accidents involving carpenters is essential to drastically reduce or eliminate trade peculiar accidents so as to enhance safety outcomes and improve overall productivity in the construction industry.

Keywords: accident, carpenter, construction, safety, workplace,

Introduction

Construction sites are among the most dangerous places to work in the world due to the high rate of occupational accidents that occur there (Fentahun *et al.*, 2019). The construction sector is known for being physically taxing. Several construction workers are killed or seriously injured every year; other workers suffer from conditions like asbestosis, dermatitis, and musculoskeletal disorders (Forteza *et al.*, 2017). Many people believe that working in an unsafe environment presents serious risks for employees (Asanka and Ranasinghe, 2015; Tadesse and Israel, 2016). A significant portion of the workforce in the construction sector, including those who work on building sites, in structures, and in homes, are employed in one of the most significant and traditional trades: carpentry. Carpentry is extremely risky, despite being extremely rewarding

(Carlos *et al.*, 2014). Injuries and illnesses among carpenters are higher than in other occupational categories. Nurmahamira *et al.*, (2020) reiterated that accidents and health hazards have serious negative social and economic repercussions on society in addition to depressing personal tragedies.

Many construction companies are aware of the need to prevent dangers and accidents on the job site, but are unwilling to invest in safety because they view it as a waste of resources due to the profit motive (Awwad *et al.*, 2016). Some construction companies believe that the idea of site safety is limited to the provision of safety equipment as argued by Muema *et al.*, (2015). Even so, there are still some professionals that want to spend money on safety but don't know how (Muema *et al.*, 2015). Accidental costs and health risks are not merely monetary in nature (Arunkumar and Gunasekaran,

2018). In addition to sad personal tragedies, accidents and health risks have significant negative social and economic effects on society. The construction sector must take precautions to prevent mishaps.

Major causes of accidents in the construction sector must be understood in order to comprehend the control methods. Only a few numbers of researchers [Fang *et al.*, (2016); Winge and Albrechtsen (2018); Saleh and Othman (2022)] have been able to pinpoint the main causes of accidents in the building industry. However, there hasn't been much research done to address carpenter-related accidents in Osun State, Nigeria. Therefore, this study investigated the types of carpenter-related construction accidents and how they affect the projects delivery in Osogbo, Osun State, Nigeria.

Carpentry and the associated accidents

One of the earliest trades is carpentry, and demand for carpenters never goes down. Workplace injuries affecting carpenters can take many different forms. They might use hand tools like saws, drills, hammers, nail guns, and sanders on a daily basis, as well as climb ladders and transport large pieces of wood (Rhodes and Morrow, 2021). The trade of carpentry is risky as reiterated by Rhodes *et al.*, (2021). Both joinery and carpentry are woodworking construction trades. Health and Safety Guide for Carpenters (2023) identifies numerous potential hazards that could cause serious harm or even death in the carpenter's workplace. Carpenters are four times more likely than other construction workers to develop wood dust breathe in from sanding and planing wood, which can lead to severe lung issues, asthma, and nasal cancer (Lette *et al.*, 2018). Carpenters operate in a range of environments, they must ensure not only their own safety but also the safety of others around them (Carlos *et al.*, 2014). They must understand what workplace safety entails and be aware of how to observe and promote workplace safety. Building sites are frequently chaotic environments with a lot of activity going on (Bilal *et al.*, 2022).

Workers and machinery are moving at a rapid pace, all of them concentrated on the current task, construction accidents can occur in such an environment. Carpenters may work at a customer's house, in a workshop, at a client's place of business, or on a construction site. The following are some examples of the roles that carpenters may play, depending on where they work, according to the Health and Safety Guide for Carpenters (2023): Building and installing structures like partition walls, doors, windows, roof timbers, floor joists, and staircases; interior fittings like kitchens, cabinets, and skirting boards and making customized furniture. They are also employed in residential or commercial structures, using a variety of hand and power tools. They frequently work in confined spaces or at heights (Health and Safety Guide for Carpenters, 2023).

Workplace accidents specific to carpenters can arise from various sources, including contact with hand held tools, falling or collapsing objects, people, or structures, and using excessive muscular force when lifting, pushing, pulling, carrying, etc. working at heights without protection, coming into contact with moving parts of machines, coming into contact with electricity, working for extended periods of time, lifting wood finishes and tools, small particles or objects striking the eye (such as wood chips, dust, etc.), using defective power equipment and sharp tools, not having enough experience handling new tools and equipment, being careless and overconfident, the machines, coming into contact with chemicals, breaking safety regulations, handling tools and equipment poorly, improper supervision, ignorance of the use of personal protective equipment, careless use of personal protective equipment and human error (Hester *et al.*, (2010). Workbenches are frequently used by carpenters, but bending over can cause back pain if a bench is too low. Additionally, since a carpenter may need to kneel on hard floors to install flooring and skirting boards, there is a chance that they will suffer knee injuries. As stated by Muema *et al.*, (2015)

and Shao, Hu, Liu, Chen, and He (2019). A construction site's condition, a worker's, coworker's, or supervisor's mistakes, along with inadequate design, poor maintenance, or a poorly thought-out job or process layout, can all contribute to an accident (Adeagbo *et al.*, 2019). There are multiple teams and individuals involved at different phases of construction activities, participants from all disciplines must contribute at every level to prevent and mitigate safety and health hazards on construction sites (Bilal *et al.*, 2022).

Effects of accident on construction project delivery

Haupt and Pillay (2018) observed that the impact of accidents in the construction sector has resulted in significant financial losses for the employer, which have been incurred through rearranging work, replacing equipment, personnel, and plants, as well as paying for compensation and legal fees. Accidents can have a variety of negative effects on employees, such as personal suffering, adversity, death, permanent injury, potential loss of earning capacity, and demotivation. In the construction industry, delays in work progress, time overruns, lower quality, overtime compensation, and legal liability are some of the economic effects of accidents (Othman *et al.*, 2018). When an employee engages in negligence, the employer is also accountable. Neglecting to protect employees is a crime that can result in legal action. The aforementioned consequences will adversely affect the project's performance and its likelihood of success.

In the Nigerian construction industry, Udo (2016) investigated 21 consequences of construction accidents. The study's highest ranked effects include worker demotivation, harm to a company's reputation, increase in project cost, damage to plant and equipment, and payment for resolving injury/death claims. Muhammad *et al.*, (2015) identified a few effects that accidents at construction sites have on projects related to construction. The biggest consequences include lost schedule time, a damaged

company reputation, a detrimental impact on employee psychology, and increased medical costs. Numerous effects that increase the project's complexity and faultiness were mentioned by Okolie and Okoye (2012). Human deaths, employee demotivation, interruptions to site operations, delays in project progress, and negative impacts on overall project cost and productivity are a few of the most prominent effects (Shakil, 2019). Only with minor or no accidents can a construction project completely achieve its goal within the projected budget.

Measures to prevent accident associated with carpenters

According to Mohammadi *et al.*, (2018), a designer can provide the best design to ensure safety if they have a thorough understanding of the accident's causes and consequences. Forteza *et al.*, (2017) reiterated that it will be easier to lower the accident rate in the construction industry if the true cause of the accident is discovered. The specifics of accident prevention plans differ based on the business's size, type, and location (Lette *et al.*, 2018). One of a management team's most crucial duties is to ensure that workers are in a safe environment (Awwad *et al.*, 2016). A carpenter is in charge of making sure that their tools and supplies are safe, regardless of the environment in which they operate, in order to safeguard both personal and public safety. Construction laws and safety regulations must be strictly followed in order to avoid accidents (Fentahun *et al.*, 2019). Creating and enforcing safety policies within a company can increase staff comfort and help avoid mishaps and injuries (Bilal *et al.*, 2022).

Construction sites should implement safety practices to prevent accidents from happening. These practices as discussed by Kassu and Kitaw, 2016; Mohammadi *et al.*, (2018); Bilal *et al.*, (2022) include: inspecting the work area, tools, and equipment before work begins to identify potential hazards; choosing tools and equipment that allow for good ergonomic procedures by choosing low-weight tools;

maintaining tools and equipment in good working order; knowing when to replace accessories on woodworking machines; routinely cleaning up wood dust and upholding good housekeeping practices; keeping work areas free of clutter and equipment; preventing unintentional machine starts by employing lock-out/tag-out techniques and/or keeping power control while working on the machine; making sure that machinery is not operated without all safety precautions in place; wearing the proper footwear, eye and hearing protection, as well as being knowledgeable about the materials working with, such as the kind of wood, the chemicals, paints, and stains and their properties.

Research Methodology

The target population for this study is the association of carpenters from different parts of Osogbo. The association of carpenters is made up of skilled workers from various Osogbo construction sites. During a field survey, a structured questionnaire was used to gather the majority of the data. The methodology employed was purposive sampling. The study's sample consisted of the 37 carpenters who attended the meeting in total. In order to obtain the most response from the respondents, questionnaires were distributed through in-person interviews. In part one of the questionnaires, general information about the respondents was requested. In part two, there was a list of twelve variables related to the types of accidents involving carpenters and nineteen variables related to accident causes. The variables were rated on a five-point Likert scale. Respondents were asked to check the appropriate column on a Likert scale of 1 to 5, indicating how much they agreed or disagreed with each of the listed variables regarding the types and causes of accidents. The mean scores were computed, and each of the 12 and 19 variables of accident types and causes was assessed using a measurement scale that went from "1" (strongly disagree; ≥ 1.0 and ≤ 2.45) to "5" (strongly agree; ≥ 3.0 and ≤ 5.0). Helped by SPSS (Statistical Package for Social

Sciences), descriptive statistics such as mean score, standard deviation, frequency, and percentages were utilized to analyze the collected data. Chi square test of independence was also used to test the relationship between the types of accidents and project delivery factors.

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Findings and Discussion

Working Environment of the Respondents

Table 1 shows the work environment of the respondents. (29.7%) has poor working environment, (27%) have fair working environment, (35.1%) have good working environment, (5.4%) have very good working environment, (2.7%) have Excellent working environment. This shows that the working environment of most of the respondents are not very good and unsafe. The unsafe environment is linked to pollution, odors, dusts which can lead to bodily injury. This is in line with the study of Rhodes *et al.*, (2021) who noted that the carpenters directly face release of pollution which subjects them to an unsafe environment.

Table 1: Working Environment

Working Environment	Frequency	Percentage
Poor	11	29.7
Fair	10	27.0
Good	13	35.1
Very Good	2	5.4
Excellent	1	2.7
Total	37	100.0

Experience of Construction Accident

The Table 2 indicate the response of the respondent on their experience of accident on site, (89.2%) of the respondent have experienced accident one time or the other on the job, while (10.8%) have never experienced accident on construction site before. This implies that majority of the respondents have experienced accidents on site. This supports the findings of (Lette *et al.*, 2018) that reiterated that carpenters are four times more likely than other

construction workers prone to accidents arising from sanding and planing wood which can lead to severe lung issues, accidents from falls, slips and contact with dangerous objects and equipment. The experiences of the respondents with workplace accidents makes their contributions to this study very relevant.

Table 2: Experience of Construction Accident

Accident Experience	Frequency	Percentage
Yes	33	89.2
No	4	10.8
Total	37	100.0

Comfortability with work after accident occurrence

The Table 3 shows if the respondents are comfortable with their work as a result of accident, 11(29.7%) of the respondent are comfortable, and 26(70.3%) of the respondent are not comfortable, this indicate that majority of the respondent are not comfortable with their work as a result of the occurrence of accidents. Workplace accidents can have a lasting impact on an employees' wellbeing. They may experience depression or post-traumatic stress disorder as a result of the accidents. It can also lead to low productivity as argued by Tadesse et al., (2016). The occurrence of accident may make an employee not comfortable with the work

Table 3: Comfortability with work after accident occurrence

Answer	Frequency	Percentage
Yes	11	29.7
No	26	70.3
Total	37	100.0

Types of accident associated with carpenters that frequently occur on construction sites

The mean values of the respondents vary from 3.5135 to 1.4595, thus, all the respondents have different perceptions on the level of occurrence of accidents associated with carpenters. The information obtained identified that the most common type of accident on the construction site

which include: injuries from stepping on sharp objects like nails (3.5135), Fall from height such as ladder, scaffolds, beams, and roofing (3.0541), Back pain and musculoskeletal illness (3.0000), Inhaling/expose to wood particles (2.7568), Cut and laceration (2.6757), Injuries from fallen object (2.6757), and Slip (2.5405). The types of accident that rarely occur according to the respondents include: Hearing loss (1.8649), electric shock (1.8378) and fire eruption (1.4595). According to the respondents, falling from a height is one of the most common accident causes, which is consistent with the findings of a study by Nurmahamira *et al.*, (2020), Chong *et al.*, (2016) and Fentahun *et al.*, (2019) which found that falls from height are one of the main causes of fatal accidents for construction workers nationwide.

Causes of accident associated with carpenters on construction site

The Table 5 shows the most common causes of accident among carpenters on construction sites, they include: lack of protection to workers on tall structures (3.6486), Faulty tools and machines (3.4324), violation of safety regulations (3.4324), using faulty machinery and cutting-edge tools (3.4054), lack of commitment to wearing personal protection equipment (3.3514), tripping hazards caused by construction waste (3.3514), Human error e.g. rushing to do the work etc. (3.3243), lack of barriers to prevent falling objects from striking persons on the ground (3.2162), unclean workplace, (3.1081), insufficient experience with new tools and equipment (3.1081) and working a lot of hours (3.1081), were rated significant. Also, in that order, the factors were ranked in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th and 12th positions.

Furthermore, Small objects or particles that are harmful to the eyes (such as dust, wood chips, etc.), (2.8649), Unprotected height-working (2.8108), Contact with collapsing or falling object (2.8108), Extreme or uncontrolled movement of the body (2.7838), High noise-level from the machine used (2.7568), contact with a

moving machine component, (2.6486), Lifting wood finishes and tools (2.5946) and Exposure to electricity (2.1351) were rated moderately significant and ranked in the order of 14th,15th,16th,17th 18th and 19th positions. The most rated cause of accident among the carpenters is “No protection at all

provided to workers on tall structures”. This was supported by ILO, (2014) and Kiconco *et al.*, (2017). with the opinion that safe workplaces and gadgets are often not provided to workers, or if they are provided are of poor.

Table 4: Types of accidents associated with carpenters that frequently occur on construction sites

Types of accident	NR (f)	Mean score(x)	Ranking of occurrence
injuries caused by stepping on sharp objects, such as nail	37	3.5135	1
falling from a height, such as from a ladder, a scaffold, a beam, or a roof	37	3.0541	2
Musculoskeletal illness and back pain	37	3.0000	3
exposure to/inhalation of wood particles	37	2.7568	4
Laceration and cuts	37	2.6757	5
injuries caused by a falling object	37	2.6757	6
Slip	37	2.5405	7
the condition known as "white finger," in which the blood vessels in the finger collapse	37	2.5135	8
Eye damage	37	2.3243	9
loss of hearing	37	1.8649	10
Electric shock	37	1.8378	11
Eruption of fire	37	1.4595	12

Table 5: Causes of accident

Causes of accident	NR (f)	Mean score	Ranking of the cause
Lack of protection to workers on tall structures	37	3.6486	1
Faulty tools and machines	37	3.4324	2
violation of safety regulations	37	3.4324	3
using faulty machinery and cutting-edge tools	37	3.4054	4
lack of commitment to wearing personal protection equipment	37	3.3514	5
tripping hazards caused by construction waste	37	3.3514	6
Human error	37	3.3243	7
lack of barriers to prevent falling objects from striking persons on the ground	37	3.2162	8
unclean workplace,	37	3.1081	9
insufficient experience with new tools and equipment	37	3.1081	10
working a lot of hours	37	3.1081	11
chemical compound exposure	37	3.0000	12
Small objects or particles that are harmful to the eyes (such as dust, wood chips, etc.),	37	2.8649	13
Unprotected height-working,	37	2.8108	14
Getting in touch with a falling or collapsing object	37	2.8108	15
extreme or unrestrained body movement	37	2.7838	16
Exposure to High noise-level from the machine used	37	2.7568	17
contact with a moving machine component,	37	2.6486	18
being exposed to electricity	37	2.1351	19

The effect of accident on construction project delivery

Table 6 indicated the effect of accident on construction project delivery among the carpenters working on construction site in Osogbo, Osun State. Using cross tabulation and chi-square some factors was identified to be associated to predict effect on project delivery. The result shows that accidents associated with carpenters significantly affect project delivery. There were statistical significant relationship between the variables of project delivery: time overrun and fall from height (X=15.787, P=0.001), reduced quality and inhaling/expose to wood particles (X=15.471,P=0.04), time overrun and slip(X=14.414, P=0.002), this is in accordance with the study of Muhammad, Abdulateef and Ladi (2015) who reiterated that, workers compliance with health and safety regulations has a positive influence in assessing workers quality delivery and productivity of construction projects.

Figure 1. shows the relationship between the causes of carpenter related accidents

which include: Lack of protection to workers on tall structures, Faulty tools and machines, violation of safety regulations, using faulty machinery and cutting-edge tools, lack of commitment to wearing personal protection equipment, tripping hazards caused by construction waste and types of accidents among which are: injuries caused by stepping on sharp objects, such as nail, falling from a height, such as from a ladder, a scaffold, a beam, or a roof, Musculoskeletal illness and back pain, exposure to / inhalation of wood particles, Laceration and cuts and Slip as well as factors that impact project delivery which are: Time overruns, Cost overruns, Delay in production, Low productivity, Reduced quality and Legal liability. The figure illustrated that the factors that impact project delivery is dependent on the type of accidents, while the types of accidents is dependent on the causes of accidents. This is supported by Adeagbo *et al.*, (2019) that reiterated that the success of the project as a whole depends on the safety of the workers on the job site, and that work can only be done effectively by workers who are in good physical and mental health.

Table 6: The effect of accident on construction project delivery

Variable	Effects					Statistics X,p
	SD	D	N/D	A	SA	
Fall from height such as ladder, scaffolds, beams, and roofing	Time overrun					X=15.787 P=0.001
	1(3) 0(0)	3(9.1) 0(0)	7(21.2) 4(100)	12(36.4) 0(0)	17(51.5) 0(0)	
Inhaling/expose to wood particles	Reduced quality					X=15.471 P=0.004
	5(17.9) 0(0)	6(18.2) 7(77.8)	4(14.3) 0(0)	3(10.7) 2(22.2)	5(17.9) 0(0)	
Inhaling/expose to wood particles	Overtime payment					X=21.985 P=0.000
	3(10.7) 0(0)	3(10.7) 0(0)	2(7.1) 7(77.8)	7(25) 2(22.2)	13(46.4) 0(0)	
Slip	Time overrun					X=14.414 P=0.002
	1(3) 0(0)	2(6.9) 5(62.5)	0(0) 0(0)	12(36.4) 0(0)	14(41.4) 3(37.5)	

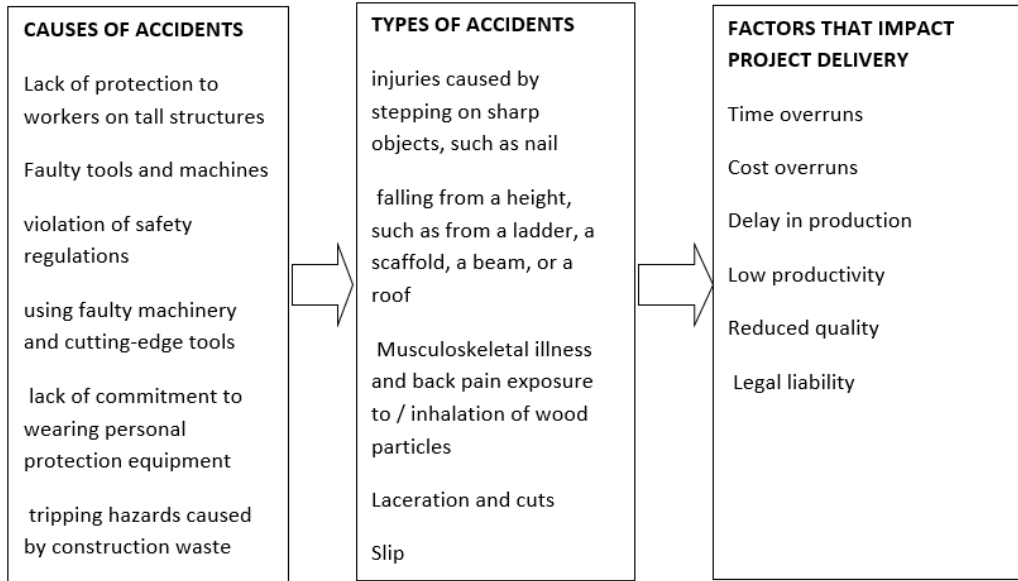


Fig 1.: The effect of accident on construction project delivery

Conclusion and Recommendation

In conclusion, the study evaluated the occurrence of construction accidents associated with carpenters in Osogbo. The results revealed the major types of accident associated with carpenters which include: injuries caused by stepping on sharp objects like nails, falling from height such as from a ladder, scaffold, beam and roof, musculoskeletal illness and back pain among others. The findings also showed the causes of accidents among carpenters as: lack of protection provided for workers on tall structures, faulty tools and equipment, violation of safety regulations among others. The types of accidents and the project delivery variables have a significant link. The safety and well-being of carpenters were addressed in this study, which is important since it will improve safety results and increase overall productivity in the construction sector. The results provide insightful information into the underlying factors that contribute to accidents involving carpenters and offer recommendations for practical preventive actions that can be put into place to enhance safety management procedures in the construction sector.

Based on the aforementioned conclusion. The following recommendations were made:

- i. Ensure that all carpenters are outfitted with the proper personal protective equipment (PPE), such as safety footwear that is specifically made for construction work. Puncture-resistant boots or shoes with reinforced soles should be worn to prevent them from stepping on sharp objects, helmet to prevent injuries from falling objects, long sleeves, safety glasses, or goggles, and cut-resistant gloves. PPE ought to be at ease, appropriately fitting, and in good shape.
- ii. Carpenter should ensure that safety standards are in place at the workplace and are enforced. Appropriate gadget should be provided to workers on tall structures to prevent accidents.
- iii. Correct tools and machineries should be used not an alternative. Conduct routine maintenance on all of the tools and equipment that carpenters use, including cleaning, lubricating, and replacing any worn or malfunctioning parts.

- iv. Carpenters should ensure they possess good physical and mental health before embarking on any job to prevent accident.
- v. Carpenters should receive training in proper lifting techniques to reduce strain on their backs. Encourage the use of assistive equipment for heavy-duty transportation, such as dollies or carts.
- vi. Carpenters should receive training in safe tool handling methods, with a focus on using sharp tools with prudence. To reduce mishaps, remind them to keep their cutting instruments sharp.
- vii. Clearly visible safety symbols and signage should be posted around the work area.
- viii. The construction sector can greatly enhance the safety management techniques used by carpenters, establish safer work environments, and decrease the frequency of accidents by putting these recommendations into practice.

References

- Adeagbo Dorcas Omolola, Audu Isa Ibrahim Dakas, Yohanna Daniel Izam (2019). Safety practices on building construction sites for sustainable development in Nigeria. *Journal of Sustainable Development in Africa* (Volume 21, No.4, 2019) ISSN: 1520-5509. Clarion University of Pennsylvania, Clarion, Pennsylvania.
- Arunkumar K and Gunasekaran J M E (2018). Causes and effects of accidents on construction site *International Journal of Engineering Science and Computing* 8 18102-18110
- Asanka W A and Ranasinghe M 2015 Study on the impact of accidents on construction projects 6th Int. Conf. on Struct. Eng. and Constr. Management 2015 (Sri Lanka)
- Awwad, R., El Souki, O. & Jabbour, M. (2016). Construction safety practices and challenges in a Middle Eastern developing country. *Safety science*, 83, 1-11.
- Bilal Manzoor, Idris Othman and Abdul Waheed (2022): Accidental safety factors and prevention techniques for high-rise building projects. *Ain Shams Engineering Journal* Volume 13, Issue 5, September 2022, 101723
- Chong L H, Halipah I and Affandi R (2016) Causes of fall hazards in construction site management *Int. Review of management and marketing* 6 257–263
- Carlos M. F., Maria A. S. H. and Marcos M. B. (2014): Safety analysis in the building construction carpentry work. <https://www.researchgate.net/publication/290733693DOI:10.1201/b16490-56>
- Fang, D., Zhao, C. and Zhang, M. (2016). A cognitive model of construction workers' unsafe behaviours. *Journal of Construction Engineering and Management* 142
- Fentahun Berhanu, Mulat Gebrehiwot, and Zemichael Gizaw (2019) Workplace injury and associated factors among construction workers in Gondar town, Northwest Ethiopia. *BMC Musculoskeletal Disord* v.20; 2019 Published online 2019 Nov 9. doi: 10.1186/s12891-019-2917-1
- Forteza F J, Carretero-Gómez J M and Sesé A (2017) Occupational risks, accidents on sites and economic performance of construction firms *Safety Sci.* 94 61–76
- Haupt T C and Pillay R (2018) Investigating the true costs of construction accidents *J. of Eng., Design and Technology* 1-44
- Health and Safety Guides » Health and Safety Guide for Carpenters (2023) <https://www.hsestudyguide.com/carpentry-hazards-and-precaution>
- Hester J. L. , John M. D, Leiming L, James N. and Dennis P (2010): Work-related injuries in residential and drywall carpentry. *Journals of applied occupational and environmental hygiene*. Vol. 18 issue 6, Pages 479-488 | Published online: 30 Nov 2010 <https://doi.org/10.1080/10473220301422>
- International Labour Organization (2014) Safety and health at work: a vision for sustainable prevention. XX World Congress on Safety and Health at

- Work 2014, International Labour Organization, Frankfurt.
- Kassu J. D. and Kitaw B. B. (2016). Work place innovation influence on occupational safety and health. *African Journal Science Technology Innovation Development* 8(1). 33-42
- Kavya K. T. (2019). Causes and effects of construction accidents. *International Journal of Innovative Technology and Exploring Engineering*. Volume 9 issues 2 pp 1-5
- Kiconco A, Ruhinda N, Kyobutungi V, Watya S. and Bazeyo W (2017). Determinants of occupational injury among building construction Workers in Kampala City, Uganda. *Annals Glob Health*. 2017;83(1):86. doi: 10.1016/j.aogh.2017.03.189. [CrossRef] [Google Scholar]
- Lette A, Ambelu A, Getahun T, Mekonen S. (2018). A survey of work-related injury among building construction workers in southwestern Ethiopia. *Int J Ind Ergon*. 2018;68:57–64. doi: 10.1016/j.ergon.2018.06.010. [Cross Ref] [Google Scholar]
- Muema LM, Gatebe E, Kirui B, Adrian AA. (2015); Awareness of construction workers on occupational hazards, illness and injury associated with construction industry in Mombasa County. *J Nurs Health Sci*. 2015;4(6):75–82. [Google Scholar]
- Muhammad B. A, Abdulateef I. & Ladi B. D. (2015). Assessment of cost impact in health and safety on construction projects. *American Journal of Engineering Research (AJER)*;4, 25-30.
- Mohammadi A, Tavakolan M and Khosravi Y (2018). Factors influencing safety performance on construction projects: A review *Safety Sci*. 109 382–397
- Nurmahamira Z, Muhamad Z, Mohamad A. M. S, Muhammad F. H. and Nor H.A (2020). Effect of accident due to fall from height at construction sites in Malaysia IOP Conf. Series: Earth and Environmental Science 498 (2020) 012106 IOP Publishing doi:10.1088/1755-1315/498/1/012106
- Okolie, KC, & Okoye, PU. (2012). Assessment of national culture dimensions and construction health and safety climate in Nigeria. *Science Journal of Environmental Engineering Research*, 2012.
- Oladipupo A 2012 Effects of accidents on construction projects delivery (Nigeria: Federal University of Technology, Akure) Qsv/09/9294.
- Othman Idris, Majid R., Mohamad H. and Shafiq H. (2018). Variety of accident causes in construction industry. MATEC Web Conferences 203 (202):022006. DOI: 10.1051/mateconf/201820302006. www.researchgate.net
- Rhodes and Morrow (2021): Common workplace injuries in carpentry. <https://rhoadeslegal.com/2021/09/24/common-injuries-carpentry>
- Saleh, R.A. and Othman, N. (2022). Overview of the causes of accidents in construction industry: A Comparative Perspectives. *International Journal of Academic Research in Economics and Management Sciences*; 11 (4), 1-12
- Shao B, Hu Z, Liu Q, Chen S and He W 2019 Fatal accident patterns of building construction activities in China *Safety Sci.Constr*. 111 253–263
- Shakil Ahmed (2019): Causes and effects of accident at construction site: a study for the construction industry in bangladesh. *International Journal of Sustainable Construction Engineering and Technology* Vol. 10 No. 2 (2019) 18-40
- Tadesse S, Israel D. (2016) Occupational injury among building construction workers in Addis Ababa, Ethiopia. *J Occup Med Toxicol*. 2016;11(1):16. doi: 10.1186/s12995-016-0107-8. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- Udo, UE, Usip, EE, and Asuquo, CF. (2016). Effect of lack of adequate attention to safety measures on construction sites in Akwa Ibom State, Nigeria. *Journal of Earth Sciences and Geotechnical Engineering*, 6(1), 113-121.
- Winge Stig and Albrechtsen (2018). Accident types and barrier failures in the construction industry. *Safety Sci*. 105, pp 108-166. 10.1016/j.ssci.2018.02.006.