INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 13, Issue 11, (2023) E-ISSN: 2222-6990

The Issues of Safety and Health Items Provided in Construction Industry Standard (CIS 27:2019): The Level of Safety Items Importance toward Contractors

Nazatul Fahimah Bahanudin, Syed Abdul Haris Syed Mustapa, Lilawati Ab Wahab, Mohd Nazri Abdullah

Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA, Perak Branch, 32610, Seri Iskandar, Perak, Malaysia

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v13-i11/19631 DOI:10.6007/IJARBSS/v13-i11/19631

Published Date: 24-11-2023

Abstract

Health and safety are relevant to all branches of industry, it is particularly important for the construction industry. It has always been a major issue as it is considered among the most exposed sectors regarding occupational accidents. Although tremendous improvements have been made in health and safety performance in some countries, the construction industry continues to lag behind most other industries. Lack of training, negligence, poor communication, and disregard for fundamental safety procedures are the main causes of accidents that occur on construction sites. Also, most employees used Personal Protective Equipment (PPE) improperly because of inexperience, carelessness, negligence, and overconfidence. Therefore, this study aims to determine the level of safety items' importance to contractors based on the Construction Industry Standard (CIS 27:2019). A literature review and a designated questionnaire survey were used to perform the study. Data will be collected quantitatively to fulfil the objective by distributing questionnaires to grade 7 contractors in the Klang Valley who have registered with CIDB. The result of the study, which is based on a questionnaire, shows items related to safety and health by referring to Construction Industry Standard CIS 27:2019 are important for contractors to follow the standard, issues related to safety and health among contractors and strategies for improvement of safety and health of the construction workers. This study will increase contractor's knowledge of the importance of safety items among contractors.

Keywords: Safety and Health, Items, Importance, Level of Safety, Construction Industry Standard CIS27:2019.

Introduction

One of the greatest sectors in any economy right now is construction. It significantly boosts the country's economy and employs many people. According to Abas et al. (2020), the construction industry plays an important role in the development process and contributes to economic expansion and increasing demand for construction services. Construction is an industry that includes the erection, maintenance, and repair of buildings and other immobile structures and the building of roads and service facilities that have become integral parts of structures and are essential to their use.

Construction safety aims to ensure that a construction site or the industry is not an immediate source of danger to the general public near a construction site, the workers at a construction site, or the required safety standards, as well as ensuring that the finished product of construction. Vitharana et al (2015) state that a hazard is a dangerous event, thing, behaviour, or circumstance. It could result in a loss of life, harm to one's physical or mental health, destruction of property, loss of livelihoods and services, disturbance of the social and economic system, or environmental harm. Electric shock, burns, wounds, broken bones, and death are all possible outcomes of safety risks that are common on-site. Therefore, health and safety at work aim to provide the conditions, skills, and behaviours that will allow the employee and their organization to complete their task effectively and in a way that prevents situations that might endanger them (Katunge et al., 2016).

In Malaysia, publicly available materials like official government publications, legislation, directives, and standards, like the Occupational Safety and Health Act of 1994, include information at the widely acknowledged technical level. According to Ayob et al (2018), the Department of Occupational Safety and Health (DOSH) has disclosed statistics showing that 1,116 work-related incidents occurred between 2011 and 2016 and that construction sites were responsible for 37.85%-51.50% of accidents leading to non-permanent impairment, permanent disability, and death. Therefore, there is a need to determine items related to safety and health by referring to the Construction Industry Standard (CIS 27:2019).

Literature Review

Construction Industry Standard CIS 27:2019 is a standard related to Occupational Safety and Health (OSH) in the construction industry. It specifies the requirements for OSH in construction work, including the specification and bill of quantities (BQ). The standard was developed by the Construction Industry Development Board (CIDB) and is used to assess and rate the impact of building construction on the environment. It is to improve the quality and safety of construction work in Malaysia. CIDB Malaysia served as a moderator and facilitator for the technical committee throughout the development of this standard. According to Cooper (2021), following the rules in CIS 27:2019 can benefit contractors by improving safety and health practices, reducing risks, and saving time, improving the quality and safety of construction work, avoiding penalties and legal issues, and improving reputation and trust with clients and stakeholders. Overall, CIS 27:2019 is crucial in promoting safety, quality, and sustainability in the construction industry.

In the construction sector, standards are often defined as published documents that outline the expected specifications, methods, and processes to be used. Establishing common standards ensures excellent dependability and consistency regarding the quality,

compatibility, and compliance of a specific product, service, material, and so on (Designing Buildings, 2022).

Safety and Health Plan

According to the United States Department of Labor (n.d), a Site Safety and Health Plan defines the possible dangers of the construction site and the corporate rules, procedures, and work practices chosen to reduce such hazards. As Niemistö (2016) mentioned, the contractor is responsible for ensuring that construction safety plans are completed before the commencement of work. The plan aims to examine and identify the hazards and risk factors related to the tasks performed at the site, the circumstances, and the working environment and eliminate these as needed.

It's essential to remain aware that a safety and health plan's particular specifics and content may change depending on the scope and difficulty of the building project, as well as local regulatory requirements and industry norms. Regulatory authorities, legal authorities, and safety experts can all be consulted to ensure the strategy is thorough and successful in creating a safe workplace.

OSH Personnel

According to Construction Industry Standard, the contractor must engage safety professionals following the relevant Acts/Regulations under DOSH authority. Safety and Health Officer, Site Safety Supervisor, Contractor Safety Supervisor, and Designated person are the safety professionals. Each of them has its role and responsibilities.

Safety and Health Officer

A competent individual in charge of monitoring and supervising health and safety compliance and associated laws and regulations in his or her company is known as a health and safety officer (HSO). This person promotes workplace safety awareness among employees, advises management on applicable rules and regulations, develops safety policies, and trains staff on safety and health concerns.

Safety and Health Officer

Site Supervisors, also called Construction Site Supervisors, manage, and distribute the activities and obligations of a construction team, often formed of construction employees and subcontractors (Safeopedia, 2018). They oversee project development while ensuring personnel understand and adhere to worksite health and safety rules. They are well-versed in construction codes and routine staff management procedures. They usually have first-hand knowledge of building tools and techniques.

Construction Safety Supervisor

Any contractor that works on site, other than the main contractor, and has more than 20 employees must select a part-time contractor safety supervisor who will devote at least 5 hours per week to safety monitoring and encouraging safe workplace behaviour.

Designated Person

The contractor must nominate a designated person in line with the Factories and Machinery (BOWEC) (S) 1986 Regulations. The designated individual is not liable for the company's debts (Mughal, 2021). OSH employees have a crucial role in preventing accidents and injuries on

construction sites, ensuring safety standards are followed, fostering a safety culture, investigating events, handling emergencies, promoting continuous improvement, and boosting worker morale and productivity. Their knowledge and efforts go a long way toward preserving a secure and healthy working environment for everyone participating in the construction project.

Safety and Health Committee

Safety and health committees are established safety and health consultation bodies that provide a structured venue to discuss mining safety and health issues (Skilled Solution Sdn. Bhd, 2020). They are significant because they promote dialogue and collaboration among employers, managers, and employees in developing and implementing safety and health measures and monitoring programs. According to CIS 27, the composition of a safety and health committee created, the election or appointment of committee members, the committee's purpose, the powers of committee members, and any other subject relevant to the committee's organization or operation should be as stipulated.

The committee establishes specific goals aligning with this goal, including lowering workplace accidents and injuries, enhancing safety training programs, locating, and decreasing hazards, and fostering a safety culture across the organization. Each committee member is charged with carrying out a specified set of duties. These could involve performing routine safety inspections, reviewing incident reports, examining safety data, detecting risks, recommending, putting into practice safety measures, offering safety training advice, and ensuring safety rules are followed.

Having a safety and health committee on a construction site is important because it allows workers to express their worries, opinions, and proposals regarding safety. They can actively contribute their practical knowledge and experience to safety-related decision-making processes. The committee also acts as a connector for safety-related information between workers, managers, and supervisors. It makes it easier for workers on a construction site to share best practices, updates, and safety-related information. Making sure that everyone is informed of safety procedures, updates, and new dangers is made easier through effective communication.

Safety and Health Training

Safety training is a type of compliance training that is provided to safeguard a company and its employees. Employee health and safety training is essential to educate staff on workplace hazards and how to deal with them. Appropriate training will educate how to recognize, address, and prevent workplace hazards. Training should be industry-specific, detailed, and industry-related to be more valuable and relevant. Appropriate safety training helps employees understand the many dangers associated with their profession and provides them with the skills to protect themselves from those hazards. Staff members who have received enough training will demonstrate a grasp of safety measures and try to preserve such practices (Cornerstone et al., 2020).

Safety and health training educates workers on potential workplace risks, safe work practices, and procedures to prevent accidents, illnesses, and injuries. It is essential to encourage a secure and healthy workplace. Workers receiving safety and health training will be better prepared to spot workplace dangers, deal with them, and react correctly to emergencies.

Effective communication on a construction site regarding safety issues is emphasized throughout training. Workers receive training to alert managers and supervisors to safety-related dangers, near-misses, events, and injuries.

In addition, proper use and maintenance of hand tools, power tools, and construction equipment are included in worker training. Understanding manufacturer guidelines, guarding specifications, using personal fall protection appropriately when operating equipment, and performing regular equipment checks are all part of safety and health training. The use of mechanical aids, ergonomics, and proper lifting and movement procedures are all covered in training to help prevent musculoskeletal injuries.

To sum up, safety and health training ensure workers have the information and skills to carry out their responsibilities safely; construction companies must offer frequent and continuous safety and health training. Construction site-specific risks and hazards should be addressed in training, and adhere to local laws and best practices.

Hazard Identification Risk Assessment and Risk Control (HIRARC)

DOSH aims to give a systematic and objective methodology to evaluate hazards and their related risks. It objectively assesses an identified hazard and a technique to control the risk. It is one of the general obligations imposed by the Occupational Safety and Health Act of 1994 (Act 514) on employers to create safe workplaces for their employees and other associated persons. The contractor must identify possible dangers to personnel or estimate their likelihood of occurring and the impact they might have. Thus, HIRARC documents must be preserved, maintained, and submitted to the S.O. HIRARC assists in reducing the risk of accidents, diseases, and injuries at work. The construction sector can prevent events from happening by carefully identifying hazards, evaluating associated risks, and putting control mechanisms in place. It makes the workplace safer for workers and lowers the incidence of accidents and illnesses.

Construction companies can save money by putting HIRARC techniques into effect. Early risk assessment reduces the possibility of accidents, injuries, and property damage. This can reduce incident-related costs for medical care, workers' compensation claims, equipment repairs, and project delays. Additionally, insurance prices might be lowered if construction companies exhibit efficient risk management techniques. HIRARC is a continuous process that needs to be reviewed and monitored regularly. It encourages a culture of ongoing safety management improvement. Regular reviews of the effectiveness of control measures, incident investigations, and worker feedback enable the safety program to be adjusted and improved, resulting in steadily rising safety performance in the construction sector.

Safety and Health Performance Report

A health and safety performance report is an excellent approach to tracking the status of a company's safety and identifying areas for improvement. It can be used to compare safety performance in prior years to that of other companies in the industry. A health and safety performance report can also aid in identifying trends in safety performance and investigating any accidents. Performance reports can be used to aid in developing and implementing effective safety management systems and assess the performance of your safety programs. Many large corporations produce internal health and safety performance reports, frequently combined with environmental performance reports. Smaller firms, too, can use their internal

communications procedures to provide short periodic reports on progress in addressing health and safety issues.

According to Construction Industry Standard 2019, contractors should prepare and submit five copies of monthly safety and health performance reports to the S.O. The report should describe the OSH program, issues on complaints, the status of the Safety and Health Plan and HIRARC, CIDB Green Card record and maintenance record, and traffic or other related safety control.

Table 1
Advantages of using Safety Performance Report

No	Advantages	Explanation
1	Transparency and Accountability	By giving a thorough overview of a company's safety and health report, safety and health performance reports encourage transparency inside a company. Organizations show their dedication to accountability and responsible management by being transparent about incidents, compliance, and performance metrics.
2	Benchmarking and Best Practices	Organizations can assess their performance in relation to industry benchmarks and best practices using safety and health performance reports. They can implement creative techniques, learn from successful efforts, and get insights into effective safety and health management strategies by comparing their results to those of other firms.
3	Legal and Regulatory Compliance	Reports on safety and health performance show if an organization complies with the necessary laws, rules, and standards. They show that the company is taking proactive steps to guarantee a risk-free working environment and reduce potential hazards. This can assist firms in avoiding the negative financial and legal effects of non-compliance.
4	Employee Engagement and Satisfaction	By showing that the company prioritizes its employees' well-being, safety and health performance reports help to increase employee engagement and satisfaction. The morale of staff members increases when they see that their employer is dedicated to upholding a safe and healthy work environment.
5	Continuous Improvement	Reports on safety and health performance constitute the basis for attempts towards ongoing improvement. Organizations can set new objectives, create improvement strategies, and track development over time by evaluating and analyzing the data and information offered in the reports. Continuous improvements in performance in terms of safety and health are facilitated by this iterative process.

Safety and Health Protective Equipment

According to Ammad et al (2020), PPE is equipment that protects workers from workplace hazards. The primary goal of PPE is to decrease worker exposure when engineering and

administrative control methods are not practicable or effective in reducing the risk to the level. The following are examples of essential PPE that may be used to safeguard personnel:

Head Protection
Head protection must be worn while there is a risk of objects falling from above, such as while working beneath individuals using equipment or when working beneath a conveyor belt.

Hearing Protection
The contractor is liable for providing hearing protection and hearing protection zones if workers are exposed to noise levels of 85dB or higher. When sound levels reach 80dB, employers must conduct a risk assessment and offer workers with information and training. High noise levels in the workplace can also interfere with worker communication, increasing the risk of accidents, injury, and even death.

Eye Protection
Workers need to wear suitable eye and facial protection, and the type of protection chosen is appropriate for the work and correctly fits each employee exposed to the hazard (Almahmoud et al., 2020). Employers employing employees in other occupational categories should conduct hazard assessments to determine whether eye and face PPE is required.

Body Protection
Body protection is a defence to keep the body safe from injury and harm. It can be used for various safety objectives, such as lighting the dark, especially during night construction, or as a warning sign to the public. To guard against occupational risks, traditional or disposable overalls, boiler suits, aprons, or chemical suits constructed of various materials may be required in specific scenarios.

Hand Protection
Contractors must guarantee that workers wear suitable protection whenever a workplace hazard assessment finds that employees face possible injury to their hands and arms that cannot be prevented through engineering and work practice measures. Potential hazards include dangerous substance absorption through the skin, chemical or thermal burns, electrical hazards, bruising, abrasions, cuts, punctures, fractures, and amputations. Gloves, finger guards, and arm coverings or elbow-length gloves are examples of protective equipment examples.

Foot Protection
Site protective footwear protects the foot from physical risks such as falling, treading on sharp objects, heat and cold, wet and slippery surfaces, and chemical exposure. Numerous forms of protective footwear are available for employment, requiring toe and foot dangers. Some are intended for specific trades or industries, such as firefighting, logging, electricians, or welders. Others offer specialized protection, such as crushing, impact, or electrical contact resistance. Many footwear solutions, such as steel-toed, chemical-resistant boots, provide integrated protection.

Personal Fall Protection Resistance
Fall protection must be provided at altitudes of four feet in general industry workplaces, five feet in shipyards, six feet in the construction industry, and eight feet in lengthy shoring

operations, according to OSHA. Furthermore, regardless of the fall distance, OSHA requires that fall protection be supplied when operating above dangerous equipment and apparatus. Safety belts and body harnesses are two simple examples of fall protection on the construction site.

Health and Welfare Provision

Workers' welfare is a basic need that is mandated by law. Everyone who works on a construction site must have access to toilets and facilities for washing, changing, eating, and rest. During the planning and preparation phases, the employer should examine welfare facilities' availability, location on site, and how they will be maintained (Department of Occupational Safety and Health, 2019).

Contractors are expected to offer welfare facilities, and clients are responsible for ensuring this occurs. Decisions and actions on this issue must be made early in the project planning process. Contractors must provide adequate care for personnel under your supervision while on the job. Furthermore, the client must ensure that the contractors have made plans for adequate welfare as stated in the construction industry standards. It is valid for all building projects. Clients should work with contractors and assist them when providing welfare facilities is difficult. As a result, employee welfare is critical, and it is incumbent on employers to offer employees opportunities for optimal performance and effectiveness (Abba et al., 2019). The availability of welfare amenities improves construction workers' performance, health, and well-being and can reduce the risk of illness at construction sites.

Safe Working Area

The International Labour Organization (2019) highlights the significance of health and safety in the construction industry and offers tools for encouraging a secure work environment. Tasks in design for safety, safety inspection, and monitoring safety are examples of areas with inadequate training. Failure in any of these areas can raise the risk of workers being injured in the construction environment.

Traffic Management

According to Fuertes et al (2013); Gangolells et al (2011); Ahn et al (2010), building activities in metropolitan areas frequently have negative consequences for the community surrounding the construction area, such as delays, poor environmental impacts, clogged traffic, safety hazards, and economic losses. Proper construction traffic management provides several benefits to construction companies. Improved efficiency of construction operations by minimizing unexpected delays in the movement of materials and equipment to and from the construction site, improved the company's public image and public relations with the surrounding community by minimizing the nuisance factor for residents and businesses in the neighbourhood and improved the company's public image and public relations with the surrounding community.

Access and Egress

Access and egress are the pace or mode of entry and leave from a workplace or work location. Access and egress routes should be controlled, safe, adequately designed, free of impediments, and well-maintained. When access and egress procedures are not adequately maintained, hazards such as fires, slips, and falls, contact with moving vehicles, illegal entry

into hazardous work areas, falls into floor apertures, and falls into the water can cause serious harm.

Construction Industry Standard 2019 mentions that contractors must provide all essential security equipment and lights until the project is completed. When a building or structure is occupied, the entrance and exit must be designed and maintained to be free and unobstructed. For access and egress, exits must be indicated with signs. Access and egress means must be free of obstructions or impediments to total instant usage in a fire or other emergency.

Plant and Machinery

A plant is any machinery, equipment, or apparatus utilized in an industrial operation. Plant refers to heavy gear and massive equipment utilized on construction sites, such as cranes, excavators, and bulldozers. It is the primary role of a building plant and why it is so crucial; with it, work would be easier to begin. A plant is generally one of the more expensive components of a construction project. Hence it is customary to be acquired, used, or rented. Construction plant installation, use, and maintenance require skilled workers.

Plant and machinery are important in the construction industry as they help in the economy, quality, safety, speed, and timely project completion. They enhance work practices and improve productivity when the machine's proper care and correct use are undertaken. The use of less advanced machines is the main reason behind project delays. The selection of the appropriate type and size of construction equipment often affects the required amount of time and effort and, thus the job-site productivity of a project.

Research Methodology

Quantitative research is concerned with collecting numerical data and generalizing it across groups of individuals or explaining a specific occurrence. According to Zaini (2009), a quantitative research technique was employed to gather objective data or information on the respondents' backgrounds. Primary and secondary data were used as data-gathering strategies in this study. The researcher will assess all the data and information using the relevant techniques to ensure the study's goal is met.

To carry out this study, a random sample is chosen. This one is the easiest to understand of all the probability sampling techniques because it only needs one random selection and little prior population knowledge. To make it easier to determine how many samples should be gathered to represent the total population fairly, the researchers used the sample determination table by Krejcie & Morgan (1970) as a guide. The major contractor's experience in handling and supervising safety procedures on construction sites was used to choose the respondents. Due to its well-established location and substantial number of development sites, Klang Valley was selected as the study area. The data are processed and analysed using the Statistical Package for Social Science Version 29 (SPSS). The researcher would gain from adopting this software because it is an effective statistical analysis tool, simple to use, and equipped with descriptive menus.

Findings and Discussion

The data will be prepared and analysed based on the preceding questionnaire survey. The main contractors in the Klang Valley received the questionnaire survey. Email and other

platforms like WhatsApp are utilized to distribute the surveys and collect the data. The questionnaire includes a list of the level of safety item importance towards contractor must include in accordance with construction industry standards.

Table 2
Level of Safety Items Importance toward Contractor

No	Items to Safety and Health, Construction Industry Standard	N	Mean	Rank
1	Safety and Health Plan	113	4.47	8
2	OSH Personnel	113	4.34	12
3	Safety and Health Committee	113	4.42	10
4	Safety and Health Training	113	4.56	5
5	Hazard Identification Risk Assessment and Risk Control (HIRARC)	113	4.47	7
6	Safety and Health Performance Report	113	4.42	9
7	Safety and Health Protective Equipment	113	4.58	2
8	Health and Welfare Provision	113	4.42	11
9	Safe Working Area	113	4.60	1
10	Traffic Management	113	4.56	6
11	Access and Egress	113	4.58	3
12	Plant and Machineries	113	4.57	4
TOTAL			**4.49**	

Based on the table above, the safe working area ranks first for this item, with a mean value of 4.60, the highest mean of all the other rankings. Safety and health protective equipment ranks as the second-most critical item for construction workers, with a mean value of 4.58. Access and egress are placed third in terms of mean value, with a 4.58 average. Before taking ownership of the site, the plant and machinery contractors must provide are placed fourth in the table above with a mean value of 4.57. The provision of safety and health training for employees by contractors is also crucial. Safety and health training receives a rank of 5 with a mean value of 4.56.

According to the Construction Industry Standard, the following five components are crucial for safety and health: traffic management, the Hazard Identification, Risk Assessment, and Risk Control (HIRARC) plan, the safety and health performance report, the safety and health committee, and finally, the safety and health plan. These 5 elements have a mean value of 4.56, 4.47, and 4.42. Safety and Health Plan and Hazard Risk Assessment and Risk Control (HIRARAC) had mean values of 4.47. The Safety and Health Performance Report and Safety and Health Committee likewise received the same mean value, 4.42, as the other two.

The remaining components are Health and Welfare Provision, Temporary Works by Designer, Special Working Conditions, and, finally, OSH Personnel, ranked 11, 12, and 14 in the table and have scores of 4.42, 4.35, and 4.34, respectively. The mean value for both temporary works by the designer and health and welfare provision is 4.42. The overall mean for this section is 4.48, which is important to have all these items already stated in the Construction Industry Standard.

Even while a few items, such as the Safety and Health Performance Report, Safety and Health Committee, Health and Welfare Provision, and Temporary Works by Designer, have the same mean value, there are still several critical elements that contractors must supply.

All these items have their own function, use and purpose. Safe working areas get the first place. Safe working areas protect workers from injury and illness and can lower injury or illness costs, reduce absenteeism and turnover, increase productivity and quality, and raise employee morale (Chowdhury, 2018). Consequently, the result above shows that most respondents are aware of the importance of safety and health items by referring to the Construction Industry Standard (CIS 27:2019). All those items stated are strongly important and get the average mean from 4.21 to 5.00, and it is compulsory to provide it on construction sites and workers.

Conclusion

This study aims to determine the level of safety item's importance toward contractors. Based on the analysis level of safety items' importance toward contractors, all respondents received an average mean score of 4.49, indicating that they are all very important. Most respondents knew the necessity of the safety precautions outlined in the Construction Industry Standard (CIS27:2019) published by the Construction Industry Development Board (CIDB). The contractor must offer a secure workspace where employees may work conveniently and pleasantly. The results demonstrate that contractors adopt seriously the standards outlined in CIS 27:2019 to ensure that the number of accidents and fatalities on construction sites can be decreased in the next years.

Acknowledgement

The authors thank Universiti Teknologi MARA, Perak Branch for the support and to all respondents and expert panels involved in this research, particularly for Grade 7 Contractors in Klang Valley.

Corresponding Author

Syed Abdul Haris Syed Mustapa
Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA, Perak Branch, 32610, Seri Iskandar, Perak, Malaysia
Email: syeda488@uitm.edu.my.

References

Abas, N. H., Yusuf, N., Suhaini, N. A., Kariya, N., Mohammad, H., & Hasmori, M. F. (2020). Factors Affecting Safety Performance of Construction Projects: A Literature Review. *IOP Conference Series: Materials Science and Engineering, 713*(1). https://doi.org/10.1088/1757-899X/713/1/012036

Abba, N., Rahim, A., Hamid, A., & Hatem, Z. M. (2019). Provision and Awareness of Welfare Facilities on Construction Sites. The 4th Proceeding of Civil Engineering, December, 133–140. https://doi.org/10.13140/RG.2.2.18295.57766

Ahn, C., Lee, S., Pena-Mora, F., & Abourizk, S. (2010). Toward Environmentally Sustainable Construction Processes: The US And Canada's Perspective on Energy Consumption and GHG/CAP Emissions. *Sustainability, 2*(1): 354–370.

Almahmoud, T., Elkonaisi, I., Grivna, M., & Abu-Zidan, F. M. (2020). Personal Protective Eyewear Usage Among Industrial Workers in Small-Scale Enterprises. *Injury*

Epidemiology, 7(1), 1–7. https://doi.org/10.1186/s40621-020-00280-z

Ammad, S., Alaloul, S. W., Saad, S., Qureshi, A. H., Sheikh, N., Ali, M., & Altaf, M. (2020). Personal Protective Equipment in Construction, Accidents Involved in Construction Infrastructure Projects. *Solid State Technology, 63(*6), 20–21. www.solidstatetechnology.us

Ayob, A., Shaari, A. A., Zaki, M. F. M., & Munaaim, M. A. C. (2018). Fatal Occupational Injuries in The Malaysian Construction Sector-Causes and Accidental Agents. *IOP Conference Series: Earth and Environmental Science, 140*(1). https://doi.org/10.1088/1755-1315/140/1/012095

Cornerstone Staffing Solutions. (2020). 3 Reasons Why Safety Training is So Important. Retrieved from https://www.cornerstonestaffing.com/ 2020/01/27/3-reasons-why-safety-training-is-so-important/

Department of Occupational Safety and Health. (2019). Welfare Facilities for Construction Sites. Retrieved from https://www.dosh.gov. my/index.php/construction-safety-v/welfare-facilities on 2023, 5 May.

Designing Buildings. (2022). Standard in the Construction Industry. Retrieved from https://www.designingbuildings.co.uk/wiki/ Standards_in_the_construction_industry

Fuertes, A., Casals, M., Gangolells, M., Forcada, N., Macarulla, M., & Roca, X. (2013). An Environmental Impact Causal Model for Improving the Environmental Performance of Construction Processes. *Journal of Cleaner Production.*

Gangolells, M., Casals, M., Gasso, S., Forcada, N., Roca, X., & Fuertes, A. (2011). Assessing Concerns of Interested Parties When Predicting The Significance Of Environmental Impacts Related To The Construction Process Of Residential Buildings. Building and Environment, 46(5): 1023–1037.

International Labour Organization. (2019). Safety and Health in Construction. Retrieved from https://www.ilo.org/safework/sectors-and-occupations/construction/lang--en/index.htm

Katunge, G., English, J., Teacher, L., Girls, M., School, H., Wahu, R., & Dean, M. (2016). Maintaining Health and Safety at Workplace: Employee and Employer's Role in Ensuring a Safe Working Environment. *Journal of Education and Practice, 7(*29), 1–7.

Mughal, B. (2021), Difference Between Designated Person & Authorised Person. Retrieved from https://www.hseblog.com/difference-between-designated-person-authorisedperson/#:~:text=The%20 Construction%20Standard%2C%2029%20CFR,locations%20at%20the%20job%20site.

Niemisto, M. (2016). Game Companies and Intellectual Property Rights. Retrieved from https://fondia.com/en/en/insights/articles/who-is-responsible-for-the-occupational-safety-of-a-construction-site

Safeopedia. (2018). What Does Construction Site Safety Supervisor (CSSS) Mean? Retrieved from https://www.safeopedia.com/definition/1449/ construction-site-safety-supervisor-csss

Skilled Solution Sdn Bhd. (2020). Safety And Health Committee. Retrieved from https://www.linkedin.com/pulse/safety-health-committee-skill-solutions-sdn-bhd

United State Department of Labor.(n.d). Occupational Safety and Health Administration. Retrived from https://www.osha.gov/etools/logging/ site-safety-health-plan#:~:text= A%20site%20Safety%20and%20Health%20Plan%20describes%20the%20potential%20 hazards ,injuries%20is%20implementing%20the%20plan.

Vitharana, V. H. P., De Silva, G. H. M. J. S., & De Silva, S. (2015). Health Hazards, Risk and Safety Practices in Construction Sites – A Review Study. Engineer: *Journal of the Institution of*

Engineers. 48(3), 35. https://doi.org/10.4038/engineer.v48i3.6840

Zaini, A. (2009). Contractor Strategies Approach to Risk Assessment at Pre-Construction Planning stage in Malaysia. Master Dissertation, UITM.