

CONSTRUCTION SAFETY PRACTICES IN BANGLADESH: AN OVERVIEW

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ABSTRACT

This paper aimed to assess the state of safety management practices at building sites in Bangladesh, with an emphasis on Dhaka, the nation's capital. An effort was made to identify the main factors that lead to accidents, investigate risky activities, and track down elements influencing construction site safety. The study involves the collection and analysis of data from various sources and field observations. Construction fatality data from OSHE (Bangladesh Occupational Safety, Health, and Environment Foundation) and Safety & Rights Society revealed that the most common causes of fatalities in construction. Fall from a height, or scaffolding, or from a ladder, fall after tripping on equipment or power cords falling from heights, and electrocution were the two prime reasons for fatalities, together accounting for 86.2% of the total fatality count. But taking some basic safety measures could have eliminated these casualties. A comprehensive field study was carried out to investigate and draw conclusions about the problems with welfare facilities, safety gear, and other elements influencing building safety, as well as their respective significance. To do this, industry insiders, i.e., the employees' bosses' personals, were questioned, and a later mathematical analysis based on their answers was carried out using rigorous statistical tools. The chi-square analysis technique was used for the analysis. The Chi-square was used to determine whether there are any significant variations in the respondents' answers. The result of the Chi-square test was 74.67. This proved that both parties (i.e., workers and employers) agree that the safety and welfare facilities are not provided up to the standard. Factors such as budget constraints, time pressures, and a lack of skilled safety personnel often hinder the effective implementation of safety practices. Furthermore, the absence of a strong safety culture and a comprehensive safety management system poses significant challenges to ensuring the overall safety of these projects.

Keywords: Construction Safety, Workplace accidents, Building site hazards, chi-square analysis, fatalities, Bangladesh.

1. INTRODUCTION

Bangladesh is currently under development. The construction sector of Bangladesh currently has been experiencing significant growth in the past few years. The construction sector bears a major portion of Bangladesh's economy. The country's population is constantly growing, and the need for housing and other infrastructure will increase in the coming years. However, the construction industry has the highest number of deaths in Bangladesh compared to other industries. In terms of mortality rate, it is only second after the textile sector. Numerous studies show that a significant percentage of construction accidents can be eliminated, reduced, or avoided if basic safety measures are implemented on-site and employees are educated and aware of common safety concerns on-site. The main objective of this study is to indicate the current safety climate of civil engineering construction sites and to suggest ways for a better safety climate. Also, this is a Call for Change to Improve the Construction Safety scenario of Bangladesh.

2. THE CONCEPT OF SAFETY CULTURE

Safety culture is a concept that is becoming popular within this sector as a useful concept to reduce fatalities, injuries, and incidents. It highlights the importance of a comprehensive approach to implement a safety culture, involves steps such as developing a safety policy, communicating with stakeholders, identifying hazards, conducting risk assessments, developing safe work procedures, providing training and resources, promoting a safety culture, and monitoring and evaluating safety performance. The construction management process is also outlined, including project planning, resource management, budgeting, risk management, quality control, and communication. The socio-economic impact of workplace safety incidents is highlighted, especially in developing countries like Bangladesh where factors like engineering controls and management systems are often overlooked. The overall goal is to create a safe work environment, prevent accidents, and ensure projects are completed efficiently and within budget.

3. BANGLADESH'S CIVIL ENGINEERING CONSTRUCTION SECTOR

In Bangladesh's economy, the civil engineering building sector is significant. With the country's rapid development and rapid population growth, there is an urgent need for shelter and living facilities to support residents. Therefore, the construction industry has grown rapidly in recent years. With 169.4 million people, Bangladesh is the world's 8th most populous country. The capital Dhaka, with a population of over 20 million, is the 6th largest city in the world and 6th among the most densely populated cities in the world (Wikipedia 2022). Statistics show that Bangladesh will need to construct urban housing, which is estimated to be around 6 million units, with this number expected to rise to 10.5 million units by 2030. This demand is driven by the fact that approximately 67 million people currently live in urban areas in Bangladesh, and it is estimated that half the country's population could be living in major cities by 2030.

4. SAFETY MANAGEMENT PRACTICES IN DHAKA CITY

Dhaka city is the capital and largest city of Bangladesh. It is a densely populated city with over 21 million people and numerous industrial, business, and commercial activities. With such a large population and a high concentration of economic activity, safety management practices are crucial to ensure the well-being of Dhaka city residents, workers, and visitors. Some of the safety management practices implemented in Dhaka city include Building codes and regulations, fire safety measures, emergency response, hazardous materials management, occupational health and safety, Public Awareness.

5. LAWS AND ACTS ABOUT SAFETY IN CONSTRUCTION SECTORS

A safe and secure workplace is the key to achieving the goals of sustainable development in any country. Construction is a very important sector directly linked with national development activities. But it is a hazardous industry with a notorious reputation for being dirty, difficult, and dangerous. Improvement of occupational safety and health at the worksites of the construction sector has a positive impact on working conditions, productivity, and economic and social development of the country. A good working environment reduces the risks of heavy physically demanding work, leads to fewer accidents at work, fewer sick days, and thus shorter times and lower costs for the total construction. The right to safe and healthy workplaces in the construction sector of Bangladesh should be recognized as a fundamental human right. At the national level, the government enacted the following Act/Code to ensure the health and safety of workers in the construction sector and to safeguard workers' rights.

5.1 Bangladesh Labor Act 2006 (BLA 2006):

5.1.1 Application and Duty Holder

The BLA 2006, which replaced the Factories Act 1965 and 24 other pieces of labour legislation (OSHE-2009), applies not only to factories but to all establishments an establishment has a wide definition and includes Contractors or sub-contractor establishments for construction, reconstruction, repair, alteration or demolition of any building, road, tunnel, drain canal or bridge. In addition, therefore, the BLA 2006 applies to construction sites.

5.1.2 Health and Safety Duties

Chapters 5-8 of the BLA 2006 set out obligations relating to the health, safety, and welfare of workers. These provisions are almost unchanged from the obligations set out in the repealed Factories Act 1965, and as a result remain primarily relevant to risks in factories, rather than construction sites. However, there are a few provisions in the BLA 2006 that are relevant to construction sites, and these are set out below:

Section 57 & 58 Sufficient and suitable lighting and Sufficient supply of wholesome pure drinking water, also Section 59 Provision of clean and sanitary latrines.

Section 63 Fencing of machinery in motion or use Section 68 & 69 Maintenance of cranes and hoists.

Section 72 Secure covering and fencing of floor openings.

Section 74 Carrying of weights likely to cause injury prohibited. Section 89 Availability of first aid boxes 'etc.

Section 90 Presence of safety record book.

Section 80 Notice by the employer to the inspector of death or bodily injury Section.

91 Facilities for washing and bathing.

Apart from the legal authorities, there are also nongovernment agencies who are working for the improvement of the workplace safety atmosphere, especially in the construction sector. They are the Bangladesh Occupational Health, Safety and Environment Foundation (OSHE), Bangladesh Institute of Labour Studies (BILS), and Bangladesh Legal Aid and Services Trust (BLAST).

6. SECTOR-WISE DISTRIBUTION OF FATALITIES IN DIFFERENT WORKPLACES IN BANGLADESH (ACCORDING TO OSHE)

The lack of proper implementation of safety measures has resulted in poor safety situations in construction sites. The data analysis in this study has revealed that a tentative 139 deaths occurred in the country during 2021. This means that on average, 12 people are dying each month in this country. The number of deaths is affected by COVID-19 otherwise the number of deaths would have been more alarming. Table 1 shows that the fatality figures in the construction sector are the second highest for all workplace accidents occurring in Bangladesh. This is because the safety issues in Bangladesh are grossly neglected especially in the construction sector. This can be seen from the following table 1.

Table 1: Sector-Wise Distribution of Fatalities in Different Workplaces in Bangladesh (Oshe).

Sector	Total Death	Percentage
Agriculture	52	9.67%
Transport	150	27.88%
Construction	139	25.84%
Manufacturing	111	20.63%
Services	86	15.98%
Total	538	100%

7. INJURY AND DEATH STATISTICS OF PREVIOUS 10 YEARS IN THE CONSTRUCTION SECTOR IN BANGLADESH

OSHE (Bangladesh Occupational Safety, Health, and Environment Foundation) is the national collaborating centre of the International Safety and Health Information Centre of the International Labor Organization (CIS-ILO). As a specialized Labor Foundation, it periodically reveals statistics on workplace accidents and workers' rights violations in the form of a monthly survey report citing all the newspaper clippings related to workplace accidents after monitoring fifteen national daily newspapers of the country. SHE provided the following data by recording the events that are published in the various national daily newspapers. But OSHE says this is not the actual data as news of most of the accidents do not reach the journalists. Number of fatalities Type of industry 14 According to the OSHE survey, a total of 1150 people died and 1418 injured in Bangladesh since 2005 while involved in some type of construction activity. Table 2 gives a year-wise estimate of the statistics which was provided by OSHE.

Table 2: Injury And Death Statistics of Previous 10 Years in The Construction Sector in Bangladesh

Year	Death	Injured	Total
2013	160	175	335
2014	165	67	232
2015	172	89	261
2016	44	147	191
2017	179	0	179
2018	163	99	262
2019	156	40	196
2020	43	10	53
2021	123	23	146
2022	105	29	134
Total	1310	679	1989

7.1 Distribution of Fatalities Based Upon Nature of Accident

Distribution of fatalities based upon the nature of the accident by analyzing the data collected from the Police authority and OSHE a range of different types of accidents were found resulting in fatal injuries. But only a very few types account for most of the fatalities. It is evident from the casualty data that these types of accidents occur regularly during building construction. If precautions could be taken to improve the relevant safety measures against those explicitly particular nature of accidents described in the following sections, then almost 99% of fatalities can easily be avoided.

The major causes of construction accidents are as follows:

- a) Fall from heights.
- b) Electrocutation
- c) Suffocation
- d) Wall collapse
- e) Fall of material

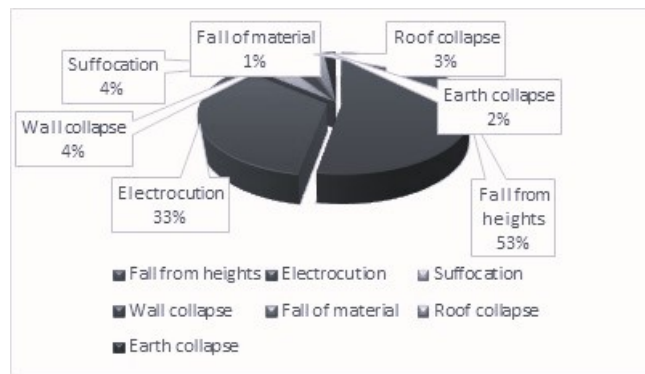
- f) Formwork/shuttering failure
- g) Roof collapse
- h) Earth collapse

It can be observed that falling from heights and electrocution are the main reasons for fatalities at the construction sites. Together they contribute about 86.2% of all the fatalities. Falling from heights led to the fatality table with about 52.8%, closely followed by electrocution which accounts for about 33.4% of the fatalities. The contribution of other causes of accidents ranges between 1 to 8% only. So, it is obvious that particularly focusing on the two major causes of fatalities and taking strict precautionary measures to prevent them, about 86.2% of the could be saved.

Table 3: Distribution of Fatalities Based Upon Nature of Accident

Cause of accident	2017	2018	2019	2020 (first six months)	2021	Total (%)
Fall from heights	270	166	47	33	31	547(52.8%)
Electrocution	115	29	133	69	still ongoing	346(33.4%)
Suffocation	13	10	24	0	still ongoing	47(4.5%)
Wall collapse	11	2	6	7	12	38(3.6%)
Fall of material	0	2	6	1	2	11(1.1%)
Roof collapse	10	3	7	7	1	28(2.7%)
Earth collapse	0	8	3	3	5	19(1.83%)
Total	419	220	226	120	51	1036

Figure: Distribution of Fatalities Based Upon Nature of Accident



8. FIELD SURVEY OF WELFARE FACILITIES OF WORKERS AND EMPLOYERS

There is a general assertion that employers do not provide the following welfare-related facilities at construction sites for workers. Please indicate your reaction to each statement by ticking the appropriate cell.

The above question was asked to both workers (group-1) and employers (group-2) in the context of the non-provision of some key welfare facilities to the workers and for this reason they were to respond to this assertion by ticking an appropriate cell to indicate whether they agree or disagree to

that assertion. The table shows the average rating of the responses from the workers' side to the above question.

Table 4: Responses to use of welfare facilities (workers)

Welfare facility	Strongly agree use (%)	Agree to use (%)	Neutral to use (%)	Disagree to use (%)	Strongly to se disagree (%)	Total (%)
Safe drinking water	4(6.67)	14(23.33)	36(60)	4(6.67)	2(3.33)	60(100)
Means of cooking food	0(0)	0(0)	0(0)	0(0)	0(0)	60(100)
Suitable accommodation to rest	6(10)	42(70)	8(13.33)	4(6.67)	0(0)	60(100)
Sanitary facilities (toilets, showers, changing rooms)	4(6.67)	14(23.33)	34(56.67)	6(10)	2(3.33)	60(100)
Accommodation to change and store clothing	6(10)	46(76.67)	6(10)	2(3.33)	0(0)	60(100)
First-aid equipment	8(13.33)	52(86.67)	0(0)	0(0)	0(0)	60(100)
Average ratings	4.66(7.78)	28(46.66)	14(23.33)	2.66(4.45)	0.6(1.11)	60(100)
	32.66(54.44)		14(23.33)	2.26(5.56)		60(100)

From analysis of the results in Table 4, the following picture emerges:

- The workers admitted that among the issues, three welfare facilities that are lacking on site for workers are first-aid equipment, accommodation to change and store clothing, and suitable accommodation to rest.
- With a response rate of 100%, workers demonstrate that first-aid items as welfare items are lacking on construction sites for workers.

They also agreed to the items - accommodation to change and store clothing and suitable accommodation to rest with a percentage of about 77%.

- They only disagree on the case of sanitary facilities (toilets, showers, changing rooms) with 13.33%.
- Mixed reaction was given in the case of safe drinking water with 40% agreeing with 60% being neutral.

The same question was posed to the employers and the results obtained are presented in Table 5.

Table 5: Responses to use of welfare facilities (employers)

Welfare facility	Strongly agree use (%)	Agree to use (%)	Neutral to use (%)	Disagree to use (%)	Strongly to use disagree (%)	Total (%)
Safe drinking water	4(20)	2(10)	10(50)	4(20)	0(0)	20(100)
Means of cooking food	0(0)	0(0)	0(0)	0(0)	0(0)	20(100)
Suitable accommodation to rest	2(10)	10(50)	6(30)	2(10)	0(0)	20(100)
Sanitary facilities (toilets, showers, changing rooms)	2(10)	4(20)	8(40)	6(30)	2(10)	20(100)
Accommodation to change and store clothing	4(20)	4(20)	12(60)	2(10)	0(0)	20(100)
First-aid equipment	4(20)	16(80)	0(0)	0(0)	0(0)	20(100)
Average ratings	3.66(13.33)	6(30)	36(30)	2.32(11.6)	0(0)	20(100)
	9.66(43.33)		36(30)	2.32(11.6)		20(100)

From analysis of the results in Table 5, the following picture emerges:

- a) The employers admitted that among other issues, two welfare facilities that were lacking on-site for workers are first-aid equipment and accommodation to change and store clothing.
- b) With a response rate of 100%, employers demonstrate that first-aid items as welfare items are lacking on construction sites for workers.
- c) But they confirm that safe drinking water, means of heating food, and sanitary facilities (toilets, showers, changing rooms) are well provided with responses of about 80%, 0%, 52%, and 60%.
- d) Mixed reaction was given in the case of suitable accommodation to rest with 20% agreeing and 10% disagreeing with 60% being neutral.

By comparing responses from both parties, we can see both agreement and differences exist between the two focus groups. They agreed on the fact there is a lack of first-aid equipment and accommodation to change and store clothing. They also agreed that there is a presence of sanitary facilities in the construction sites. However, there were some disputes in the response on factors like safe drinking water, means of cooking food, and water for washing and cooking. But the percentage of response between the two parties was close.

9. CHI-SQUARE (X²) TEST ON WELFARE FACILITIES

The Chi-square test of the contingency table is used to determine whether differences exist in responses between two or more populations (Keller and Warrack 2004). In this study, the Chi-square test was used where employers and workers were identified as the population. The result of the Chi-square test is achieved by stating the hypothesis, computing the observed and expected values from the responses, and computing the X² statistic and p-value. The X² statistic measures how far away are the observed values from the expected ones, and it is the sum of each of the contributions from each variable. The p-value is computed by looking under the Chi-square table with the degrees of freedom (see Appendix - B). From this, Table 6 shows the results of computed observed values and expected values on welfare facilities from both workers (group-1) and employers (group-2) on welfare issues.

Table 6: Chi-square (X²) test on welfare facilities

Welfare facility	Group-1 (%) (Observed)	Group-2 (%) Observed	Total	Group-1 (%) expected	Group-2 (%) expected	(Group-1) X2	(Group-2) X2
Safe drinking water	30	30	60	60	50	15	8
Means of cooking	0	0	0	50	40	50	40
Suitable accommodation to Rest	80	60	140	90	80	1.11	5
Sanitary facilities (toilets, showers, changing rooms)	30	30	60	50	60	8	15
Accommodation to change and store Clothing	86.67	40	126.67	95	60	0.73	6.67
First-aid equipment	100	100	200	100	100	0	0
SUM	326.67	260	586.67				
X2 (calculated)							74.67

As indicated, the result of the Chi-square test is achieved by:

- a) Stating the hypothesis
- b) Computing the observed and expected values from the responses.
- c) Computing X² statistics and
- d) p-value

Hypothesis:

H0: responses from workers and employers on welfare facilities issues are independent.

H1: H0 is not true (two-tail)

Where H0 denotes the null hypothesis and H1 denotes the alternative hypothesis Significant level (α) = 0.05

We reject H0, if X^2 calculated $>$ X^2

X^2 Statistic:

After stating the hypothesis, the next step is to calculate the X^2 statistic and it is computed from the relation,

$$(X^2) = \frac{\sum_{i=1}^n [\text{Observed proportions} - \text{Expected proportions}]^2}{[\text{Expected proportions}]}$$

The observed and expected proportions values are obtained from the responses of the two parties. After that, X^2 for all variables from welfare facilities in Table 5.9 is calculated from the X^2 equation above.

Degrees of freedom:

The degrees of freedom are calculated from the equation (number of rows - 1) \times (number of columns - 1) and Table 5.9, the number of rows is 6, and the number of columns is 7. Thus, the degrees of freedom is = (6-1) \times (7-1) = 5 \times 6 = 30

P-Value:

The last part is to compute the P-value. This is done by looking under the Chi-square table (see Appendix - B). The degrees of freedom which are now 6 read from the Chi-square table under significant level (α) = 0.05, this then gives $X^2 = 43.77$

Now X^2 calculated = 74.67

X^2 Table $<$ X^2 calculated.

So, the null hypothesis can be rejected, and we can accept the alternate hypothesis. This means that the responses are dependent, and it can be inferred that there is enough evidence of a relationship between responses from workers and employers on the issue of the use of welfare facilities. Or in other words, the variation, or the difference in the responses of the two groups is statistically insignificant. Therefore, the Chi-square test proves the fact that welfare facilities are not well provided in the construction sites. This finding is important as welfare facilities like first-aid equipment are not available on the construction sites, and this is certified by the response of both parties. This does not help the condition of high fatality rates present in the construction industry. If the availability of first aid kits can be ensured in the construction sites, then the fatality rate could be controlled to some extent. Unavailability of other welfare facilities can create issues in the construction industry like raising conflicts between workers and employers' personnel.

10. SAFETY EQUIPMENT

There is a general assertion that employers do not provide the following safety-related items or equipment at construction sites for workers. Please indicate your reaction to each statement by ticking the appropriate cell The above question is related to the responses of the workers about the safety equipment which are important for the safety of the workers in the construction sites. They were asked to indicate.

Table 7: Responses to the use of safety equipment (workers)

Welfare facility	Strongly agree use (%)	Agree to use (%)	Neutral to use (%)	Disagree to use (%)	Strongly to se disagree (%)	Total (%)
Safety signs	34(56.66)	14(23.33)	8(13.3)	4(6.66)	0(0)	60(100)
Hard hats or helmets	40(66.67)	12(20)	8(13.3)	0(0)	0(0)	60(100)
Safety glasses goggles and face shields	42(70)	8(13.3)	6(10)	2(3.33)	2(3.33)	60(100)
Hoisting equipment	30(50)	12(20)	8(13.3)	6(10)	4(6.66)	60(100)
Safety belt	50(83.33)	6(10)	4(6.66)	0(0)	0(0)	60(100)
Safety boots	46(76.66)	8(13.3)	6(10)	0(0)	0(0)	60(100)
Rain gear	26(43.33)	16(26.66)	14(23.33)	4(6.66)	0(0)	60(100)
Knee pads	20(33.33)	10(16.6)	10(16.6)	14(23.33)	6(10)	60(100)
Flashlights	40(66.67)	6(10)	14(23.33)	0(0)	0(0)	60(100)
Hearing protection	32(53.33)	10(16.6)	8(13.3)	8(13.3)	2(3.33)	60(100)
Safety nets	38(63.33)	16(26.67)	4(6.66)	2(3.33)	0(0)	60(100)
Ladder scaffold platforms	30(50)	10(16.6)	14(23.33)	6(10)	0(0)	60(100)
Average ratings	35.66 (59.44)	10.16 (17.47)	16.16 (15.82)	7.16 (5.54)	1.16 (1.94)	60(100)
	45.82 (76.91)		16.16(15.82)	8.32(7.48)		60(100)

whether they agree or disagree with that assertion. Table 7 below shows the average rate of responses from them to the above question.

Following the results in Table 7, the following picture emerges:

- a) From Table 7, the average ratings indicate that almost 77% of workers agreed to the assertion while only 23% of them disagreed. b) Among other issues, the workers asserted that hearing protection, rain gear, and kneepads are not provided at all.
- c) The percentage of disagreement was able to reach double-figure only in the case of safety signs and hard hats or helmets.

11. CONCLUSIONS

In conclusion, this study aimed to examine construction safety practices in Bangladesh. The findings of this study shed light on the current state of construction safety in the country and identified areas that require improvement. Through an extensive review of literature, analysis of data, and interviews with relevant stakeholders, several key observations and conclusions can be drawn.

- After reviewing the literature related to our thesis, we have observed that in Bangladesh there are laws for the safety and welfare of workers made by some private organizations and BNBC. However, there is no official law and there is no specialized authority to implement it at the field level. The government should take quick action in this regard. Also, our study indicates that a significant number of accidents occur because of lack of enforcement of safety laws in the field.
- Firstly, it is evident that construction safety in Bangladesh is a critical concern mainly Building construction that needs urgent attention. The rapid growth of the construction industry and the increasing number of megaprojects have led to significant challenges in ensuring the safety and well-being of workers. The lack of adequate safety regulations, enforcement mechanisms, and awareness among construction companies and workers contributes to the high rate of accidents and injuries in the sector.
- According to our survey observations, the situation of comparative safety implementation in the new areas around Dhaka which are undergoing rapid urbanization is deplorable. We conducted a survey in Aftabnagar under Dhaka North City Corporation and considering the results, we want to say that the government should take quick action regarding safety implementation.

12. RECOMMENDATIONS

Recommendation for Construction Safety Improvements

Based on the findings and conclusions of this study, the following recommendations are proposed to improve construction safety practices in Bangladesh:

- The government should revise and update existing safety regulations, ensuring they are comprehensive, enforceable, and aligned with international standards. This should include provisions for regular inspections, penalties for non-compliance, and clear guidelines for safety management.
- Construction companies should prioritize safety training for all workers, supervisors, and management personnel. Regular awareness campaigns, workshops, and training programs should be conducted to educate workers about potential hazards, safe work practices, and the proper use of personal protective equipment (PPE).
- Encourage research and innovation in construction safety practices in Bangladesh. This can involve supporting academic institutions, research organizations, and industry experts in conducting studies, developing new safety technologies, and identifying emerging safety trends to address future challenges.
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By implementing these recommendations, it is anticipated that construction safety practices in Bangladesh will be significantly improved. All stakeholders need to recognize the importance of construction safety and work together to create a safer working environment for the workers and reduce the number of accidents and injuries in the industry.

Recommendations for Future Research in Construction Safety

More thorough research on this topic is needed to get more comprehensive results and develop timely solutions. Future research on this topic may pursue the following:

- a) This survey was conducted in Dhaka city in around 15 construction sites. The more areas can be surveyed, and the more people should be involved in the questionnaire survey the more appropriate the result will be obtained. For more appropriate results, the sample size should be increased.
- b) More welfare facilities, safety equipment, and various factors affecting safety can be added for the survey and subsequent analysis. The more parameters will be added, the more accurate and extensive results can be obtained.
- c) More accurate statistical analysis can be done, and other statistical tools can be tried for analysis to compare the results.
- d) The data collection process will be easier if construction safety-related organizations and authorities are more helpful.

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REFERENCES

- Bangladesh Occupational Safety, Health and Environment Foundation (OSHE). (2021).
Bangladesh Bureau of Statistics (BBS). (2021). Report on Labor Force Survey, Dhaka.
Bangladesh Legal Aid and Services Trust (BLAST). (2008). “BLAST and another vs. Bangladesh and others [„Building Construction Code and Worker Safety“ Case].”
Danso, F.O. (2010). “Occupational health and safety issues involving casual workers on building construction sites in Ghana, a Kumasi study.” *M.S. Thesis, Kwame Nkrumah University of Science and Technology, Ghana.*
Adnan, E., Sherif, M., Ziad, A. M., and Peter, E.M. (2007). “Factors affecting labor productivity in building projects in the Gaza Strip.” *J.Civ.Eng.Manage.*
Faruque, A. A. (2009). “Current Status and Evolution of Industrial Relations System in Bangladesh.” International Labor Organization.
Fowler, J., and Floyd, J. (1995). *Improving Survey Questions: Design and Evaluation, Sage Publications, Thousand Oaks, CA.*
Housing and Building Research Institute (HBRI). (2006). *Bangladesh National Building Code 2010, Dhaka.*
International Labor Organization (ILO). (2009). “Construction: a hazardous work.”