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# Bangladesh Management Staffs' view on indoor condition, Health and Safety of Factory

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**Abstract.** Bangladesh is a developing country. In Bangladesh, there are lots of factories for different readymade garments products. Products are used in Bangladesh and also export to many different countries. A huge number of populations are working in these industries as workers. In Bangladesh, for nearly a decade the garment industry contributing to the country's economic growth reached an impressive 6 percent growth rate. Bangladesh is now a day one of the world's leading clothing exporters, and the garment industry employs 3.6 million workers out of a total population of over 150 million. Most of the nation's 4,500 factories are concentrated around the capital city named Dhaka and attract thousands of rural residents in search of jobs and a better life for their families. These factories are not well designed in terms of workers' health and safety. A field study was held about the health and safety of workers in the factory in Bangladesh. For the study, a questionnaire survey was held among the management staff of factories. The management staff responded and get information about factories of the current condition. This Study will help to find out the current indoor condition of the factory building in terms of health and safety of workers and help to introduce a standard towards factory owners which can introduce in their factory to develop the indoor condition.

**Keywords:** Bangladesh, Factory , Health and Safety, In House, Safety Measure

## 1. Introduction

In Bangladesh, nearly a decade the garment industries are contributing to the economic growth of the country, it reached an impressive 6 (%) percent economic growth rate. Currently, Bangladesh is one of the world's leading clothing exporters, and the garment industry employs more than 3.6 million workers out of a total population of over 150 million. A huge number which is 4,500 factories are concentrated around Dhaka, the capital city and opened job opportunity for thousands of rural residents and a better life for them and their families. [1,2].

Bangladesh is considered as undergo develop country. Bangladesh is on process of development for industrialization. Industry and factory, vastly they are growing in whole country. There are lots of factories of different products around all the districts in Bangladesh. Garments industries, which are one of the uppermost items of exported goods. A big number of workers are working in these factories around the whole country. Garments factories are not designed properly in a sense of safety and healthy environmental conditions. The factories are also not located in proper places and also not in a well-planned which is inside the city areas. The factories are developed and converted into factory in the city in a widespread way. For this fact, the safety and healthy environment inside factory buildings are not



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up to standard. Each and every month workers of the factories are having an illness related to environmental issues. This study will find out and help the factory workers to provide a safety measure from fire protection and safety concerns and also help the employers to monitor employee's health and increase their production margins.

Among, all the major problems of factory buildings which are developed in Bangladesh are overheating, fire protection, health factors and natural ventilation. Factory buildings which are located in equatorial regions and it have a warm-humid climatic condition, the factory exposed roof is one of the prime sources of internal heat gain for an indoor environment. Factory buildings also consists other heat sources like human metabolisms, types of machinery, overcrowded workers and not proper ventilation way. The geographical location of Bangladesh, the factory receives the vast sunlight most of the day throughout the year. When the heat transmitted into the indoor through open window and roofs, the hot air increased the indoor temperature of workplace and the heat then remains there and also increased by machinery heat generation.



**Figure 1:** Exterior and interior of after fire broke out at factory buildings at Gazipur. (Source: The new work times)



**Figure 2:** Interior of after fire broke out at factory buildings at Gazipur. (Source: The new work times)



**Figure 3:** Exterior and interior of after fire broke out at factory buildings at Gazipur. (Source: The new work times)

The excessive heat difference occurs in the illness of the workers. From another study it was found that around 87% heat transfer through the roof to the user is by the radiation process. Rest 13% of heat is transferred from outdoor to indoor through conduction and convection [3]. Above all, in factories, other factors are the main reason for the death penalty and in economic loss. Last few years, it was recorded that a few numbers of incidents of fire break out in different factories and which caused the death penalty and permanent disorder. 24 November 2012, a fire broke out in the Tazreen Fashion factory at the Ashulia district on the periphery area of Dhaka, Bangladesh.[4,5,6,7] the confirmed death toll was 117 people in that fire, and around 200 were injured badly.[6] This was the biggest and deadliest fire at garments factory in the history.[8] The fire was originally presumed to be generated by an electrical short circuit. This incident and others related to it have directed to various proposed improvements in workers' rights and safety laws in Bangladesh.[9]. A fire at a garment factory named Hameem group at north of Dhaka, the capital, killed at least 20 people and injured dozens on Tuesday, in the latest blow to the country's largest industry [13]. Between 2006 and 2009, 414 workers died in 213 factory fires. The fire at the Ha-Meem Group factory was not the first one to occur this year either [14].

## 2. Aim and objective of the research

The objective of this study was to evaluate the current condition of the factory in terms of fire and health safety of factory workers. The field study with a questionnaire survey was being conducted to find out the observation of management staff towards factory health and safety measures.

### 3. Methodology

Factory buildings are being introduced to be designed effectively to establish an approach to fire protection and safety for employees. Currently, most of the factory buildings which are used for the production of apparel in the Dhaka city, those are contemporary buildings and transformed into production factory building. These converted factory buildings are not designed by an architect/designer to make sure of its safety angles. The factory machinery layout changed by the owner to increase the production margin without any consult with Architect/designers or even think about the structural capability of the building. These transformed factories are mostly found in comparably new and old residential buildings, which are entirely automated ventilated and no contact with the natural climate as those buildings are not designed as factories in primary designed level. For the extra units of machinery, the electricity consumption capacity of the floor or the factory becomes overload and for this sometimes fire broke out and it causes several death penalties. Some factories are designed by Architect/designers but still until the end, it changed by the user end. It promotes many related side influences which can affect not only the building itself but also the urban micro-climatic atmosphere of the city. For this purpose, now a day, factories are built a little far from the city in suburban surroundings.

In order to find the factory condition in terms of fire and safety in Bangladesh, all the subsequent general strategies were being considered thoroughly to select the factory building for the research field study.

- The factory buildings which was selected were dimensionally proper for emergency exit and free space for maintaining ergonomics.
- Factories were required to select according to their size and worker numbers with the reference of planned or unplanned structure.
- Individual factory building design, types of machinery layout, ergonomics, horizontal plan or vertical, fire exit plan.
- Factory protocol, health and safety issues, welfare will be considered in this study.



**Figure 4:** Physical condition of factory 1 building area in sub-urban area (Source: Internet Google Earth Map)



**Figure 5:** Physical condition of factory 1 building area in sub-urban area (Source: Internet Google Earth Map)

There were two types of responses in every factory building for the questionnaire survey which are management staff and employees. Two sets of questionnaires were provided among two types of respondents. Later all recorded data was being inputted into two different software for analysis.

For analysis of this field study data of questionnaire survey findings, MSExcel software was being used. The questionnaire survey for the factory in terms of fire and safety were input into the software to get the result that response by respondents.

Statistic software SPSS version 17, was used to analyse the collected data from the Likert scale. The modal value was taken as the average value and ranking was used to find out the health-related matters. SPSS is also used to get the choice as a response to management staff and employees.

#### 4. Findings and Discussion

This field survey mainly concentrated on the health and safety of workers at the factory. Management staff and floor supervisors also part of this study. In this part of the field survey, the questionnaire is responded to by management staff. The response was recorded in four categories and those are Yes (Y), No (N), Not Answer (N/A) and Sometimes (ST) observed.

Some factory owner designates medical physician for the employee of the factory which are well designed or converted factory. Workers face health issues or injuries while or illness, then these physicians are serving in factories. In contingency cases to give first aid, some well-planned factories keep medical doctors in-house. From this survey, it is found that some unplanned or converted factories owners don't follow this. Management staff also voted in the response of an in-house psychologist. Sometimes work stress and work pressure with family matter makes the employee disturbed. A psychologist can help the employees and also staff to recover from stress and provide a mental calmness. Small accident seldom occurs in factories with workers. An expert on accident prevention sometimes in-house or sometimes have to rush to the near hospital. Administration Staff response and it shows few factories have an in-house expert who can handle the minor accident with workers.

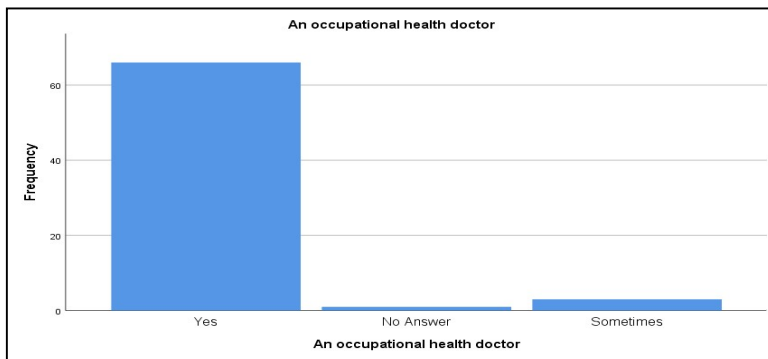
**Table 1:** Tabular format of response of Management Staff

Health & safety	Yes	No	N/A	ST
An occupational health doctor	66		1	3
A psychologist		67		3
Expert dealing about ergonomic design and workplaces	26	17	2	25
A generalist on health and safety	26	2	1	41
An expert on accident prevention	23	17	5	25
Documentation on health and safety	41	16	1	12
Specific budget for health and safety and equipment	29	3	11	27
Regular medical examinations of health of employees	15	21	1	33
Raising awareness about healthy eating	16	16	10	28
Raising awareness on the prevention of addiction	26	13	2	29
Promotion of sports activities out of working hours		24	8	38
Promotion of back exercises, stretching exercise at work	9	17	3	41
Sickness absences routinely analysed	29	16	5	20
A procedure to support employees returning to work	60	5	2	3
Health and safety issues discussed at the top management	25	7	4	34
Team leaders and line managers receive any training	40	9	2	19
Personally, received any training on health and safety	34	19		17
Inspection by the Health and Safety Executive or the local authority	25	5	6	34
In my organization safety is important as quality of the work and getting the work done on time.	35	10	10	15
Workers are involved in decisions affecting their safety	26	30	3	11
New employees at my organization learn quickly that they are expected to follow safety practices/rules.	42	4	2	22
My workplace values (improvements to) safety	37	6		27

Regular medical examinations of the health of employees are an important criterion for the factory to confirm all employees are in good health and can give an effort to increase the production to meet the deadline. In this survey, they answered sometimes it visible in some factories. Administration staff also voted that the factory have enough documentation on health and safety procedures. From the survey also it is found that after sickness absences by the worker there is routinely analysed their health in the factory.

**Table 2:** Tabular format an occupational health doctor available in house

		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	66	94.3	94.3	94.3
	No	1	1.4	1.4	95.7
	Answer				
	Sometimes	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

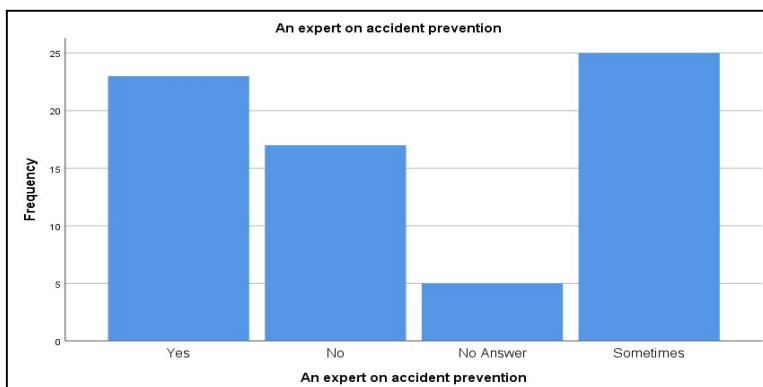


**Figure 6:** Graphical format an occupational health doctor available in house.

From the table 2 of the field survey it is clearly visible that 94.3% of total management staff voted for occupational doctor which shows an occupational doctor is available in house. One of the most important for factory floor is to have an expert on accident prevention in house.

**Table 3:** Tabular format an expert on accident prevention

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	32.9	32.9	32.9
	No	17	24.3	24.3	57.1
	No Answer	5	7.1	7.1	64.3
	Sometimes	25	35.7	35.7	100.0
	Total	70	100.0	100.0	



**Figure 7:** Graphical format an expert on accident prevention

In table 3, 35.7% of management staff voted for sometimes which means the expert sometimes available in-house for a few factories. Whereas, 32.9% of staff voted at Yes for an expert for an accident there always an expert hand in-house. The team leaders and line managers receive any training while he/she working at the factory, in this case, 40 staff out of 70 staff declared that they receive training about health and safety.

**Table 4:** Tabular format team leaders and line managers in your establishment receive any training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	40	57.1	57.1	57.1
	No	9	12.9	12.9	70.0
	No Answer	2	2.9	2.9	72.9
	Sometimes	19	27.1	27.1	100.0
	Total	70	100.0	100.0	

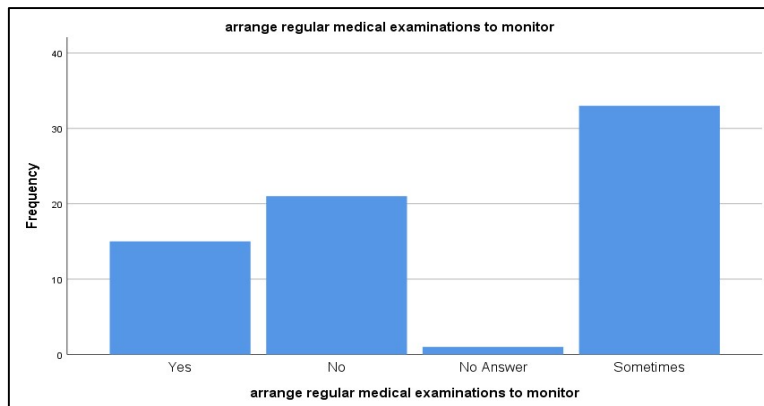


**Figure 8:** Graphical format team leaders and line managers in your establishment receive any training

As a routine investigation by the Health and Safety Executive or the local authority visit the factories as it is stated in fire accord rule and regulation. In the field survey, it is found that management staff voted Y by 40 staffs whereas another 27.1% (19) choose for ST and 12.9% (9) choose N. Among the management staff 57.1% voted that the team leaders and line managers receive training at own establishment about health and safety.

**Table 5:** Tabular format of regular medical examinations to monitor the health of employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	15	21.4	21.4	21.4
	No	21	30.0	30.0	51.4
	No Answer	1	1.4	1.4	52.9
	Sometimes	33	47.1	47.1	100.0
	Total	70	100.0	100.0	

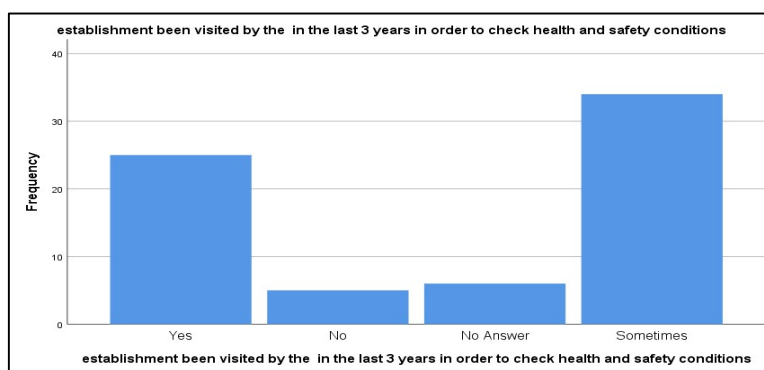


**Figure 9:** Graphical format of regular medical examinations to monitor the health of employees

From table 5, about the regular medical examination to monitor the health condition of employees, the management staff voted sometimes and which is 47.1% of the total staff were interviewed. Only 21.4% of staff voted that they have this monitoring process. 30% of staff also agree that there is no such monitoring system in their factories.

**Table 6:** Tabular format of establishment been visited by the in the last 3 years in order to check health and safety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	35.7	35.7	35.7
	No	5	7.1	7.1	42.9
	No Answer	6	8.6	8.6	51.4
	Sometimes	34	48.6	48.6	100.0
	Total	70	100.0	100.0	



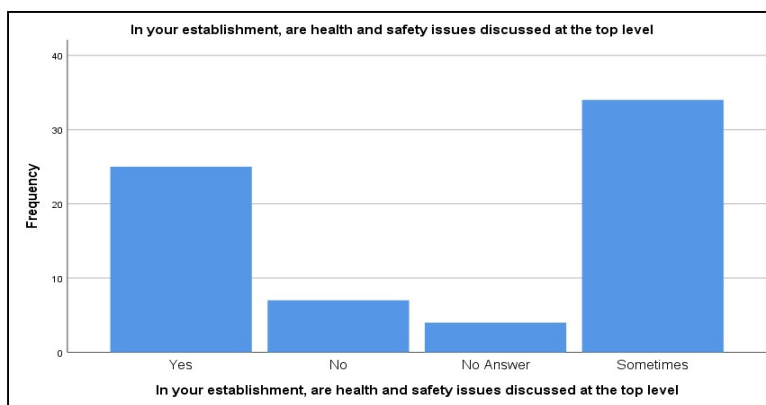
**Figure 10:** Graphical format of establishment been visited by the in the last 3 years in order to check health and safety

By the Fire Accord department must be there a visit to every factory every year. The management staff response to the question that factory visits by the authority to check health and safety conditions during the last 3 years. 48.6% of staff responded as sometimes which shows they do not witness such a visit. 7.1 % staff response as No about this type of visit. But it is also observed by 35.7% of staff who voted at yes.



**Table 7:** Tabular format of health and safety issues discussed at the top level of management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	35.7	35.7	35.7
	No	7	10.0	10.0	45.7
	No Answer	4	5.7	5.7	51.4
	Sometimes	34	48.6	48.6	100.0
	Total	70	100.0	100.0	



**Figure 11:** Graphical format of health and safety issues discussed at the top level of management

From table 7, it is visible that 48.6 % of the total 70 staff voted for sometimes which indicates the issues in factory building are not regularly discussed with the top management team. 35.7% of staff voted and informed that it is discussed with top management. No, and No Answer is voted as 10% and 5.7% which is negligible.

**5. Conclusion**

The questionnaire survey was conducted at planned factories and converted buildings as factories. The management staff gave their response as they experience while they are working in factories. Management staff included those admin staff, floor supervisor, HR and these staff everyday experience all the incidents at the factory and health issues of employees. For the employees’ health examination while they working at a factory there must be an occupational health doctor following the ACCORD rules. From the staff response, it was recorded 94.3% of total staff agreed that an occupational health doctor is available at the factory. Sometimes an accident happens at the factory and that time needs an expert who can take necessary action and also can guide employees to prevent an accident. From the analysis of recorded data, it was found that 35.7% of staff mention this facility not available when it's needed. Generally, there is training for all employees to make the job skill but it is also very important that few staff and employees also take training about manage health and safety issues. From the questionnaire, it was found that 57.1% of staff voted that they have this type of training for a line manager or team leader. On the other hand, 12.9% responded that this type of training doesn’t have in their factory. One of the important factors is the monitoring of employees’ health in factories. But it is also found that few factories also don’t have a regular examination to monitor the health of employees which was recorded from the survey investigation. By analysis, it is found 30.0% voted no and 47.1% voted at sometimes. The Health and safety conditions of a factory must be visited by authority every year but from the field study, it was found that 48.6% voted within 3 years they rarely experienced this

type of inspection. From the field study, it is confirmed that there needs some standard that can follow in every factory to prevent health and safety issues. Currently, the factories are not following the ACCORD rules and guidelines properly. Through this field survey, the findings will guide the factory owners to upgrade the lake in their factories in terms of health and safety issues. From this study, it is also can suggest for future study can be made for fire protection and staff health safety of factories those developed unplanned way.

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