

Assessment of Fire Hazard on the Readymade Garment Industry in Chittagong City, Bangladesh: A geospatial analysis of CEPZ and Baizid Industrial Hub

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Abstract

The Readymade Garments (RMG) industries are the largest contributor for the national export earnings and second largest contributor in gross domestic product (GDP) of Bangladesh. Starting from the late 1970s, RMG sector of the country has dramatically grown up a geometric progression over the few decades which were started as a minor as well as non-traditional sector with a negligible of exporting. Although the country has a glorious history of textile, cloths and clothing's from the ancient period of time. Over the preceding decade, fire and fire hazard is the continual problem in the readymade garments industries of Bangladesh. Considering this as a crucial problem, this paper was carried out a geospatial assessment of fire hazard effects on readymade garment industries in Chittagong Export Processing Zone and Baizid Industrial hub of Chittagong city, Bangladesh. The study was mainly carried out based on primary field survey while secondary sources were also used in comparing and basement of analysis. There were two types of parameters (Hard and Soft Parameters) generally have used to assess the fire hazard risk and vulnerability on readymade garments. Based on 19 soft parameters in the study, a suitable and appropriate Fire Risk Index (FRI) was developed to identify the risk and vulnerability of the industry. In both of the study area, there were 50 garment industries were surveyed where each area covered by 25 sample stations. By the evaluation of soft parameters, the study assessed that the Chittagong Export Processing Zone has a mean safety is 90.45% (9.55% deviation from the standard) and 80.29% safety (19.71% deviation from the standard) covered in Baizid Industrial hub. Although both of them were considered as good condition as well second one nearest to the average. Electric short circuit was the prime cause of fire in CEPZ and Baizid industrial hub. Overall, it was found that about 80% garments in Baizid Industrial area under in good condition which is (10-20) % deviation from ideal case. While CEPZ area about 80% garments was categorized as excellent condition, it is only 8% seen in Baizid area. The study also reveals that there is no garment in both areas which is in poor as well as extremely vulnerable to fire hazards.

Keywords

Readymade Garments, Fire hazards, Quantitative and qualitative measurements, Vulnerability and risk indexing, Fire safety Parameters

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1. INTRODUCTION

Readymade garment is the principle exporting sector in Bangladesh, approximately 78% of the total foreign currency generated from this sector and also the second largest apparel exporter in the world with a total export of USD \$17.91 billion in the fiscal year of 2010-11 (BGMEA, 2016). The garment sector has enjoyed a significant growth in Bangladesh for the last three decades. From a humble beginning of 12 enterprises in 1978, this sector currently consists of 4,500 factories of various sizes, although around 3,500 are currently operating (Abdin, 2008). Almost all of these factories are distributed primarily in the two of the largest cities Dhaka, the capital and Chittagong, the port

city. Unfortunately, given the labor intensive nature of the industry, the density of workers on factory floors is very high. This high density of workers results in a large number of injuries and fatalities in the event of an accident (Habib, 2009; Abdullah, 2005)

The readymade garment industry is a highly competitive industry and cost-saving is highly valued sector in the economic development of Bangladesh. While the lack of a safety culture, cost-cutting measures often affect the health and safety of the workers (Abdullah, 2005). Clothing is easily flammable and as such fire is one of the most frequent and damage inducing accidents in these factories in Bangladesh (Ahmed, 2007). Fire is also purported to be

the largest cause of on the job injuries and fatalities in this sector. Each and every new incident of fire and related damage adversely affects the reputation of the industry abroad, especially since the working conditions in the manufacturing sector in the developing countries is a general cause of concern in many developed countries (Akhter, 2010). Given the importance of fire safety in the garment sector, there have been concerted efforts from the government, the industry lobby (Bangladesh Garments Manufacturers and Exporters Associations, BGMEA) and the international buyers of the apparel products, to improve the fire safety culture and this has indeed reduced the fire incidents and losses significantly (Alam, 2006; J and T, 2009). Despite the various measures, rules and regulations implemented in the past decades, there are still several instances of fire outbreak in the garment factories every year, resulting in significant losses of lives, livelihoods (through injuries), equipments and materials (J and T, 2009). As is common in any developing country, there is a lack of data on fire safety in Bangladesh, and, although there is a few studies on fire safety status in general no comprehensive fire safety assessment of the garment factories were undertaken before. In the wake of a recent fire disaster at a garment factory that killed more than 100 factory workers fire safety evaluation of the industry became even more important (Firoz, 2011). The recent fire at the Tazreen Fashions garment factory has brought the perennial challenge of worker safety into the spotlight once again. Given the constant pressure to lower costs and the dearth of meaningful government oversight, businesses are continually tempted to reduce costs at the price of worker safety. Worker deaths are not new in Bangladesh especially Chittagong city, and while they have led to recriminations and some important changes, fires and other tragic accidents continue.

Fires have been a persistent problem in readymade garment (RMG) industry for over a decade in Chittagong city industrial areas. The country's comparative advantage is low costs; the minimum wage for workers is a mere Tk. 3,000 (\$37) per month (FY and N, 2011). As keeping costs low has been one of the keys to the sector's success in Bangladesh, there are strong disincentives to make necessary investments in worker safety. While improvements were made over the years, the safety record of the Chittagong city industrial areas RMG industry remains poor (Tazreen and Sabet, 2013). There is some disagreement about the number of worker deaths in the industry. According to the Bangladesh Institute of Labour Studies, 431 workers died in 14 major fire incidents between 1990 and 2012 (Prothom, 2013). However, according to Bangladesh Fire Department, 414 garment workers were killed in 213 factory fires between 2006 and 2009 alone (Prothom, 2013). Especially, enforcement of the rules and regulations and day-to-day health and safety management practices on factory floor is a major issue. In order to improve the fire safety in the readymade garment industries, it is important to understand and quan-

tify the current state of affair in fire safety of the garments factories. Therefore the aim of this study is to examine the fire hazard in RMG industrial sectors and intensity of fire hazard, existing conditions and remedial measures to reduce the problems in EPZ and non- EPZ industrial hub of Chittagong city. To investigate the existing fire safety design of the readymade garments industries of Chittagong city, this study has tried to assess the risk and vulnerability due to fire hazard in RMG industries at the study areas, was prepared a vulnerable map based on severity and magnitude of RMG industries in both area and finally was explored the fire risk index and the causes and consequences of fire hazard.

2. EXPERIMENTAL SECTION

2.1 Study Area

The study area, the Chittagong city of Bangladesh (Figure 1) is the principal city of the south-eastern region of Bangladesh and the second largest city of the country after capital Dhaka. The city is also the principle commercial hub of the country as the largest sea port is located here. The study is mainly carried on two principle industrial locations at Biazid industrial hub and Chittagong Export Processing Zone (CEPZ) areas. The Biazid industrial hub is the northern part of the city is located at 22022'N to 22028'N and 91046'E to 91051'E with three city corporation ward. While the Chittagong Export Processing Zone (CEPZ) is the southernmost part of the city located at South Halishahar is only 3.1 km from the sea port, 5.5 km from the CBD of Chittagong city and 11.3 km from the Shah Amanat Int. airport, Chittagong (BEPZA, 2013).

2.2 Methods and materials

Considering the importance of fire safety for the worker in RMG industry at Chittagong city, an intensive study was carried out on two important industrial areas at Chittagong city (CEPZ and Baizid Industrial hub). The study was mainly based on primary field survey. However secondary source of information are also used for making background of the study.

2.2.1 Primary Field Survey

Primary field survey has been conducted under the present study during the month of January to March, 2016. The primary field survey included a questionnaire survey on various levels of the industries, mapping, and observation and in depth interview from fire related person and worker.

Questionnaire Survey : To conduct the research, some questionnaires have constructed with the open and closed type of questions along with pre-coded and coded manner. The questionnaires were developed on the basis of the objectives to determine the fire safety system for readymade garments industry in Chittagong city. Fire hazard estimation is mainly carried out from the garments worker, fire safety officers and garment's security officers etc. and at

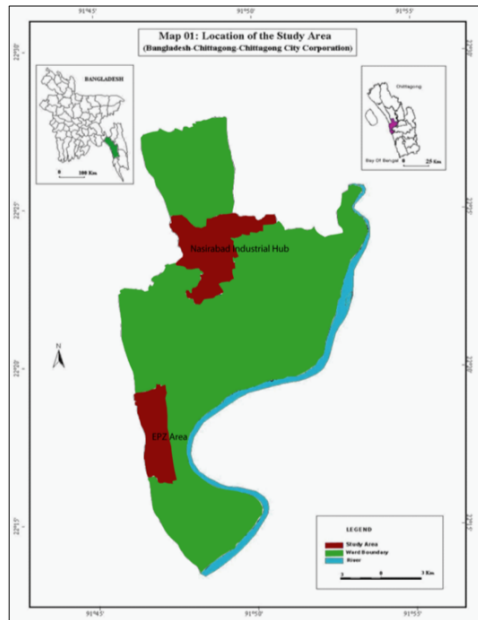


Figure 1. Location of the study area in Bangladesh (Source: Chittagong city corporation, Chittagong Development Authority and a modification of Arc GIS 10.2)

the same time also some opinions and valuable suggestions have been taken from BGMEA, RMG, BNBC, and FSCD officials.

Sampling : A purposive judgment sampling method has been used for the study. In CEPZ area, there about 167 industries where 72 are garments and garments related industry. Due to authority restriction and other jurisdictional limitations, only 25 garment industries in CEPZ have taken as a sample for the study (38% of the total). Therefore, for a balance of comparison at Biazid Industrial hub also taken 25 industries as a sample for the survey.

Mapping: Arc GIS 10.2, Illustrator, Photoshop etc. software have used for the purposes of mapping and analysis of the risk and vulnerability assessment at the readymade garments in both areas. For the base of accuracy, source maps have collected from the Bangladesh Export Processing Zone Authority (BEPZA), BGMEA, Chittagong Development Authority (CDA), Chittagong City Corporation (CCC) and Google Satellite.

Checklist Survey : A checklist has developed and surveyed on the basis of Bangladesh Fire Service and Civil Defense Authority (BFSCDA) for certifying a garment factory's existing fire safety system and capacity.

In depth Interviews : Some detail In-depth Interviews have conducted with garments workers, fire safety officers and fire safety workers who are experienced and available knowledge about fire and fire safety systems in his working place.

2.2.2 Secondary Data Collections and Analysis

A detail and study related secondary data and information have been collected from the various organizations like Chittagong City Corporation (CCC), Chittagong Development Authority (CDA), Bangladesh Fire Service and Civil Department (FSCD), BGMEA, BEPZA etc. Some information also have been collected from Banglapedia, Wikipedia, journals, newspapers, archives, research papers and web sites of different organizations.

2.2.3 Data Presentation and Analysis

Collected primary surveyed and secondary sources data have analyzed and represented through SPSS 10.0, MS Excel, MS Access and Arc GIS 10.2 etc. Following two type of assessment methods have been applied for risk and vulnerability identification:

Qualitative Method for Fire Risk Assessment : In this study, a qualitative method by checklists and narratives approach has been applied on the basis of [Hultquist and Karlsson \(2000\)](#) (Table 1) [14]. The checklist approach mainly was checked the performance of the building (or, in present case, the garment factory), generally in a yes/no format, with respect to a set list of standards or codes relevant to fire safety according to following parameters with their weights.

Quantitative Method for Fire Risk Index (FRI) of Assessment: In quantitative method, risk indexing has been used as evaluating multiple attributes into a single value and various risk indexes by primarily in the number. Types of parameters (attributes) considered and the arithmetic functions used to summarize these parameters. Among various types of fire risk rating, the most popular ones are Gretener's index, FRAME index, Dow's Fire and Explosion Index, Fire System Evaluation System (FSES) Index and Hierarchical Approach ([Hultquist and Karlsson, 2000](#)). The study mainly carried out through Dow's Fire and Explosion Index by following equation:

$$FRI = \frac{\sum_{i=1}^n X_i}{\sum_{i=1}^n W_i} \times 100 \quad (1)$$

Where, FRI = Fire risk index in percentage, X_i is a dimensionless grade parameter of i ; W_i is the importance of parameter i ; and i is number of parameter as $i= 1, 2, \dots, n, n=19$.

The weight W_i was used to incorporate the variations in importance of the parameters relative to each other and is generally determined by expert opinion and/or from previous data. The grade points or scores X_i have reflected the 'measure' of the danger, consequences or safety offered by a particular parameter i . Since the units of measurement for different parameters were different, X_i was expressed as a normalized dimensionless number [Watts \(1997\)](#).

Table 1. List of different parameters with their level of weight and consequences (Source: Watts and Hall, 2002)

Parameters	Weight of Parameter	Consequence and Descriptions
Width of the main Road	5	Most Important: If not present, very high damage of both life and properties may occur
Distance between two building	5	
General stair	5	
Exit door locked	5	
Emergency exit in the factory	5	
Water reservoirs	5	Important: If not present, considerable damage of both life and properties may occur
Fire fighting pump	5	
Fire drilling held	4	
Emergency gate blocked by furniture	4	
Fire extinguished	4	
Combustible material	4	Essential: Loss of life may not occur but other losses and injuries are high
Director system	4	
Distance fire service station	4	
Is the transformer near the	3	
Work ability of announcement	3	
Emergency light	3	Preferable: Loss of properties and injuries are considerable
First Aid box	3	
Gas mask	2	
Electric cable over headed	2	

Table 2. Description of the grade point of the parameter

Grade Point	Not quantifiable parameters subjective observations	Quantifiable parameters % deviation from ideal case
5	Excellent	Less than 10%
4	Good	From 10%-20%
3	Average	From 20%-30%
2	Poor	From 30%-40%
1	Very poor	More than 50%

3. RESULTS AND DISCUSSION

3.1 Existing fire safety design in the RMG industries

Fire safety design is a group of equipment and or behaviour designed to both reduce the risk of starting a fire and reduce the risk of injury in the event of a fire (Watts, 1997; Yunus and Yamagata, 2012). The structural design to protect the fire hazard includes the aid in reducing the spread of fire and smoke. A storey or floor is any level or part of a building that has a permanent roof and could be used by people (BNBC, 1993). It is very important for any garments to measure the larger condition and understand the occupant level in any garments factory (Muhammad, 2011). The number of floors of a garment has been counted through the observation technique. In CEPZ area 40% garments consist of six floors, as in Baizid Industrial area it is only 20% and second highest 32% consist of five floors in CEPZ area. On the other hand in Baizid Industrial area the highest 24% garments consist of less than three floors, where as it is not found in CEPZ area. In this study observation method represent that in CEPZ

area the structure of buildings is beautiful, well-structured, and spacious and well planned. On the other hand in Baizid Industrial area it is ugly, poor-structured, congested and unplanned.

Access way shall be provided for accessibility of site to firefighting appliances. Snorkel or Turntable Ladder appliances need to firefighting and rescue in high-rise apartment. To allow access of those appliances 30 feet wide road is required (Bangladesh Fire Service and Civil Defense, 18th September, 2014) (Prothom, 2013). Accessibility data has been collected through field survey by observation method. In the study area, above 30 feet wide access road has been found 28 % garments in CEPZ on the other hand in Baizid industrial area it is in only 12%. The highest 64% garments road accessibility has been found above 26-30 feet and only few garment access way found 21-25 feet in Chittagong EPZ area. On the other hand in Baizid industrial area the highest 32% garments road access way found above 26-30 feet. It is alarming for Baizid area 28% garments road are less than

16 feet, which is so difficult for access fire fighting car.

General stair is a most important element of any industrial infrastructure used by industrial personnel and worker for frequent movement (Muhammad, 2011). In which infrastructure general stairs are wider and present in sufficient number the worker will exit in a short of time in case of fire hazard or any critical situation. In this study, the highest percentage of general stair in Baizid industrial area lies in two stairs and then the number of one general stair is 20% (Figure 2). The amount of stair above three is seldom seen in this area. On the other hand in CEPZ area number of four general stair cases is the maximum in this graph. Because the large number of worker worked in this factory and the infrastructures are structurally huge. There are about 14% industries in this area seen up to seven general stairs. The number of general stair case one and two are merely visible in CEPZ.

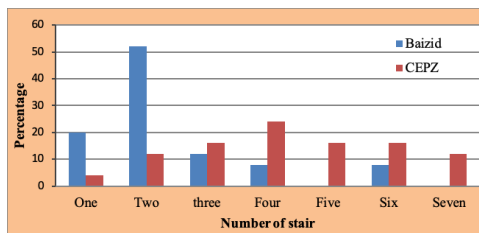


Figure 2. Conditions of the General Stair at the RMG Factories of CEPZ and Baizid industrial hub

This is one of the important attributes to understand fire safety condition in any factories by considering fire hazard. An emergency exit in industries is a special exit for emergencies such as a fire; the combined use of regular and special exits allows for faster evacuation, while it also provides an alternatives if the rout to the regular exit is blocked by fire (Muhammad, 2011). That is why emergency exit is an important factor for the fire safety condition measure of any garments. In the study, the data has been collected by observation methods. The highest percentage of emergency exit in Baizid industrial area lies in one emergency exit point and then the number of three emergency exit points is 16% (Figure 3). The amount of emergency exit four+ is seldom seen in this area. On the other hand in CEPZ area number of four+ emergency exit cases is the maximum in this graph. The number of emergency exit case one and two are merely visible in CEPZ. But it is alarming for Baizid area highest (32%) of factories are setup without emergency stair. So, it can be said that the overall emergency condition in CEPZ is better than Baizid area.

The following diagram shows the storage of combustible material in both areas. Minimal storage of combustible material (cotton, cloth and chemical) ensures the better condition for industry. As combustible materials are easily flammable and it occurs devastating fire. So, it is very perilous if any fire hazard takes place. In the study it is seen

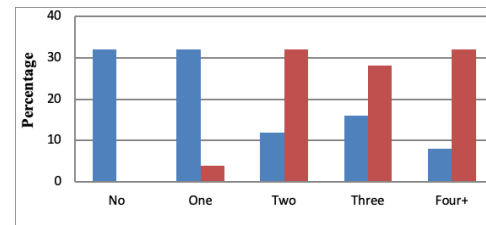


Figure 3. Emergency exit way in the RMG industries at CEPZ and Baizid industrial hub areas of Chittagong city

that combustible materials are found in every industry of the study area more or less. In both the area it is seen that the average condition stands as the highest. In CEPZ area 32% garments industries have been recorded very poor storage of combustible material. On the other hand in Baizid area it is almost 12%.

Fire alarm is a device, such as a siren, used in announcing the outbreak of a fire. This study found out that the garment with and without fire alarm. In the study area it has been found that 100% garments are with fire alarm and it is unseen without fire alarm in both areas. Smoke detector and heat detector device detect smoke and heat respectively. In the study area these information which have been collected by the survey no garments found without detector system. Each and every factory has more or less detector systems. From the study it is seen that detector systems are highly present in CEPZ area.

From the study it is found, the fire safety system is satisfactory in the garments of Chittagong city area. Most of the garment's fire safety system is excellent. Accessibility and emergency exits are most important factor to keep safe from fire but maximum factories do not follow the standard level in this aspect. It is also observed that fire extinguisher; detective system and fire alarm system are modern and found in satisfactory level. Faire safety system is high in CEPZ are than Baizid area but in Baizid area it is also good. The main cause of this variation is that the industries of CEPZ area build on some solid rules which are provided by BEPZA, Fire Service and Civil Defenses and BGMEA. Bangladesh Export Processing Zone Authority is not only provided the rules for EPZ but also strictly monitor the activities and notice in this sector. On the other hand, in the industries of Baizid area it is absent because of lack of fire inspection officer in Baizid fire station. Proper fire inspection can reduce the vulnerability of garments considering fire hazard in this area.

3.2 Infrastructural Deign and Opportunities to safety

Risk indexing is a way of evaluating multiple attributes into a single value and various risk indexes differ primarily in the number and types of parameters (attributes) considered and the arithmetic functions used to summarize these parameters (Hultquist and Karlsson, 2000; BNBC, 1993; Muhammad, 2011; Quasem, 2002). In this research, the weight reflects

were the importance of the parameters in terms of potential consequences. This research work contains about 19 parameters (on the basis of Dodd and Donegan, 1994) and those are divided into four categories respectively most important, Important, Essential and not essential but preferable. In this research higher grade point, higher percentage or lower deviation from ideal case represents good condition for garment industry.

There are about seven parameters which are considered as most important (Table 1). From the study findings, only water reservoir and presence of fire fighting pump are in excellent condition at Biozid industrial hub. On the other hand in the same industrial area five parameters are in good condition those are more than 10% deviation from the standard. The Condition of General stair and Emergency exit is not good in those factories. It is more than 40% deviation from ideal case. Comparatively at CEPZ area, it is found that among the seven parameters, exactly five parameters are in excellent condition and the rest two parameters are in good condition.

The aforementioned bar diagram in six important parameters at the Chittagong Export Processing Zone Area four parameters are in excellent condition and the rest two are in good condition. On the other hand In case of Baizid Industrial Area among the six important parameters only two parameters are in excellent condition (emergency gate blocked by furniture and distance from the nearest fire service station) and the rest 4 are in good condition.

The parameters which are regarded as essential to assess the fire hazards for the readymade garments in the study area are the presence of transformer, workability of announcement, emergency light and first aid box. It is seen from the above diagram that among the four elements of the essential parameter two parameters namely presence of transformer around the garments and workability of announcement have been found in excellent condition and the rest two are in average condition in the Chittagong EPZ area. And the same condition prevails in the Baizid Industrial area also.

To assess the fire hazards in the garments factory a category has been made named Preferable Parameter. This parameter contains the presence of gas mask when fire hazard occurs and electric cable over head. Among the two parameters in CEPZ area one is in excellent condition and the rest one named the presence of gas mask is in good condition but very nearest to the average condition. On the other hand in BAI area among these two parameters one named electric cable over head is in good condition but the rest one named the presence of gas mask is in very poor condition.

3.3 Fire Hazard Risk Indexing by Different Parameters

Most important parameters are given the maximum weight 5. In Baizid industrial area the average grade point of most

important parameters 3.96 in scale of 5. In our grading strategy, a large grade point refers to a safer situation. Therefore Fire Risk Index (FRI) is in an inverse scale, a higher Fire Risk Index (FRI) means less risk. The mean FRI for 25 factories is 3.96 in scales of 5, which shows that the fire safety practice are below the ideal value of 5. It ensures that in case of most important parameters, average value of 25 factory deviation more than 20% to less than 30% from ideal case. So it is considered as average condition but nearly good condition or vulnerable for fire safety in this area.

Calculate value of overall Fire Risk Index (FRI) for Baizid industrial area is 3.52 in scale of 4.00. This is (10-20) % deviation from the ideal case. So, it is considered as good condition or less vulnerable for most important parameter. Average Fire Risk Index (FRI) for essential parameters in Baizid industrial area is 2.41 in scale of 3.00. Which is deviated more than 20% to less than 30%, it indicates that essential parameters in this area were average condition. In case of preferable parameters this area is in poor condition having scored 1.44 in scales of 3. It is near about 30% deviation from ideal case, so it is considered as vulnerable.

On the other hand, CEPZ is the well planned zone having more facility and specified boundary for industrial development. There have various types of industries and only RMG industries were taken as consideration.

In Chittagong EPZ area the average condition of most important parameters for 25 garment industries are 4.67 (calculation has been given appendix) in scale of 5.00. It is only 5.74% deviation from ideal case, which indicates that CEPZ area is in excellent condition or very less vulnerable regarding its most important parameters. Calculate value of overall Fire Risk Index (FRI) for CEPZ area is 3.52 in scale of 4.00. Which indicates that, for important parameters the fire safety situation in this area is excellent, which is only 8.12% deviation from ideal case and considered as very less vulnerable? Average value of 25 industries for essential parameters in this area is in good condition with score of 2.55 values in the scale 3. It is 15% deviation from ideal case and considered about less vulnerable. In CEPZ area the condition of preferable parameters is also good. The average fire risk index value for 25 factories is in 1.8 out of 2. In this area fire drilling held regularly, on the other hand gas mask is in average condition.

For the purpose of socio-economic development, poverty alleviation and rapid growth of industrialization, BEPZA tries to attract the local and foreign investors by setting up the EPZ and delivering necessary efforts and cooperation to flourish our industrial sector [13, 19]. At present in Bangladesh, there are about eight EPZ, from which Chittagong EPZ is the biggest and most export revenue earning ones. In 2010-11 economic years CEPZ export 14268.66 million US dollars by exporting. At present 172305 workers are working in this EPZ [13]. CEPZ lies in 163 hectares land dividing into 501 plots. In which 167 plots turned into

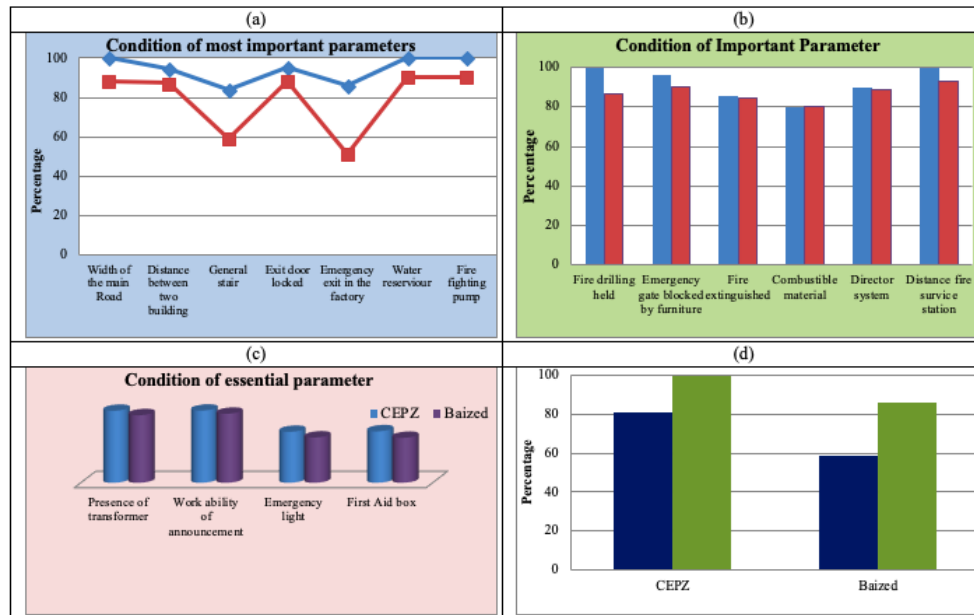


Figure 4. Comparative scenario of the condition of a) most important, b) important, c) essential and d) preferable parameters

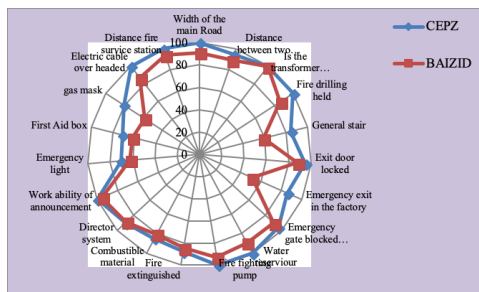


Figure 5. Overall level of good conditions in all parameters sub-sectors at Baizid industrial hub and CEPZ areas

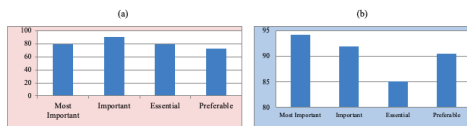


Figure 6. Overall condition of the grouping of parameters (a) Baizid industrial hub, and (b) CEPZ readymade garment industries in Chittagong city

different types of industry. From those 72 are garments, 34 are textile and 61 are other industry. In this research study about 25 garments industries which are 155 of total industries and 34% of total garment industry.

In our grading strategy, a large grade point was referred to a safer situation. Therefore fire risk index (FRI) was used as inverse scale. A higher Fire Risk Index (FRI) means less risk. On the other hand higher percentage of fire safety

ensures safer condition, on the other hand lower percentage of deviation ensures safer condition. In this map, there about 80% garments industries were in excellent condition in this area. They were less than 10% deviation from ideal case and considered about very less vulnerable. On the other hand 20% were in good condition with deviation 10-20% from the ideal case and were considered less vulnerable. In those industries maximum 19.33% deviation from the ideal case, it is located in sector-1. It was under good condition but near about average condition. On the other hand minimum 2.8% deviations from ideal case, which is located in sector 6\A. In figure 6 yellow colour represents excellent condition of industries with less than 10% deviation from ideal case. On the other hand red colour indicates good condition with more than 10% deviation.

4. CONCLUSIONS

This study can be conducted to workers safety in case of emergency situation in RMG industry. The findings of such study may be used to further modify the fire safety system and operational management of RMG industries in Chittagong city. Codes and standards reflect that concern with special requirements. Industrial fire incidents data is not available although fire hazard characterization information is available in the Fire Service and Civil Defence (FSCD) stations. Besides no mentionable vulnerability or safety assessment has been performed for this hazard of garments industry. As a result, fire hazard vulnerable industry which is not assessed for this hazard may break out fire and causes lots of human death and economic loss. This can negative affect our economy of the country. In the study area it has

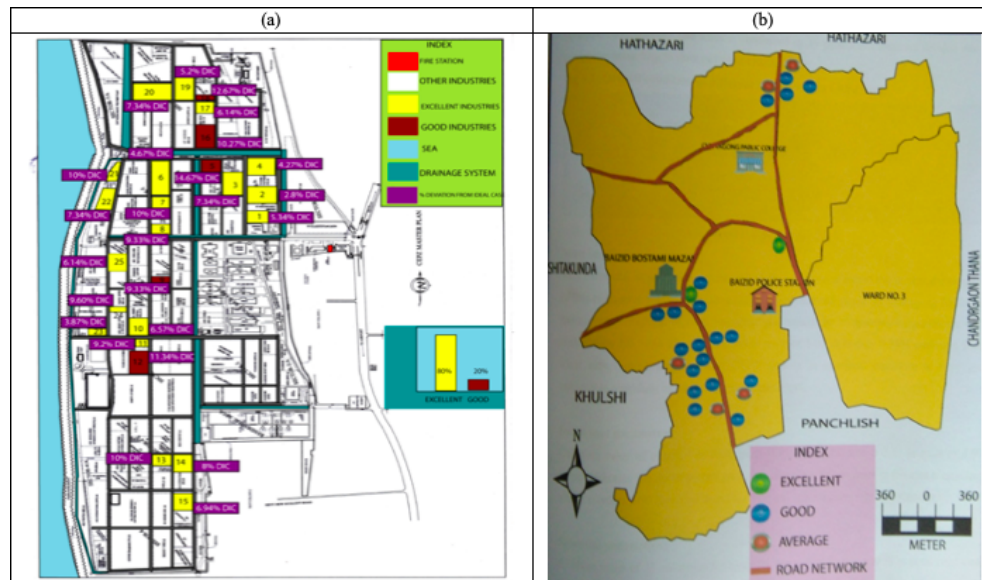


Figure 7. Level of Vulnerability and Risk of Fire Hazards at a) CEPZ area and b) Baizid I/H, Chittagong, Bangladesh

been found that in CEPZ area is more safe and sound than the Baizid industrial area. As EPZ are export oriented heavy garments industries so all type of fire related equipment are sufficient in amount. It was sound good as both areas; the poor condition is totally absent. The electric short circuit was the prime case of fire hazards in the garments factories. For the frequent fire hazard in the last few years in the country, the government along with the garments owners is more watchful about fire hazards and regarding the fire as a crucial threat for their factories talking various imperative steps to reduce fire hazards. Now, all the people concerned with this sector heeding much more concentration on fire hazards so that fire hazards can be dwindled and if occurs the loss of life and property can be diminished. The fire safety score can help to know about the safekeeping for the worker in their workplace. This type of study can help to make people conscious regarding fire hazard and also can minimize the different losses of the garments industry.

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