

Fire Safety Preparedness in the Bangladesh Ready-Made Garment Industry: Workers' Perspectives

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ABSTRACT

Although the ready-made garment (RMG) industry is vital to Bangladesh's economy, fire incidents cause significant loss of life and property in the sector. This paper explores RMG workers' perceptions of fire safety preparedness in their factories and of their own preparedness, using a qualitative approach through interviews with 36 RMG workers and 14 key informants. Findings show that all factories have a safety committee, a fire prevention plan, an early fire warning system and an emergency action plan. Moreover, each factory conducts fire training and drills, performs regular workplace inspections, maintains provisions for the safe storage of chemicals, maintains firefighting equipment, trains personnel for fire emergencies, and clearly displays emergency contact numbers. Common problems at the factory level include often obstructed emergency pathways and workroom doors, blocked areas outside exit gates leading to the assembly point, narrow staircases, insufficient fire training for all workers, lack of participation by all workers in all evacuation drills and improper chemical storage. At the worker level, although all or most workers know one or more causes of fires, the drop, down, and roll technique, the locations of firefighting equipment and emergency contact information, problems remain in following established evacuation procedures and in understanding the appropriate actions to take to protect against smoke inhalation or if trapped inside a building during a fire. These findings suggest that improvements in fire safety preparedness are essential at both the factory and worker levels to strengthen the resilience of factories and their workers to fire hazards. These findings will help policymakers, government agencies, factory owners, RMG workers and other stakeholders take measures to strengthen the resilience of the RMG industry and its workers against fire hazards in Bangladesh and other similar countries.

Keywords: ready-made garment (RMG) industry, fire safety preparedness, Bangladesh, RMG workers, evacuation

INTRODUCTION

The ready-made garment (RMG) industry plays a pivotal role in Bangladesh's socio-economic development. It is the country's leading export sector and a key driver of economic growth, accounting for more than 80 percent of total export earnings (Nasrin et al., 2025; Khan et al., 2021). The sector has played a major role in creating employment, particularly for women (Nasrin et al., 2025; Wadud & Huda, 2017). Approximately 4 million people in Bangladesh, most of whom are women, rely directly on the RMG sector for their livelihoods (Daily Star, 2024; Wadud & Huda, 2017). Despite its significant contributions, workplace safety in the sector remains unsatisfactory and the sector remains vulnerable to various hazards, including fires. Many safety incidents in this sector, such as fires and building collapses, have damaged its reputation at home and abroad (Wadud & Huda, 2017).

The RMG industry in Bangladesh has a very poor record of fire safety. Fire incidents at RMG factories cause injuries and loss of life, as well as substantial economic losses and damage, including foreign currency losses (Mizanuzzaman, 2016; Wadud & Huda, 2017). Fire is the most prevalent lethal incident and one of the leading causes of deaths and injuries in the RMG industry. For instance, about 94.09 percent ($n=223$) of all lethal incidents ($n=237$) occurring between 1990 and 2020 in 237 garment factories in Bangladesh were fires. These 237 incidents caused 1,689 deaths and 5,181 injuries, and fire incidents alone were responsible for 26.11 percent of these deaths and 47.19 percent of these injuries (Islam et al., 2022).

Although various fire safety improvement measures in the RMG sector have been undertaken over the years to enhance the safety of this industry during fires due to some catastrophic events such as the 2012 Tazreen Fashions Ltd. fire that caused the deaths of 112 people and injuries to 200 people, the RMG industry still remains the most vulnerable sector to industrial fire incidents (Mizanuzzaman, 2016; Chowdhury et al., 2025; Hossain, 2016; Islam et al., 2022; The Financial Express, 2021). For instance, 273 of 383 industrial fires in Bangladesh in 2020 occurred in the RMG industry (Chowdhury et al., 2025). One of the major causes of fires in the RMG sector is an electrical short circuit (Hossain, 2016). The conversion of residential or commercial buildings into garment factories and the construction of unauthorised floors in many garment factories have created numerous safety problems, such as faulty electrical circuits and inadequate emergency exits (Hossain, 2016).

Since fire incidents substantially affect the RMG sector by causing injuries, fatalities and substantial economic losses and damages (Mizanuzzaman, 2016), it is imperative to understand fire safety preparedness at both the factory and worker levels. This understanding is crucial for reducing fire risks, thereby decreasing fire-related fatalities and injuries and supporting the economic development of the RMG sector. However, despite its critical importance, current knowledge regarding fire safety preparedness at both levels remains limited. To address this gap, this paper examines fire safety preparedness at these levels from workers' perspectives. Therefore, the objective of this paper is to understand how workers perceive fire safety preparedness at both the factory and individual worker levels in Bangladesh's RMG factories.

LITERATURE REVIEW

The RMG industry, with its poor safety records, faces significant challenges in ensuring workplace safety and improving working conditions for millions of garment workers in compliance with international standards (Ansary & Barua, 2015). Workers in this industry are vulnerable to many occupational safety and health hazards. For instance, they face safety hazards such as fire, electrical, chemical, ergonomic, and biological hazards, as well as health hazards such as exposure to excessive heat, work in places with insufficient air ventilation and poor air quality, work in overcrowded workplaces, and exposure to excessive vibrations from machinery (RSC, 2024).

Safety incidents in the garment industry, such as fires and building collapses, arise from a range of causes. Key causes include the construction of buildings without regard for safety standards; the conversion of residential or commercial buildings into garment factories; the addition of unauthorised floors beyond the building's safe capacity; the increase in the workforce and machinery beyond the building's safe capacity; overcrowded working conditions; old or poor electrical connections; and the presence of flammable materials (Hossain, 2016; Hasan et al., 2017; Islam et al., 2022). Other key causes include inadequate training for management personnel and workers; lack of safety equipment; narrow emergency pathways; insufficient emergency exits; and inadequate firefighting equipment (Hossain, 2016; Hasan et al., 2017; Islam et al., 2022).

Among the various hazards in the RMG industry, fire is the most prevalent. Most of the accidents in this industry result from fire. Common fire hazards in RMG factories in Bangladesh include faulty electrical connections, flammable objects near heat sources, open flames near combustible materials, dust accumulation on electrical machines and installations, unsafe storage of flammable materials and smoking inside the factory (RSC, 2024). The most important cause of fire in the RMG industry is an electrical short circuit. In addition, boiler explosions, transformer explosions, improper storage of flammable materials, overheating, kitchen fires, machinery friction, smoking, poor housekeeping, and sabotage are other important causes of fires in the RMG industry (Hossain, 2016).

In response to frequent fire incidents in this industry, various measures have been implemented to enhance the industry's and its employees' resilience to fires (Accord, 2013; ILO, 2020). In accordance with the Bangladesh Labour (Amendment) Act (2013), each factory with 50 or more workers is required to establish its own safety committee (GoB, 2013). The safety committee comprises representatives from both management and workers. Identification and reduction of hazards, including fires, regular workplace inspections to ensure safety and the arrangement of safety training are among the most important tasks of this committee (RSC, 2025). All garment factories are also required to have a fire alarm system for early fire warning (RSC, 2021). In addition, garment factories have focused on regular fire safety monitoring to reduce fire risks. As part of this monitoring, factories are expected to have a fire prevention plan that identifies the causes of fires and outlines measures to prevent them (RSC, 2025). Likewise, factories are expected to regularly inspect the fire warning system, train employees on how to respond to warnings, and conduct fire drills. Moreover, factories are expected to take proactive measures to contain fires, such as installing sprinkler systems and using fire-resistant walls and doors. Furthermore, factories need to meet basic requirements for safe evacuation in case of a fire, including ensuring required exits on each floor, keeping emergency pathways (including stairways) and exit gates clearly marked, unobstructed and unlocked, posting exit maps on all floors, and training employees in safe evacuation (RSC 2021; 2025).

However, many Bangladeshi RMG factories still fall short of established safety standards, including basic fire safety standards (Mizanuzzaman, 2016; Stanwick & Stanwick, 2015; Wadud & Huda, 2017). Many factories lack essential fire alarm systems, do not install fire doors, lack storage areas with fire-resistant walls, do not possess firefighting equipment and do not maintain adequate water storage both inside and outside the premises (Mizanuzzaman, 2016; Stanwick & Stanwick, 2015; Alam, 2020). Additionally, many factories lack clearly marked emergency exit signs, and emergency pathways (including stairways, corridors, and passageways) are frequently obstructed by packages or locked on different floors (Alam, 2020). Moreover, many factories lack adequate exit gates, which are often narrow when available and frequently remain blocked or locked (Mizanuzzaman, 2016; Stanwick & Stanwick, 2015; Alam, 2020). Furthermore, many factories lack an emergency evacuation plan and a designated assembly point for evacuation (Alam, 2020; Hossain, 2016). In addition, numerous factories do not conduct fire drills, do not provide workers with evacuation training, and never practice evacuation procedures at the workplace (Alam, 2020; Hossain, 2016). In many factories, management also fails to follow the established emergency evacuation plan due to negligence (Hossain, 2016).

Studies show that non-compliance with safety standards is the primary cause of deaths and injuries in RMG factory fires. The primary causes of deaths and injuries in RMG factory fires include a lack of exit gates, locked exit gates, inadequate staircase width, dark stairways, falls from stairways, panic, jumping from upper floors due to panic, and suffocation from smoke (Mizanuzzaman, 2016; Stanwick & Stanwick, 2015; Ahmed & Hossain, 2009). Safe and efficient evacuation in RMG factories must be ensured by maintaining necessary emergency pathways and exits (leading to the outside of the building). These pathways and exits should be kept clear of smoke and fire and must remain unlocked at all times (RSC, 2021; MHPW, 2020).

Therefore, better preparedness at both the factory and worker levels is required not only to reduce fire incidents but also to reduce losses and damage, including worker deaths and injuries, in the event of a fire. Studies show that better preparedness through various measures, such as conducting regular fire training sessions and fire drills, routinely inspecting electrical lines, regularly inspecting fire alarms to ensure they remain active and functional, ensuring that firefighting equipment is adequate and regularly maintained, and ensuring safe and efficient evacuation procedures, can effectively enhance the resilience of RMG factories and their personnel against fire hazards (Habib et al., 2022; Mizanuzzaman, 2016; Islam et al., 2022; Hossain, 2016).

Many studies have examined safety issues, including fire safety, in the context of the RMG industry in Bangladesh. These studies have mainly focused on developing a fire risk index (Wadud & Huda, 2017), the structural and fire safety of RMG factory buildings (Ansary & Barua, 2015), workplace safety compliance (Barua & Ansary, 2017), loss and damage from fire hazards (Mizanuzzaman, 2016), the causes and effects of fires and other deadly incidents (Hasan et al., 2017; Islam et al., 2022), fire hazards and their impacts on RMG workers (Hossain, 2016), and fire safety conditions (Habib et al., 2022). However, there is limited research on fire safety preparedness at the industry and worker levels from workers' perspectives. Therefore, this study aims to fill this

knowledge gap by exploring workers' perspectives on fire safety preparedness at their factory and on their personal fire preparedness.

METHODOLOGY

The study was conducted in five RMG factories in Narsingdi District, Bangladesh, using a qualitative approach. Data were collected through observation, in-depth interviews with workers from five RMG factories, and key informant interviews (KIIs) with officials from RMG factories and the Department of Fire Service and Civil Defence (DFSCD). In-depth interviews were conducted with 36 workers from five RMG factories (see Table 1). Of the 36 workers, 12 were interviewed from one factory, 9 from another and 15 from three factories, with 5 from each. In addition, a total of 14 KIIs were conducted, including 10 with RMG factory officials, 3 with DFSCD officials and one with an academic with expertise in the RMG sector and RMG workers. Ethical approval for the study was obtained from the university's Human Research Ethics Committee, and all data were collected in accordance with that university's ethical guidelines.

All workers were interviewed in person at their homes. Eight KIIs were conducted in person at their factories or offices, while six KIIs were conducted by mobile phone. All interviews with workers were audio-recorded. However, many KIIs were not recorded because key informants from RMG factories declined to be recorded during the interviews. In addition to audio recording, notes were taken during these interviews. All interviews and KIIs lasted 30 to 60 minutes. Two interview guides were used to conduct these interviews: one for interviews with workers and the other for KIIs. Both guides focused on preparedness for fire and earthquake hazards at both the factory and worker levels. They also inquired into the causes of these hazards, the gaps in current knowledge and preparation to deal with them and what should be done to be better prepared. In addition, the guides included questions on other issues, such as workplace violence, maternity leave and working hours. It is noteworthy that collecting data from both factory workers and officials provided an opportunity to understand the perspectives of both groups. This enabled cross-checking of data on the issues under investigation and reduced potential biases.

Data were analysed using thematic analysis. Themes were developed using a data-driven approach. An extensive set of categories was initially generated from the database and these categories were subsequently reduced to a smaller number of themes. All themes and their interrelationships were then carefully examined. Finally, the findings were compared with the existing literature to assess their consistency with or divergence from the existing knowledge base. Because data were collected from only five RMG factories and workers from these factories were selected through a purposeful sampling strategy, the study findings may not be applicable to all RMG factories and workers in Bangladesh; therefore, caution should be exercised when generalising them.

Table 1: Socio-demographic profile of the workers.

Socio-economic characteristics	n=36
Sex	
Male	20
Female	16
Age	
Less than 20	2
20-29	19
30-39	9
40-49	5
More than 49	1
Marital status	
Married	26
Unmarried	10
Years of schooling	
1-5	6
6-10	20
11-12	10

Years of employment	
Less than 1 year	4
1-5	20
6-10	9
11-15	3
Monthly gross salary (including overtime pay) in Taka	
Less than 15,000	6
15,001-20,000	18
More than 20,000	12
Have experience with a workplace fire incident	
Yes	27
No	9
Have participated in any fire drills organised by DFSCD	
Yes	36
No	0
Have participated in any evacuation drills organised by the factory itself	
Yes	36
No	0

Source: In-depth interviews with workers (2025–2026).

RESULTS

Fire Safety Preparedness at the Factory Level

Safety Committee

All factories have a safety committee comprising members from both management and workers. Among other activities, this committee conducts regular workplace inspections, identifies and reduces safety and health hazards and organises training sessions for employees on various issues, including fire safety and other workplace hazards, to reduce risks and protect both the factory and employees from potential harm. This is evident in the following quote:

We have a safety committee in our factory. Members include people from management and our co-workers. This committee works to ensure workplace safety by performing various activities. For instance, it conducts regular workplace inspections, identifies safety and health hazards and implements measures to address them. The committee also organises training sessions on various issues, including fire safety training and procedures to follow in the event of a fire in our factory. (Interviewee 3, 10 October 2025)

Fire Prevention Plan

All factories have a fire prevention plan to protect workers and property from fire incidents. The plan identifies major workplace fire hazards and outlines policies and procedures for housekeeping and equipment maintenance. It also includes comprehensive information on the individuals responsible for maintaining the equipment and systems installed to prevent fires and for managing fuel-source hazards. Moreover, it specifies how employees should be trained to recognise fire hazards associated with the materials and processes they work with. This can be understood from the following quotes:

To prevent fire incidents at the factory, the factory has a fire prevention plan. This plan lists major fire hazards in the workplace and outlines housekeeping and equipment maintenance policies and procedures. It also outlines how employees should be properly trained on the fire hazards associated with the materials and processes they handle. (KII 3, 8 March 2026)

Our factory has a fire prevention plan. The plan lists major workplace fire hazards and outlines the measures needed to prevent fires. For instance, it specifies how we should maintain proper housekeeping. It also specifies how to train us on the fire hazards associated with our work, including those related to the materials we handle. (Interviewee 31, 1 March 2026)

Early Warning of Fire

All but one of the factories are equipped with automatic early fire warning systems, whereas one factory has only a manual system. Two factories with automatic fire alarm systems also have manual systems. Most participants believe that all the fire warning devices in their factory are functional and that they are regularly inspected to ensure they work properly. However, a few participants believe that some fire warning devices are not functional and although these devices are inspected, the inspections are not conducted regularly. This can be understood from the following quotes:

I believe all fire warning devices in our factory are functional. Factory management regularly checks them to ensure they work properly. (Interviewee 23, 26 February 2026)

I believe some fire warning devices are not functional. Although these devices are inspected, I believe our factory management does not conduct regular inspections to ensure they function properly. (Interviewee 36, 30 March 2026)

Emergency Action Plan

All factories have an emergency action plan that outlines the actions employees should take during emergencies, such as fires. Evacuation policies and procedures are a vital part of this action plan, as this plan outlines emergency pathways, exit gates and assembly points and procedures for assisting people during evacuations and other issues such as how and when employees will be trained. While all the factories have evacuation maps on every floor, clearly marked emergency pathways and exit gates, and a designated assembly point, emergency pathways are not always kept clear. Sometimes, these pathways are blocked by packages and other objects. Likewise, the doors of rooms where workers work are sometimes blocked for a period of time by produced goods or other materials due to delays in removing those items to the designated places by the respective personnel. Similarly, although the building's exit gate is automatic, the area outside it is sometimes blocked by raw materials and factory products temporarily stored there for loading and unloading. As emergency pathways, room doors and the area outside the building's exit gate sometimes remain obstructed, workers may encounter difficulties evacuating to the assembly point and may sustain injuries and fatalities if an emergency such as a fire occurs. This could be understood from the following quote:

We have clearly marked emergency pathways and exit gates in our factory building. Each floor displays an evacuation map showing the locations of emergency pathways and exits, as well as the assembly point outside the building. However, emergency pathways are sometimes blocked by packages or other objects. Doors to workrooms are sometimes partially or fully blocked by items placed in front of them inside the rooms. Moreover, although the building's exit gate is automatic, the area outside it is sometimes obstructed by the loading and unloading of raw materials and factory products. In case of an emergency, such as a fire, workers may face challenges in reaching a safe location, may fall or be stampeded and may suffer injuries or even die due to these obstructions. (Interviewee 35, 7 March 2026)

A significant number of participants believe that the staircases are not wide enough to allow all workers to evacuate simultaneously during a fire, and thus they could fall or be stampeded during evacuation, which could lead to more injuries and fatalities. This can be understood from the following quote:

The staircases in our factory are not wide enough to allow the rapid evacuation of all employees at the same time during a fire. This could cause people to fall and be stampeded during a fire, resulting in injuries and even deaths. (Interviewee 2, 10 October 2025)

Training and Drills

All factories conduct fire training sessions and fire drills. All factories have at least 18 percent of workers who have received fire safety training from DFSCD (source: KIIs). These trained workers are organised into three teams: firefighting, rescue and first aid. They also participate in regular fire training conducted by their respective factories. Moreover, all workers in all the factories receive basic fire safety instructions as part of their orientation training upon recruitment. Additionally, factories arrange basic non-intensive fire training for workers not trained by DFSCD. While some factories ensure all workers are covered through these internal sessions, others cover between 50 and 60 percent of workers (source: KIIs). Furthermore, in three factories, all workers, including the 18 percent trained by DFSCD, receive basic orientation regarding fire hazards and evacuation procedures from external agencies, such as the RMG Sustainability Council (RSC), through “all employee meetings”, whereas workers in two factories receive no external fire safety training.

Furthermore, workers in all factories participate in two fire drills organised annually by DFSCD. In addition to these two external drills, internal fire safety teams within each factory conduct monthly evacuation drills rather than full-scale fire drills. These drills are held during both daytime and nighttime hours. The number of daytime evacuation drills at the studied factories ranged from 8 to 12 per year, whereas the number of nighttime evacuation drills ranged from 3 to 12 per year (sources: KIIs). However, most workers across all factories reported participating in only six drills annually and a few reported participating in seven drills annually, including the two external fire drills conducted by DFSCD. Although this discrepancy may be attributed to fewer internal evacuation drills being conducted than reported during interviews, an analysis of the data indicates additional factors that may explain the gap between workers’ and management’s perspectives. For example, when internal safety teams conduct evacuation drills on their own, they often do not invite all workers to participate. Furthermore, workers assigned to different shifts may be unable to participate in certain drills. Similarly, some workers may choose to avoid participating in such drills. Participants expressed the opinion that they should receive more intensive fire training and that increasing drill frequency would improve their practical understanding of fire safety. This can be understood from the following quotes:

I received fire safety instructions upon recruitment and at other times from the factory. I also received basic information on fire safety and evacuation procedures during a session on occupational safety and health hazards. Additionally, I receive briefings on fire safety and evacuation procedures when I go to the assembly point during evacuation drills. I participate in two fire drills conducted by DFSCD and three to four evacuation drills conducted by our factory’s fire management team each year. I have not participated in all the evacuation drills conducted by the factory because I was not invited. The factory often does not call all units or everyone in the production department where I work for these drills. I believe that we should receive more intensive fire safety training. Moreover, additional fire drills and internal evacuation drills should be conducted to enhance our practical knowledge of how to prevent, extinguish, and respond to fires. (Interviewee 32, 6 March 2026)

More intensive training on fire safety will increase our knowledge of the causes of fires, how to reduce the risk of fire incidents and what to do during fires. More fire and evacuation drills are necessary. These drills are effective because they give us hands-on experience and help us easily remember what to do and how to do it during fires. (Interviewee 4, 17 October 2025)

Workplace Inspections

All participants indicate that factories regularly inspect electrical and gas lines, machinery such as boilers, compressors, and generators, and other utility systems to ensure compliance with safety standards and prevent fires. Factories have dedicated departments responsible for conducting routine inspections of key utilities to uphold safety and compliance standards. They address and repair issues immediately when identified. This can be understood from the following quote:

Regular inspections of utilities are conducted by the factory’s responsible departments to ensure safety and prevent fires. These departments routinely inspect electrical and gas lines, boilers, compressors, generators, firefighting and emergency utilities and other potential fire sources. If any problems are found, they are repaired immediately. (Interviewee 20, 31 October 2025)

Storage of Hazardous and Flammable Chemicals

Hazardous and flammable chemicals can cause fires in the factory. Factories usually store these chemicals safely after use. They have designated chemical rooms that are clearly marked. Only experts and workers involved in chemical management are allowed to enter these rooms. However, sometimes experts and workers in the chemical section do not properly store and dispose of these chemicals after finishing their work. This can lead to a fire in the factory. This can be understood from the following quote:

After use, hazardous and flammable chemicals are stored safely in chemical rooms. These rooms are marked with a hazard sign. Only experts and relevant workers can enter these rooms. However, experts and workers involved in chemical handling sometimes do not store and dispose of these chemicals properly, which may lead to the risk of fires. (Interviewee 19, 31 October 2025)

Firefighting Equipment and Capacity

All factories are equipped with firefighting equipment, including fire doors, fire extinguishers, standpipe systems, hydrant systems, fire pump systems and water storage tanks. Some factories are also equipped with sprinkler systems.

Most participants believe that all the fire extinguishers at their factory are functional, while a few believe that some are not functional and may not work properly during a fire. Likewise, most stated that factory management inspects them regularly to ensure they are functional, while a few participants believe that although their factory management inspects these fire extinguishers, inspections are not conducted on a regular basis. This is evident in the following quotes:

In our factory, all fire extinguishers are functional and ready for immediate use. Factory management routinely inspects them to ensure they function properly. (Interviewee 20, 31 October 2025)

I think all fire extinguishers at our factory are not functional. I think our factory management does not inspect them regularly. (Interviewee 35, 7 March 2026)

All participants believe that the available fire equipment can extinguish a small fire. All but a few participants believe that it is sufficient to extinguish a medium fire, while a few believe that it might suffice for a large fire. Nevertheless, all agree that external assistance is necessary to extinguish a large fire effectively. Moreover, all participants feel that firefighting facilities need to be increased to extinguish large fires more effectively, especially when the outside fire services would take longer to reach the factory. This can be understood from the following quote:

With the available fire safety equipment, we can handle small to medium-sized fire incidents effectively. However, we will require external assistance from the fire service department to extinguish large fires effectively. I think the factory should increase the quantity of equipment to combat large fires effectively. (Interviewee 3, 10 October 2025)

Trained Personnel and their Capacity

Factories have their own trained firefighting, rescue, and first aid teams composed of regular workers. Factory management ensures that these teams are available during operational hours to respond promptly to emergencies such as fires. These teams work to extinguish fires, rescue workers, and administer first aid if anyone gets injured during fires or other emergencies. Everyone believes that these teams can handle small fire incidents, rescue workers, and provide first aid, while most believe that they can manage medium-sized fires and a few believe that these teams can handle large fires. Moreover, everyone believes that increasing the number of trained personnel would enhance the effectiveness of firefighting, rescue and first aid efforts. This can be understood from the following quote:

In emergencies like a fire incident, our factory has trained personnel who work to extinguish fires, rescue workers and provide first aid. These personnel are regular workers who are specially trained for

emergencies. I think they can manage small-scale fires and medium-scale fires on their own. However, they cannot extinguish large fires except in a few cases. Factory management should increase the number of trained personnel to effectively manage large-scale fires. This will protect the factory and us if outside emergency agencies take longer than expected to respond to a fire incident. (Interviewee 1, 9 October 2025)

Emergency Responders' Contact Numbers

Each factory maintains a list of emergency contact numbers for responders such as the fire service, police station, ambulance service, hospital, and office. Factories display these numbers on every floor and in other key locations so that anyone can contact emergency responders during emergencies. This can be seen in the following quote:

A list of contact numbers, including the fire service, ambulance service, nearby hospital, police station, and office, is posted on the board throughout the factory. This ensures easy access to emergency responders if needed during a fire or other emergencies. (Interview 33, 6 March 2026)

Fire Safety Preparedness at the Worker Level

Causes of Fire Hazards

All participants are aware of one or more factors that can cause fires in their factories. Some of these factors include electrical short circuits caused by issues such as loose or twisted wires, broken or burnt sockets, and the accumulation of dust on electrical equipment and machinery; machinery-related problems such as overheating; the placement of flammable materials near heat sources; improper storage or handling of flammable liquids; and smoking within the factory premises. Among the participants who experienced factory fires, the majority identified electrical short circuits as the primary cause. This understanding is reflected in the following quotes:

Electrical short circuits caused by issues such as loose or twisted wires, overheating of machinery, the proximity of flammable objects to heat sources, unsafe storage or handling of flammable liquids, and smoking inside the factory premises can also cause a fire. Most fire incidents in our factory resulted from electrical short circuits. (Interviewee 4, 17 October 2025)

Most of the fire incidents at our factory are caused by electrical short circuits. Other causes include machinery-related issues such as overheating, unsafe storage of flammable liquids, and smoking inside the factory. (Interviewee 31, 1 March 2026)

Evacuations

All participants know that when the alarm sounds during a fire, they should immediately exit the building and proceed to the assembly point. Moreover, everyone knows the assembly point. Additionally, all workers know that they should evacuate calmly. However, most workers do not evacuate calmly and in an orderly manner. Instead, they panic and run while evacuating the factory building. The gap between workers' knowledge and their practices is evident in the following quotes:

When I hear the fire alarm, I should quickly evacuate the factory. During evacuation, I should follow the established evacuation procedure. I should not panic or run; instead, I should evacuate calmly and in an orderly manner to prevent injuries. (Interviewee 2, 10 October 2025)

During a fire emergency, I know that I should stay calm. But most of us panic and run to the assembly point. As a result, we sometimes get injured. (Interviewee 34, 6 March 2026)

I know that I should not run during a fire and should follow the standard evacuation procedures. However, during a previous fire, I felt panicked and frightened and I ran to the assembly point. Most workers did the same. As a result, workers collided, fell, and were stampeded on emergency pathways and 15 to 20 workers were injured. (Interviewee 5, 17 October 2025)

Similarly, although all but a few workers know that they should not waste time collecting personal belongings when evacuating to a safe place, many still do so during a fire. In addition, although most participants know that they should not use the lift during evacuations, a few, unfortunately, do not know this. This can be understood from the following quote:

I know that we should not prioritise collecting personal belongings over evacuating. Instead, we should evacuate immediately to the designated assembly point. Although most workers, except a few, know this, many still try to collect their personal belongings first. I do not know whether I should avoid using the lift during a fire. (Interviewee 32, 6 March 2026)

Safety from Smoke

Most participants do not know how to protect themselves from smoke during a fire, while many do. They know they need to stay low and crawl on their hands and knees, and if possible, cover their noses and mouths with a wet cloth or, if unavailable, a dry one, to reduce smoke inhalation. Evidence of both awareness and lack of awareness on this is demonstrated by the following quotes:

Smoke from a fire is just as dangerous as the fire itself. To avoid inhaling it, one should stay low, crawl and cover the nose and mouth with a wet cloth or, if a wet cloth is unavailable, with a dry cloth. (Interviewee 12, 19 October 2025)

I do not know how I can save myself if I get trapped in a room full of smoke during a fire. Since I am not educated and the authorities have not yet provided me with any instructions on this, I am completely unaware of how to protect myself from inhaling smoke during a fire. (Interviewee 33, 6 March 2026)

Actions to Take when Trapped inside a Building

Only a few participants know what to do if they become trapped inside a building during a fire. They stated that they should try to get close to a window and signal for help through it. They also mentioned that they should go to the roof if evacuating the building is not possible, or if reaching the roof is safer than descending when someone is near the roof floor during a fire. The understanding or lack of understanding of what actions to take when trapped inside a building can be understood from the following quotes:

During a fire emergency, if I get trapped inside a building, I should try to signal my presence through the windows. If exiting the building is not possible or if reaching the roof is safer than exiting, given my location near the roof, then I should go to the roof. (Interviewee 3, 10 October 2025)

I have no idea what to do if I get trapped inside the factory building during a fire. I do not know how I can rescue myself or communicate with a rescuer to ask for help if I am trapped inside the building. (Interviewee 6, 17 October 2025)

Stop, Drop, and Roll

All participants demonstrate that they know what to do if they catch fire. They know that they should stop immediately, lie down, and roll on the floor to extinguish the fire. All participants are also aware of the procedures to follow when assisting a co-worker who catches fire. This can be understood from the following quotes:

If my clothes catch fire, I should not panic or run. I should stop immediately, lie down on the floor, and roll to extinguish the flames. If someone else catches fire, I should cover them with a thick blanket to put out the flames. (Interviewee 9, 18 October 2025)

I should not panic or run if my clothes catch fire. Instead, I should stop immediately, drop to the floor, and roll to put out the flames. (Interviewee 17, 21 October 2025)

Know the Location and Use of Firefighting Equipment

Every worker, except those who are also firefighters, knows the locations of a small number of pieces of firefighting equipment and most do not know how to use any of the equipment. Although some know, they only know how to use some equipment. However, firefighters know the locations and uses of all the equipment. This can be understood from the following quotes:

I know the locations of some firefighting equipment, including fire extinguishers and hose reel pipes. But I do not know how to use firefighting equipment. (Interviewee 22, 26 February 2026)

As a member of the firefighting team, I know the locations and use of all firefighting equipment at our factory. (Interviewee 1, 9 October 2025)

Knowledge of the Emergency Responders' Contact Number

Except for a few exceptions, all participants know at least one emergency contact number to call in case of an emergency, such as a fire. Only some participants know more than one emergency contact number, including those for fire services, ambulances, and other services. Workers' knowledge of the emergency responders' contact information can be understood from the following quotes:

I only know the emergency contact number 999, which I can call for help during any emergency, such as a fire. (Interviewee 6, 17 October 2025)

I know the emergency contact number 999 to call during an emergency like a fire. I also know the contact numbers for other emergency services, such as fire departments and ambulance services. (Interviewee 1, 9 October 2025)

I do not know any emergency contact numbers I can call for help during a fire or other emergencies. (Interviewee 18, 21 October 2025)

DISCUSSION

The findings show that all the factories have a safety committee, a fire prevention plan, an early fire warning system and an emergency action plan. Although each factory has a fire prevention plan and an early fire warning system, a few participants believe that some fire warning devices are not functional and may not work properly during a fire. Moreover, a few believe that although these devices are inspected, the inspections are not regular. Other studies also show that some workers believe that fire alarms are not functional and are not inspected regularly (Habib et al., 2022).

Moreover, all the factories have clearly marked emergency pathways and exits, as well as a designated assembly point. Unlike other studies, this study found that exit signs are clearly marked in all the factories studied (Alam, 2020). However, emergency pathways are sometimes blocked by packages and other objects, which is consistent with previous research (Alam, 2020). Similarly, workroom doors are sometimes blocked by goods or materials due to delays in relocating them to designated storage areas. However, unlike other studies, this study found that room doors are never locked (Ahmed & Hossain, 2009). Likewise, the area outside the exit gates, which leads to the assembly point, is sometimes obstructed by ongoing loading and unloading activities of raw materials and products in front of the building's exit gates. Other studies also found that the exit gates remain blocked (Alam, 2020). However, unlike other studies, this study found that the exit gate leading to the assembly point is not locked (Mizanuzzaman, 2016; Stanwick & Stanwick, 2015; Ahmed & Hossain, 2009). A considerable number of participants believe that the staircases are not wide enough for everyone to evacuate simultaneously. Thus, narrow staircases increase the risk of falls and stampedes and can cause more injuries and fatalities during a fire. Other studies also show that narrow staircases act as barriers to evacuation and can cause injuries and fatalities during a fire (Ahmed & Hossain, 2009).

Although the factory provides regular training on fires and other hazards to members of the firefighting, rescue and first aid teams, workers who are not members of these teams do not receive intensive fire safety training.

However, they receive briefings on basic fire safety and evacuation procedures upon recruitment and at various times, particularly during internal evacuation drills, from the factory's fire safety teams. In some factories, all workers also receive basic training on fire safety and evacuation procedures from external agencies such as RSC. Moreover, the participation of most workers in six fire and evacuation drills indicates increased efforts by RMG factories to improve fire safety preparedness, as previous studies show that most RMG factories in Bangladesh conduct only two fire drills (Habib et al., 2022). Nevertheless, the findings reveal a discrepancy between workers' and factory management's perspectives on the frequency of internal evacuation drills. One of the main reasons for this is that internal evacuation drills are conducted without involving all units or all workers, particularly those in the production department. Thus, the participation of all workers should be ensured during these drills.

Although each factory conducts regular inspections of utility lines and machinery and focuses on the safe storage of hazardous and flammable chemicals to meet safety standards and prevent fires, improvements in chemical storage are still required as experts and workers who handle chemicals sometimes do not store and dispose of them properly after finishing their work.

Likewise, although each factory has firefighting equipment, a few participants believe that some extinguishers are not functional and thus will not work during a fire. Moreover, a few participants think that fire extinguishers are not checked regularly. Both these findings are consistent with previous research (Habib et al., 2022). Moreover, while a few participants believe that the available fire equipment can handle a large fire, all participants believe that the factories should increase their stock of firefighting equipment to extinguish fires more effectively.

The findings show that each factory has trained personnel for firefighting, rescue, and first aid and that team members remain available during the factory's operating hours to respond promptly to emergencies such as fires. However, although a few participants believe they can manage large-sized fires, all participants believe that the factories should increase the number of trained personnel. Each factory displays emergency responders' contact numbers to ensure easy access to them during a fire or other emergencies.

At the worker level, findings show that all RMG workers know at least one or more factors that can cause a fire in their factory. Moreover, most participants who experienced factory fires cited electrical short circuits as the primary cause, consistent with previous research (Hossain, 2016). All participants know that they should immediately exit the building and proceed to the assembly point when the automatic alarm sounds. Everyone also knows the assembly point, which sharply differs from previous research, such as Alam's (2020) study, which found that only 45 percent knew it. Moreover, although all workers know they should calmly evacuate the building during a fire, most panic and run. Other studies also show that fire alarms create panic, and when workers cannot stay calm, they perform unexpected actions that can cause injuries and fatalities (Mizanuzzaman, 2016). Furthermore, many workers try to collect their personal belongings before evacuation, and a few do not even know that they should avoid using the lift during evacuations. Findings also show that most participants do not know how to protect themselves from smoke or what to do if they become trapped inside the building during a fire. As smoke inhalation is one of the main causes of injuries and deaths during a fire at RMG factories in Bangladesh, workers need to be educated about this (Stanwick & Stanwick, 2015; Mizanuzzaman, 2016). Similarly, as workers often become trapped inside a building during a fire, they need to be properly trained on the actions to take when trapped (Stanwick & Stanwick, 2015; Ahmed & Hossain, 2009).

The findings also show that all workers know the stop, drop and roll technique. Additionally, everyone knows the locations of a small number of firefighting equipment although most do not know how to use any of it. Other studies show that almost 99 percent of workers know the location of fire equipment in the room where they work (ILO, 2019). However, unlike other studies, this study shows that most workers do not know how to use fire equipment (ILO, 2019). Furthermore, with a few exceptions, everyone knows at least one emergency contact number to call in an emergency, such as for a fire, consistent with previous research (Alam, 2020).

Finally, the Sustainable Development Goals (SDGs), specifically Goals 8 and 9, emphasise the importance of establishing a safe and secure workplace, promoting sustainable industrial practices and fostering inclusive and sustainable industrialisation (UN, 2015). The Sendai Framework for Disaster Risk Reduction also emphasises the need to enhance workplace resilience to disaster risks (UNDRR, 2015). The study findings will help policymakers, relevant government agencies, factory owners, workers, and other stakeholders achieve the SDG

goals and the outcome and goal of the Sendai Framework by implementing appropriate measures to strengthen the resilience of the RMG industry and its workers to fire hazards in Bangladesh and similar countries.

CONCLUSIONS

The RMG sector in Bangladesh still faces challenges related to fire safety. The study shows that, despite various initiatives RMG factories have taken to enhance fire safety preparedness for their factories and workers, there are areas that warrant targeted interventions to strengthen the resilience of RMG factories and their workers to fire hazards. For instance, although numerous measures have been implemented to ensure safe evacuation and proper handling and storage of chemicals, factories should make further efforts to ensure that emergency pathways, room doors and the area outside the emergency gate that leads to the assembly point from the building always remain unobstructed and that chemicals are always handled and stored properly. Additionally, factories should make greater efforts to regularly inspect fire alarms and firefighting equipment, provide more intensive and inclusive fire training and ensure the participation of all workers in evacuation drills. At the worker level, serious efforts are needed in certain areas, such as ensuring that workers evacuate the building following established procedures instead of panicking and running, ensuring that they do not waste time collecting personal belongings before evacuating to safe places and ensuring that they know what to do to protect themselves from smoke inhalation and what to do if they become trapped inside the building.

Finally, relevant government agencies, such as the Department of Inspection of Factories and Institutions (DIFI) and DFSCD, and private initiatives, such as the RSC, should conduct routine inspections of RMG factories to ensure compliance with required fire safety standards and to enforce remedial actions when non-compliance is identified. Establishing a safe working environment that protects all workers from fire and other occupational safety and health risks in RMG factories is vital for achieving SDG goals related to safe and secure workplaces, sustainable industrial practices and inclusive industrial development. The study findings will help all stakeholders devise and implement policies to enhance the resilience of RMG factories and their workers to fire incidents, thereby contributing to the achievement of SDG goals and the implementation of the priority actions of the Sendai Framework by reducing fire risks and fire-related casualties, injuries, and economic losses in Bangladesh's RMG industry.

Author Contributions

Conceptualisation: SKS; Data curation: SKS & OKS; Formal analysis: SKS & OKS; Funding: SKS; Investigation: SKS & OKS; Methodology: SKS; Project administration: SKS; Resources: SKS; Validation: SKS; Visualisation: SKS; Writing – original draft: SKS; Writing – review and editing: SKS.

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Institutional Review Board Statement

The ethical aspects of this research were approved by the Research Ethics Board of Shahjalal University of Science and Technology, Sylhet, Bangladesh. The ethical approval reference number was: Ref: SREB/SSS/SOC/01 (2025).

Informed Consent Statement

Informed consent was obtained from all the participants involved in the research.

Data Availability Statement

The qualitative data are not publicly available due to privacy concerns.

Conflicts of Interest

The authors declare no conflict of interest.

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