

# Policy Brief

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সেন্টার ফর পলিসি ডায়ালগ (সিপিডি)  
Centre for Policy Dialogue (CPD)



## Highlights

- The plastic industry, contributing 1 per cent to Bangladesh's GDP and generating USD 166.25 million in export revenue, grapples with severe OSH challenges such as structural issues, substandard conditions, and reliance on complex machinery contribute to workplace hazards, including fire, chemical exposure, and electrical risks.
- This survey highlights the dynamics of Bangladesh's plastic industry, revealing a predominantly micro enterprise-dominated sector which operates primarily in the domestic market. The study emphasises critical gaps in OSH practices, necessitating a broader approach to address unique challenges in the sector.
- The study finds alarming gaps in fire safety, non-compliance with gas pipeline regulations, and inadequacies in electrical safety facilities within plastic industry. These vulnerabilities underscore the pressing need for immediate corrective measures, combining legal obligations with proactive safety initiatives at factory level.
- Plastic industry workers face extreme working conditions, including heat, draughts, and inadequate ventilation with accidents and injuries remaining underreported, highlighting the need for designated OSH personnel and strategic interventions to address workers' concerns and enhance safety standards at factory level.

## Safety Risks in the Plastic Sector

### How to Improve Occupational Safety and Health (OSH) Standards?

Khondaker Golam Moazzem and Jebunnesa\*

#### 1. BACKGROUND AND OBJECTIVES

The plastic industry in Bangladesh, a major non-RMG (Readymade Garments) sector, contributes around 1 per cent to the country's Gross Domestic Product (GDP) through approximately 5,000 manufacturing units. Despite generating USD 166.25 million in export revenue in FY2021, the sector faces challenges, particularly in workplace safety due to its labour-intensive nature. Operating mostly within the domestic value chain, plastic enterprises often neglect safety standards in the absence of the pressure for compliance from international buyers.

The plastic industry faces unique challenges, such as structural issues due to small-scale operations in non-designed spaces, informal segments leading to substandard conditions, and reliance on complex machinery contributing to accidents and worker fatigue. Additionally, Occupational Safety and Health (OSH) problems encompass fire safety concerns due to the flammable nature of plastic, exposure to hazardous chemicals, and electrical safety risks. Combining legal obligations with proactive safety initiatives at the factory level can enhance the overall OSH preparedness of the sector.

Against the backdrop, the study aims to identify compliance gaps and weaknesses in OSH practices at the enterprise level, providing a foundation for recommendations to enhance safety standards within the sector. More specifically, objectives include assessing OSH practices at the enterprise level, examining the extent of laws and regulations implementation, and analysing workers' perceptions regarding OSH practices.

\* Dr Khondaker Golam Moazzem is the Research Director of the Centre for Policy Dialogue (CPD), and Ms Jebunnesa is a Programme Associate at CPD.

## 2. METHODOLOGY

The study focused on generating primary data through conducting a survey on OSH standards in the plastic sector at the enterprise level. The survey consisted of two sections, one for management and another for workers. Management-level questions aimed to establish a baseline regarding OSH compliances, safety measures, awareness of industrial safety, public agency involvement, and buyer engagement on safety issues. Worker-level questions gathered perspectives on OSH standards, policies, awareness level and training on safety issues. The study adopted survey instruments from the non-RMG factory inspection checklist by the Department of Inspection for Factories and Establishments (DIFE) and an OSH Vulnerability Measure survey.

The sample size for management level involved 50 factories, while the worker-level survey included 100 workers from these factories, focusing on fire, electrical, and structural safety in Dhaka, Gazipur, and Narayanganj districts. The factories were classified based on size: 2 large, 8 medium, 20 small, and 20 micros.

## 3. ENTERPRISE LANDSCAPE IN THE PLASTIC INDUSTRY: SAMPLE SURVEY

The sample enterprise landscape analysis provides a comprehensive overview and dynamics of the plastic sector in

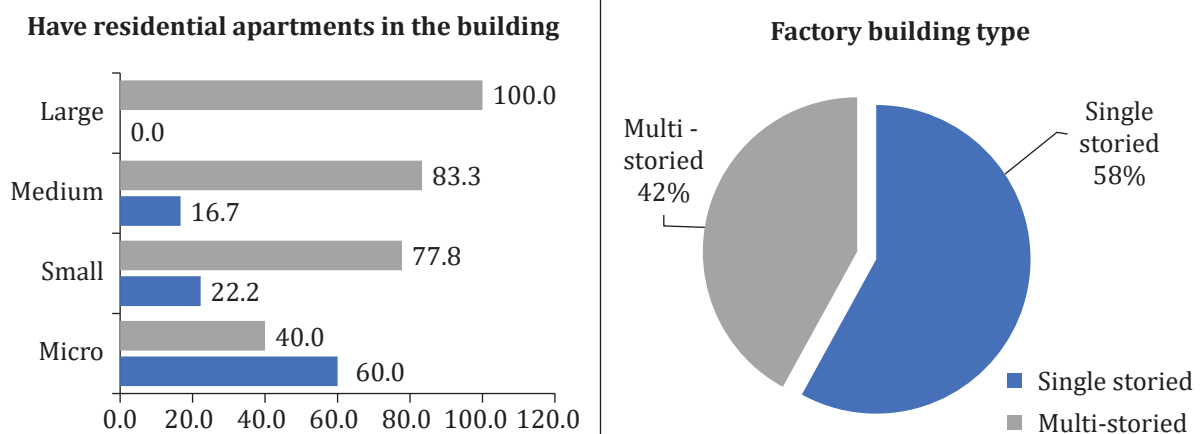
Bangladesh, focusing on factory demographics, market exposure, employment and management structure, and membership status as given below (Figure 1).

**Factory demographics:** The plastic factories in Bangladesh vary in size, ownership, building type, and location. Notably, all factories are domestically owned, with a majority (56 per cent) in rented spaces. The distribution shows micro and small enterprises predominantly operate in rented spaces, and 42 per cent of the factories are in multi-storied buildings where a significant portion is operating in residential apartments.

**Market exposure:** The data on market exposure reveals that 24 per cent of the surveyed factories engage in exporting products to foreign countries, while 76 per cent primarily operate within the domestic market. For exporting factories, major destinations include China, the USA, Italy, and Saudi Arabia, suggesting that many factories operate outside international safety standards commonly followed in developed markets such as the EU.

**Employment and management structure:** The majority of the surveyed factories (40 per cent) have 1-50 workers, and the sector is male-dominated (80:20 male-to-female ratio) (Table 1). The workforce composition indicates that the industry has relatively young management professionals, with the majority having 3-10 years of experience indicating frequent migration of skilled employees.

**Figure 1** Building Types and Information About the Existence of Residential Apartments



Source: CPD Plastic Sector Survey, 2023.

**Table 1** Proportions of Male and Female Workers Based on Factory Size (in per cent)

Factory Size	Female Worker	Male Worker
Large	30.2	69.8
Medium	25.8	74.2
Small	21.8	78.2
Micro	4.8	95.2
Overall	20.7	79.3

Source: CPD Plastic Sector Survey, 2023.

**Membership Status:** Private organisations play a crucial role in promoting OSH in the plastic sector. The Bangladesh Plastic Goods Manufacturers & Exporters Association (BPGMEA) is prominent, with a high frequency of membership (94 per cent). Other organisations include Plastic Byabosayee Samity, and a few factories (6 per cent) are not members of any organisation.

#### 4. ENTERPRISE-LEVEL OSH VULNERABILITY PROFILE OF THE PLASTIC INDUSTRY: SAMPLE SURVEY

**Level of fire safety practices:** Fire safety practices in plastic factories are crucial for worker safety and asset protection. Data reveals that around 52 per cent of factory stairs do not open to the roof, potentially causing more casualties in case of emergencies (Table 2). Additionally, 64 per cent of factories restrict workers' access to the roof, hindering evacuation during fires.

**Table 3** Proportions of Male and Female Workers Based

Firefighting facilities	(in per cent)				
	Micro	Small	Medium	Large	Total
A documented fire safety plan	25.0	45.0	62.5	100.0	42.0
Installed Fire hydrant system	5.0	0.0	50.0	100.0	14.0
Hosepipes/hose reels on every floor	10.0	5.0	50.0	100.0	18.0
Risers	0.0	0.0	0.0	100.0	4.0
An auto-transfer system for hydrants and pumps	0.0	5.0	25.0	100.0	10.0
Pillar hydrants	0.0	0.0	0.0	100.0	4.0
Sprinklers	0.0	0.0	0.0	100.0	4.0
Repeater control panels, annunciator, key switches, indicator monitors	0.0	0.0	12.5	100.0	6.0

(Table 3 contd.)

**Table 2** Levels of Fire Safety Practices (in per cent)

Size	Factory stairs open to the roof	Workers have access to the roof
	Yes	Yes
Micro	40.0	15.0
Small	45.0	5.0
Medium	62.5	12.5
Large	100.0	100.0
<b>Total</b>	<b>48.0</b>	<b>36.0</b>

Source: CPD Plastic Sector Survey, 2023.

Table 3 presents the availability of firefighting facilities at factory premises. While some factories have firefighting measures like documented fire safety plans (42 per cent), installed fire hydrant systems (14 per cent), and 24/7 safety officers (46 per cent), critical facilities like pillar hydrants and sprinklers are present in only 4 per cent of the factories. Fire drills are conducted in 72 per cent of factories annually and 8 per cent monthly, but 20 per cent do not practice any drills, especially the micro-enterprises (45 per cent).

Different types of chemicals used in the plastic industry which have different levels of health and safety risks (Table 4). Factories use chemicals like flammable gases (30 per cent), calcium carbide (12 per cent) and Ammonium Nitrate (8 per cent), raising concerns about mishandling risks. However, inspection lacks check on frequently used plastics and

(Table 3 contd.)

<b>Firefighting facilities</b>	<b>Micro</b>	<b>Small</b>	<b>Medium</b>	<b>Large</b>	<b>Total</b>
A round-the-clock safety officer	35.0	35.0	87.5	100.0	46.0
Smoke detectors and heat detectors or multi-detectors	10.0	5.0	50.0	100.0	18.0
Fire alarm systems	20.0	20.0	75.0	100.0	32.0
Emergency lights and exit signage	15.0	35.0	25.0	100.0	28.0
Fireproof decoration/false ceiling	0.0	5.0	12.5	100.0	8.0
Ducts/wall holes sealed by fireproof material/fire stoppers	5.0	5.0	0.0	100.0	8.0
Easily accessible emergency exit stairs	15.0	20.0	37.5	100.0	24.0
Underground water reservoir	15.0	45.0	25.0	100.0	32.0
Fire equipment and fire extinguishers	60.0	95.0	87.5	100.0	80.0
Personal protective equipment (PPEs) for each worker	0.0	15.0	62.5	0.0	16.0

**Source:** CPD Plastic Sector Survey, 2023.

**Table 4** Chemicals Used in Plastic Sector

<b>Chemicals</b>	<b>Micro</b>	<b>Small</b>	<b>Medium</b>	<b>Large</b>	<b>Overall</b>
Ammonium Nitrate (NH <sub>4</sub> NO <sub>3</sub> )	5	15	12.5	0	8
Calcium Carbide (CaC <sub>2</sub> )	5	15	12.5	50	12
Petroleum	10	0	0	0	4
Flammable Liquid Chemicals	10	5	0	0	6
Gases (LPG, Oxygen, Natural Gas, Ammonia, Nitrogen Carbon dioxide, Helium, Argon)	10	40	50	50	30

**Source:** CPD Plastic Sector Survey, 2023.

additives in the industry, which may pose hazards like chemical exposure, toxic fumes inhalation, and fire risks.

**Level of structural safety practices:** Structural safety practices in plastic factories are a significant concern, covering layout of the factory, gas pipeline compliance, protection of dangerous machine parts, and essential OSH facilities. According to the findings, only 14 per cent of factories comply with gas pipeline regulations (Table 5), posing a substantial risk of gas leaks, while 74 per cent do not adhere to the regulations, there's a lack of protective measures, with only 18 per cent having fireproof walls around dangerous machine parts, and 54 per cent uncertain about machine safeguards, increasing the risk of accidents and injuries. In terms of OSH

facilities, 82 per cent provide safe drinking water, but critical components like regular hydraulic tests (12 per cent) and an approved storehouse (6 per cent) are notably absent, compromising workers' safety during emergencies.

Additionally, the findings highlight the unsatisfactory rate of safety tests and training. Notably, 42 per cent have not provided training on the storage of hazardous substances, increasing the risk of mishandling and improper storage and 46 per cent lacking electrical test certificates. Overall, the data underscores a concerning lack of adherence to safety regulations and implementation of necessary measures in surveyed plastic factories, posing serious risks to workers' well-being and the potential for accidents and chemical exposure.

**Table 5** Factories Having Gas Pipelines Laid Underground as per Gas Pipeline Regulations

Size	Yes (%)	No (%)	Not sure (%)
Micro	5.0	90.0	5.0
Small	15.0	60.0	25.0
Medium	12.5	35.0	0.0
Large	100.0	0.0	0.0
<b>Total</b>	<b>14.0</b>	<b>74.0</b>	<b>12.0</b>

Source: CPD Plastic Sector Survey, 2023.

**Level of electrical safety practices:** Electrical safety practices in plastic factories are crucial for mitigating potential risks associated with electrical hazards (Table 6). Regarding electrical safety facilities, 32 per cent of factories have rescue instructions posted in Bengali and English languages, 58 per cent have measures to prevent charging shocks, and 66 per cent have an earthing system. However, only 30 per cent have metal coverings for joint boxes, fuse covers, and lamp holders, 34 per cent display 'Dangerous'

messages on generators and motors, 34 per cent maintain a safe space in front of main switchboards, and 26 per cent ensure stable frames or base plates for generators, transformers, and motors. Overall, data suggests that electrical security in plastic factories is in a weak state.

Moreover, the data reveals disparities in capacity of protection of different electrical equipment used in different types of factories (Table 7). In the case of the separating wall for generator, 20 per

**Table 6** Presence of Electrical Safety Facilities Status on Factory Premises

Electrical safety facilities	<i>(in per cent)</i>				
	Micro	Small	Medium	Large	Overall
Instructions in Bengali and English posted for the recovery of electrocuted persons in an easily visible place where electricity is used	10	35	63	100	32
Cut-outs, circuit breaker circuits and devices arranged to prevent charging shock	35	70	88	50	58
Frames or base plates of generators, transformers, switchgear, and motors	15	15	63	100	26
Metal coverings of joint boxes, fuse covers, lamp holders	35	20	38	50	30
Earthing system	65	60	75	100	66
A plate with the message 'Dangerous' in Bengali and 'Dangerous' in English languages is permanently displayed on every generator and motor	15	45	38	100	34
Three-foot wide space in front of the main switchboard	25	30	50	100	34

Source: CPD Plastic Sector Survey, 2023.

**Table 7** Level of Electrical Safety Status

The generator is separated by	Per cent	The electrical substation and substation equipment are separated by	Per cent
2-hour fire-rated wall with earthing	20	4-hour fireproof walls	14
3-hour fire-rated wall without earthing	4	3-hour fireproof walls	8
4-hour fire-rated wall with earthing	4	2-hour fireproof walls	4

Source: CPD Plastic Sector Survey, 2023.

**Table 8** Impact of Having an OSH Person on the Number of Accidents and Injury in the Last Five Years

Have designated OSH person	Number of scidents	Number of injuries (Fatal & non-fatal)
Yes	7	7
No	36	20
<b>Total</b>	<b>43</b>	<b>27</b>

Source: CPD Plastic Sector Survey, 2023.

cent factories have a 2-hour fire-rated wall with earthing, 4 per cent have a 3-hour fire-rated wall without earthing, and 4 per cent have a 4-hour fire-rated wall with earthing. These variations indicate asymmetric information and differentiate awareness levels regarding safety protocols and legal bindings.

The data also highlights interesting findings, such as the cost-cutting theory not aligning with the actual percentages. According to the findings, relatively cheap and small safety equipment were absent more compared to bigger facilities, suggesting OSH initiatives may rely more on habitual practices and lack of awareness rather than the cost of safety equipment itself.

**Accidents and injury:** The review of accidents and injuries in surveyed plastic factories over the last five years highlights a

concerning trend with 43 accidents and 27 fatal or non-fatal injuries during this period within the surveyed factories. Interestingly the accidents are not reflected in the DIFE annual reports, underscoring the problem of under-reported incidents and lack of documentation in these factories.

Factories lacking designated OSH personnel reported higher accident numbers, emphasising the importance of having dedicated safety professionals. The data (Table-8) suggests that having designated OSH personnel enables factories to prioritise safety measures, implement preventive strategies, and respond promptly to incidents, thereby reducing accidents and injuries.

**Workers' perception:** Understanding occupational safety and health (OSH) practices at the factory level is crucial for fostering a secure work environment. Table 9 provides insights into workers' experiences, revealing that 99 per cent endure extreme heat, 80 per cent face draughts, 69 per cent experience discomfort due to temperature changes, and 45 per cent lack fresh air. Female workers express higher concerns about chemical hazards, dust, smoke, changing temperature, and lack of light. Workers also showed concerns regarding noise levels, manual lifting, and repetitive strain injuries, indicating potential health risks for workers.

**Table 9** Workers' Perspective on the Factory Environment

Workers suffer from	Male	Female	Overall
The cold	12.3	11.1	12.0
The heat	98.6	100.0	99.0
The changes in temperature	64.4	81.5	69.0
The draught	84.9	66.7	80.0
The lack of fresh air	43.8	48.1	45.0
The low light/ lack of lighting	32.9	48.1	37.0
The stench	30.1	37.0	32.0
The dust	4.1	11.1	6.0
The smoke	8.2	14.8	10.0
Chemical hazards like leakage, vapour, gas, emissions	19.2	40.7	25.0
Noise	31.5	33.3	32.0

Source: CPD Plastic Sector Survey, 2023.

In the case of providing support for injured workers, 74 per cent of factories offer free medical attention and 60 per cent provide paid sick leave for severe injuries. However, 23 per cent offer only unpaid sick leave, possibly discouraging prompt injury reporting. Nonetheless, the findings reflect positive changes in workers' perceptions of safety, with 68 per cent feeling improvement, while 7 per cent still feel unsafe, and 25 per cent believe safety remains the same.

## 5. DRIVERS AND CONSTRAINTS FOR OSH IMPROVEMENT IN THE PLASTIC ENTERPRISES

**Role of public organisations:** According to the findings, Dhaka has undergone the highest number of inspections (24), followed by Gazipur (9) and Narayanganj (5), highlighting potential challenges in resource allocation and the need for better coverage.

Larger factories undergo more frequent inspections (16-20 in the last five years) than micro-factories (1-5 inspections), indicating non-uniform safety standards across the sector. Alarming, 24 per cent of factories have not faced any inspection in the last five years. Accidents are not reported to any authority in 30 per cent of factories, hindering root cause identification and preventive measures, compromising overall safety. While worker training receives significant support (54 per cent), there is room for increased emphasis on management training (22 per cent) and inspection follow-up (26 per cent) to strengthen safety commitment from the public authorities.

**Role of private organisations:** As highlighted in the findings, employers' organisations and private authorities prioritise awareness and management training as their support instrument to the member factories. But to become a member of these private organisations, the enterprise is not required to show any compliance status of their factories.

For factories involved in exports, 50 per cent of clients, brands, or buyers actively audit factory sites to assess OSH performance, showcasing external stakeholder engagement

in monitoring safety. However, 33.33 per cent of clients do not actively measure OSH performance, suggesting potential areas for improvement in accountability and compliance.

## 6. RECOMMENDATIONS FOR IMPROVEMENT OF SAFETY STANDARDS OF THE PLASTIC SECTOR

According to the study findings, the plastic sector in Bangladesh faces four major weaknesses affecting OSH standards in the enterprise level, including the prevalence of micro-small factories with low compliance standards, exposure to severe safety risks in residential and multistoried rented locations, an overemphasis on the domestic market with minimal compliance pressure, and a lack of direct monitoring and surveillance. The subsequent set of recommendations aims to strategically address and eliminate these weaknesses to enhance OSH standards in the country's plastic factory sector.

### **A Five-to-Ten-year strategic plan for sustainable growth:**

To enhance OSH standards in the plastic industry and boost competitiveness in export markets, a comprehensive 5-10-year strategic plan is essential. This plan should align with global standards, prioritise sustainability, and involve collaboration with ministries, agencies, and workers' organisations. It needs to encompass not only product and market development but also consider OSH, environmental impact, circularity, global commitments, and post-graduation opportunities, aiming to transform the plastic industry into a compliant and sustainable export-oriented sector.

### **Immediate relocation of factories to industrial zones:**

There is a pressing need for the immediate relocation of factories situated in residential areas and multi-storied buildings to state-of-the-art industrial zones. This strategic move aims to reduce safety risks for workers and the surrounding areas. The proposal involves approval from the government, financial arrangements from the Ministry of Finance, and guidance from the Ministry of Industries. The relocation project should put specific considerations for small and micro enterprises to repay the cost over a 25-year period.



**Establishment of ISU-Plastic by DIFE:** The Department of Inspection for Factories and Establishments (DIFE) should establish a dedicated unit, 'ISU-Plastic', under its Industrial Safety Unit. This unit is tasked with ensuring regular and comprehensive inspections covering all plastic factories in various locations. The unit should co-ordinate inspection frequencies among specific agencies, maintain standard safety protocols, and integrate all relevant information into the LIMA database.

**Active participation of employer organisations:** Employers' organisations, particularly the BPGMEA, should play a proactive role in improving safety standards. By developing a five-year strategic plan with a focus on sustainability and OSH, BPGMEA can lead the sector's transformation. Initiatives may include appointing an OSH

officer, collaborating with safety experts, revising membership criteria to include safety requirements, and encouraging safety-related practices among its members.

**Collaboration for remediation measures:** National and international organisations, such as the International Labour Organization (ILO), should collaborate to expand remediation measures in the plastic sector. BPGMEA can take the lead in partnering with ILO to develop a three-year programme addressing OSH issues. This collaboration may involve monitoring improvements, capacity building, awareness campaigns for both management and workers, establishment of safety committees, and adherence to safety protocols. Special attention can be given to gender-related aspects and work modality issues through pilot programmes like the Better Work Bangladesh Programme.



### **Centre for Policy Dialogue (CPD)**

House 40/C, Road 11 (new), Dhanmondi, Dhaka-1209, Bangladesh  
Telephone: (+88 02) 48118090, 55001185, 58156979 Fax: (+88 02) 48110414  
E-mail: info@cpd.org.bd Website: www.cpd.org.bd