

# Policy Brief

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## Industrial Safety Concerning Chemical Management

### What Lessons Did We Learn from Chittagong ICD Blast?

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## Highlights

- Chemical-related accidents in Bangladesh have significantly increased in recent years (2014 onwards). The majority of these accidents are related to industrial and commercial activities which indicates that industrial safety concerning hazardous chemicals is not an issue involving ICDs only; rather the safety concerns are exposed across the value chain of these chemical products.
- Bangladesh is gradually being industrialised, which means that it will have to deal with a greater quantity of chemical and hazardous goods. As a result, safety concerns about dangerous chemicals must be prioritised.
- The hazardous materials supply chain is governed by various laws, acts, rules, international guidelines, and compliances. Rules, laws, and regulations for each stage of the value chain—production, transportation, storage, and shipment—have yet to be integrated into a framework.
- Apart from monitoring and overseeing institutions in order to reform their inspection protocols, assurance of safety at every stage as well as coordination between relevant authorities needs to be in place. Also, the coordination committee's operation must be regular and effective.

### 1. BACKGROUND AND OBJECTIVES

The blasts at BM Container Depot (BMCD) incident in Chittagong on 4 June 2022 brought industrial safety concerns to the forefront once again. The explosions caused 51 lives, injured over 200 workers, and destroyed assets worth USD110 million.<sup>1</sup> The accident occurred owing to the mishandling of hazardous chemicals—hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) containerised for export. The BMCD had a storage capacity of 6300 containers—65 per cent of the total capacity (4,113 containers)—stored during the explosion. During that period, 867 TEUs of exportable products were stored including readymade garments (RMG), frozen foods, and H<sub>2</sub>O<sub>2</sub>. Besides, 557 container-load of imported products, and 3,000 empty containers were there. Around 27 containers were loaded with chemicals among which 15 were burnt during the explosion. A total of 600 workers worked in the terminal in two shifts. Besides, C&F agents, importers, and transporters—about 1,300–1,500 people were engaged regularly in the depot. The blasts also caused the death of 12 Bangladesh Fire Service and Civil Defense (FSCD) firefighters mainly because of the lack of necessary protection against handling fire originating from chemical products since they were not informed about storing chemicals in the depots.

A committee consisting of seven members is responsible for evaluating inland container depot (ICD) related activities according to the draft Private Inland Container Depot (ICD) and Container Freight Station (CFS) Policy 2021 by the National Board of Revenue (NBR). The committee includes representatives of Customs House, Custom Bond Commissionerate, NBR, Port Authority, the Federation of Bangladesh Chambers of Commerce and Industry (FBCCI), Bangladesh Inland Container Depot Association (BICDA), and Off-Docks department. Even though the committee has been in place, the BMCD was operating without proper authorization and certification for handling hazardous chemicals. Several mismanagements at the end of both owner and authority have been exposed after the incident, starting from the lack of necessary approval for storing chemicals to

<sup>1</sup><https://www.dhakatribune.com/business/2022/06/05/losses-from-chittagong-depot-fire-mount-to-over-110m>

attempting fire rescue with inadequate preparedness. Chemical-related accidents occurred intermittently in the 1980s, 1990s, and 2000s. However, such accidents have significantly increased in recent years (2014 onwards). The majority of these accidents are related to industrial and commercial activities which indicate industrial safety concerning hazardous chemicals is not an issue involving ICDs solely. The safety concerns are exposed across the value chain of these chemicals and hazardous products—production, transportation, storage, and shipment.

This policy brief aims to:

- (a) present overviews of the level of compliances maintained in hazardous chemical-related value chain particularly related to ICD related activities in compliance with various issues including registration, licensing, certification, standardisation; and
- (b) identify weaknesses and safety-related concerns of hazardous chemicals from an industrial safety framework perspective considering occupational safety and health, and put forward a set of recommendations for the improvement of compliance issues.

## 2. ICDs HANDLING CHEMICALS

The ICD, where the incident took place, is a part of a network of international trade of different goods which provides a dry-dock facility at the port to ease the congestion. They are operated privately as an extension of the port terminal facility to provide support by arranging additional logistics and space facilities in case of export and import. The inland container terminal has started operations in 1996. A total of 20 inland container terminals with a storage capacity of 78,700 TEUs are currently in operation, mostly located in Chittagong district and nearby areas. Apart from that, Dhaka ICD is located in Kamlapur, Dhaka. Three key functions of the ICD include:

- Handling of import containers of selected items
- Handling of all export containers
- Storing and handling empty containers

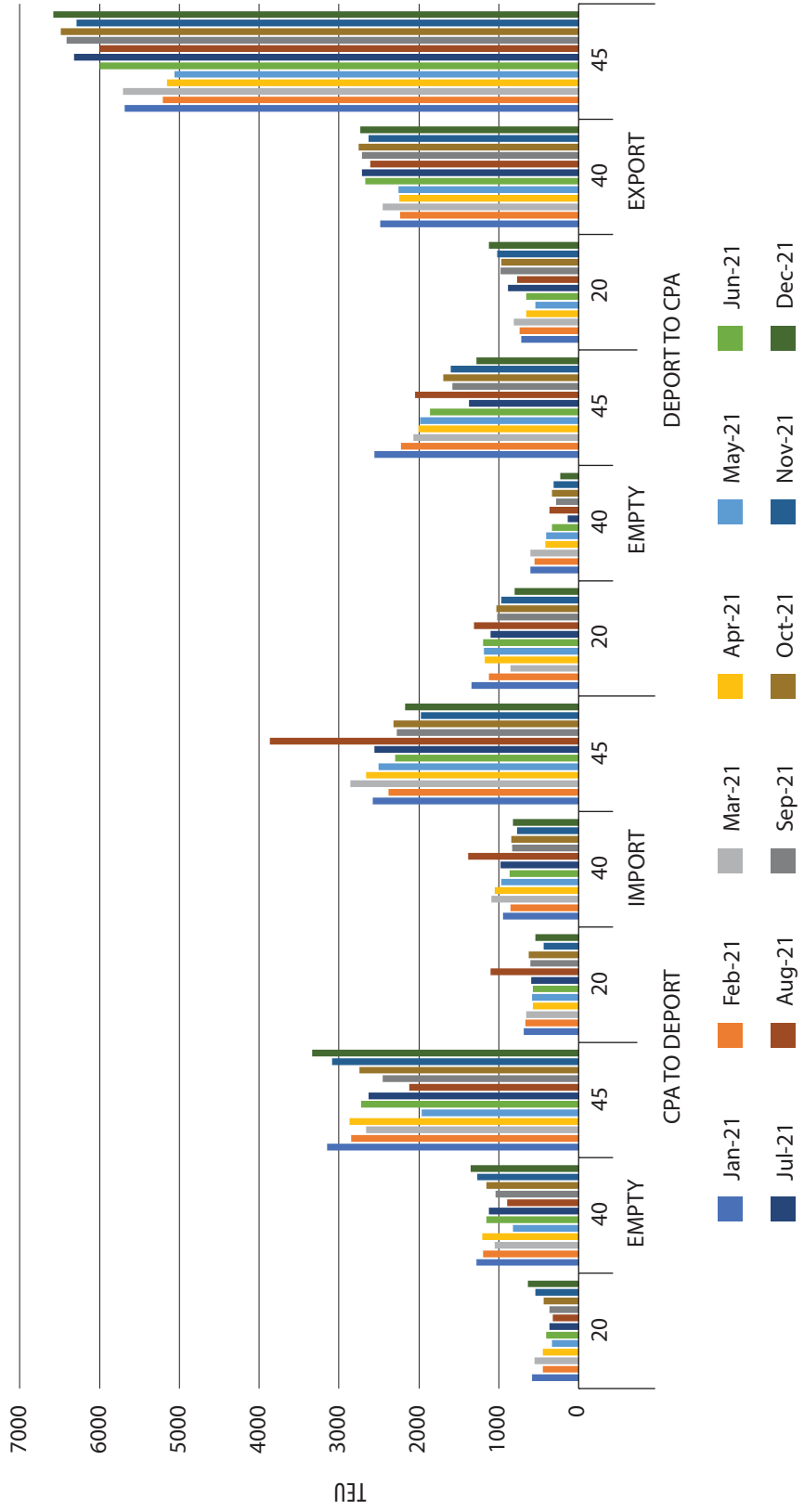
At present 37 import products are allowed at the ICDs. Recently the Customs Port Authority proposed the NBR to allow ICDs to handle an additional 100 import products. During FY2020–21, it handled 51.3 per cent of total export and 18.9 per cent of total imports.

### 2.1 Performance of the ICDs in chemical handling

In Bangladesh, a total of 20 ICDs like the BMCD are in operation of which 17 ICDs are located in Chittagong and nearby areas as reported. These ICDs provide the facility at the import and export stage in the form of storing empty containers (20, 40 and 45 feet) and loaded containers (20, 40 and 45 feet) (Figure 1). In 2021, these ICDs provide support for 9,61,228 boxes, equivalent to 1,562,015 TEUs. Out of these, 59.6 per cent are related to the export stage (depot to port authority) and the rest 40 per cent are related to the import stage (port authority to depot).

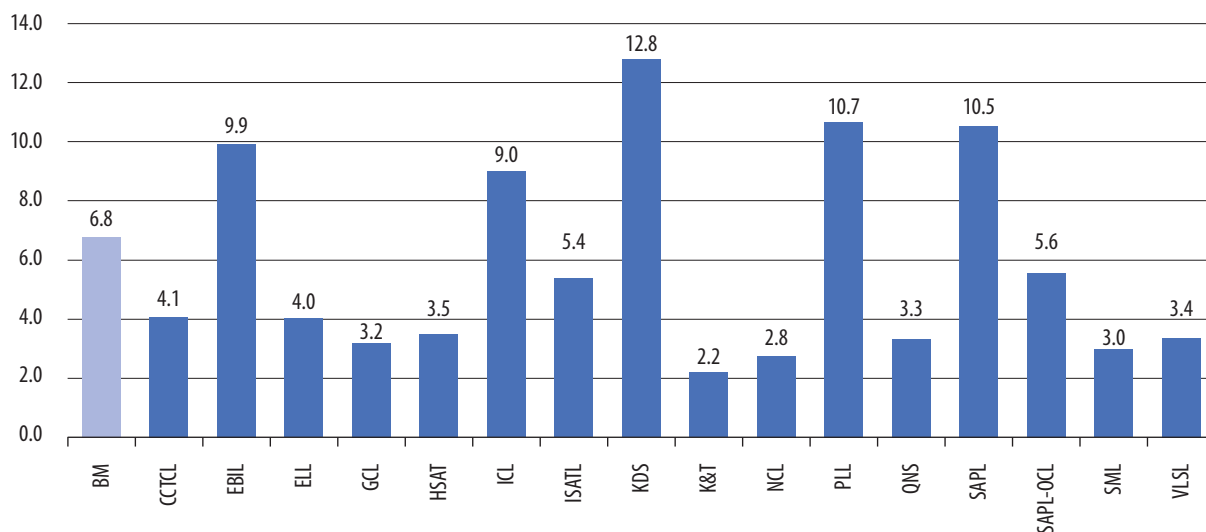
As in Figure 2, among the 17 ICDs, the largest is KDS which handles 12.8 per cent of total containers (in terms of TEUs). This is followed by PLL (10.7 per cent) and SAPL (10.5 per cent) and ICL (9.0 per cent). BMCD handles 6.8 per cent of total containers. In 2021, the use of containers has increased over time in case of export, accompanied by a decline in empty containers perhaps due to a significant rise in export. In case of imports, the use of empty containers has increased; similarly, the number of loaded containers has declined. This can be explained by the increased production and trade volume in the following part. In the Import stage, ICDs cover a few hazardous chemicals including sodium sulphate, fertiliser, soda ash, and carbon black. In the export stage, they cover all kinds of hazardous chemicals as ICDs in Bangladesh is allowed to provide off-dock facility for 100 per cent export products.

**Figure 1** Container Movement at ICs



Source: Authors' accumulation from various sources.

**Figure 2** Share of ICDs in Total Capacity (TEUs)



Source: Authors' accumulation from various sources.

## 2.2 Chemical sector and trade of chemicals in Bangladesh

The recent rise in chemical-related accidents can be explained by the increased amount of chemical export and import in Bangladesh, as the country's chemical industry continues to grow alongside the country's manufacturing industry (e.g., textile, tannery, and apparel industry). The manufacturing processes require various chemicals as raw materials. According to the Survey of Manufacturing Industries (SMI) 2017, a total of 251 businesses manufactured chemicals, with the majority were under three categories namely micro (86), small (103), and medium (35). These enterprises employed about 33,660 workers mainly male workers (86.4 per cent). Apart from the chemical factories, 149 enterprises are found which produce pharmaceutical products that are indirectly linked with chemicals.

However, not all chemicals are considered hazardous or dangerous. A total of 15 substances are classified as hazardous under various international conventions. These include- (a) ammonium nitrate; (b) nitromethane; (c) sodium nitrate; (d) potassium nitrate; (e) sodium chlorate; (f) potassium chlorate; (g) potassium perchlorate; (h) acetone; (i) hydrogen peroxide; (j) nitric acid; (k) urea; (l) aluminium powder; (m) aluminium flakes; (n) calcium ammonium nitrate; (o) acetic anhydride.

Bangladesh imports almost all these chemicals. Urea, acetic anhydride, aluminium powder, acetone, and potassium perchlorate are among the most dangerous chemicals imported. It is important to note from Table 1 that the import of some of the chemicals, known as hazardous, has been increasing given the increased trade volume. These include urea, aluminium powder, potassium nitrate, and acetic anhydride.

**Table 1** Hazardous Chemicals Imported by Bangladesh

Imported Goods	Import ('000 USD)											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Ammonium nitrate	256	181	130	118	142	219	260	147	416	298	228	273
Nitromethene	27	2	53	0	15	31	0	1	0	544	1	3
Sodium nitrate	94	209	102	197	244	169	89	204	171	249	225	152
Potassium nitrate	40	48	320	234	158	185	253	272	148	91	95	307
Sodium chlorate	20	30	19	35	43	7	34	60	39	29	24	6
Potassium chlorate	877	1197	857	410	729	1137	1455	1716	1274	672	618	189
Potassium perchlorate	0	1	1648	1453	1970	555	60	1009	685	981	237	1262
Acetone	1072	1361	1087	1212	1080	1049	1031	1068	1332	1080	1403	1572
Hydrogen peroxide	1994	2880	460	707	232	260	376	382	1842	606	661	274
Nitric acid	284	465	392	347	364	429	481	357	362	634	373	793
Urea	295066	189612	179697	185200	251598	165253	149596	80895	219297	225331	149376	302968
Aluminum powder	0	1313	2552	1028	380	1233	2607	2579	223	757	1094	2251
Aluminum flakes	0	1	7	0	6	0	77	0	5	14	7	3
Calcium ammonium Nitrate	0	0	0	0	0	0	0	9	6	0	7	8
Acetic anhydride	1018	1617	1241	2815	1167	2058	1543	1810	2857	2137	2465	4203

Source: Trade Map (2022).

On the other hand, Bangladesh's export of hazardous chemicals is confined mostly to one item—hydrogen peroxide. Table 2 represents the time series of hazardous chemicals exported by Bangladesh. Over the years, the export of hydrogen peroxide has been increasing—from USD 0.27 million in 2010 to USD 16.1 million.

**Table 2** Hazardous Chemicals Exported by Bangladesh

Exported Goods	HS code	Export ('000 USD)											
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Ammonium nitrate	310230	0	0	0	0	0	0	0	1	0	0	0	16
Sodium chlorate	282911	0	0	0	0	0	0	0	0	0	0	13	0
Hydrogen peroxide	284700	266	1224	3114	4589	6961	6981	7627	8157	11402	16520	15249	16110
Urea	310210	28512	39159	70971	0	0	6005	6095	0	0	0	0	26108

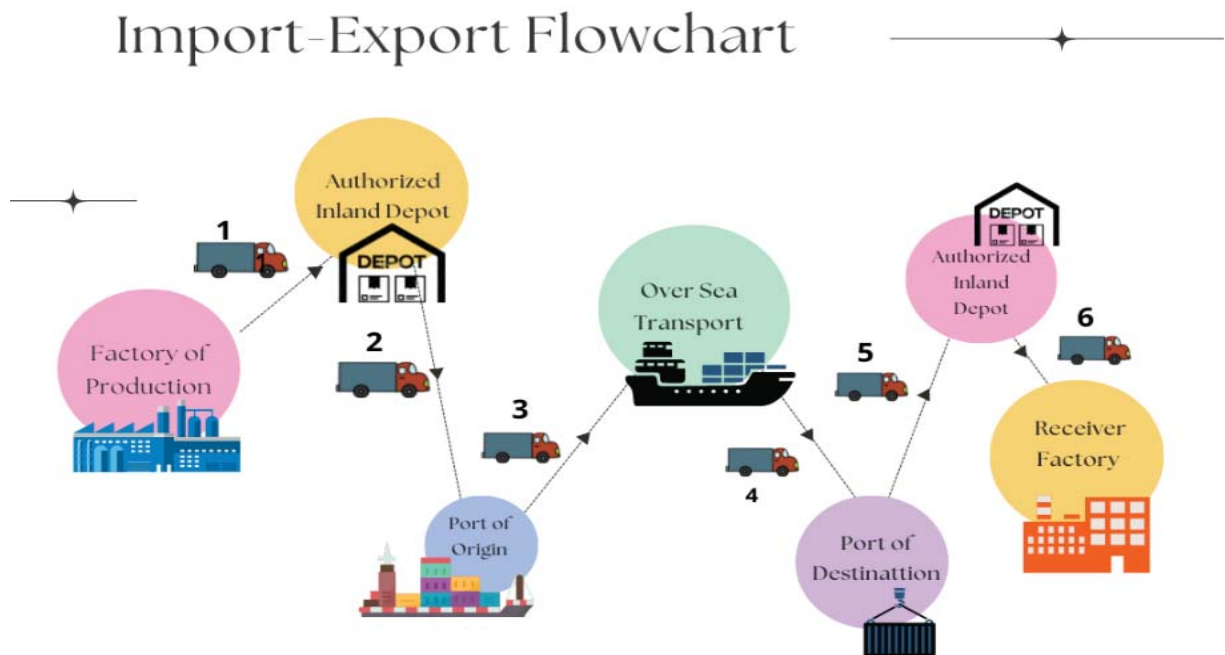
Source: Trade Map (2022).

Given the increased volume of trade every year, safety measures related to hazardous chemicals should be given importance to avoid the increased number of chemical-related incidents. Since handling hazardous chemicals, including the production, storage and transportation, mostly takes place outside the ICDs, handling hazardous chemicals with proper safety concerns is equally important throughout the supply chain, inside and outside of the ICDs.

### 3. REGULATORY FRAMEWORK FOR CHEMICAL MANAGEMENT

Sound management of chemicals to prevent incidents like the BMCD blast, requires a legal framework and integrated activities, which would cover and link all aspects of the chemical lifecycle including production, import, export, storage, and transport of chemicals (Figure 3).

**Figure 3** Import-Export Flowchart of Chemicals



Source: Illustrated by authors.

Existing Bangladeshi legislation along with the implementing authorities under different stages of chemical lifecycles can be divided into the following four major categories shown in Table 3.

The above table summarises the fact that Bangladesh has chemical-related laws in almost every sector of the supply chain, but the incident at BMCD calls attention to the fact that existing regulations provide chemical management on a sectoral basis. It is crucial to inspect, assess and implement a

legal framework to sustain in the long run. Analyses of the reported concerns related to ICDs as presented in Section 4 will clearly specify the importance of a well-coordinated framework and an active monitoring cell.

**Table 3** Policies and Acts Related to Chemical Management Across Various Sectors

Act	Objectives	Implementing Authority
<b>1. Import/Export</b>		
The Import and Export (Control) Act, 1950; The Import Policy Order, 2015–2018; Export Policy, 2015–2018	To control importing and exporting goods including chemicals	Office of the Chief Controller of Imports & Exports, Ministry of Commerce
Dangerous Cargo Act, 1953	To provide for the safety of the port, for handling dangerous goods.	Bangladesh Navy, Port Authority
The Explosive Act 1884; The Explosive Substance Act, 1908 (modified upto 1983)	To regulate the manufacture, possession, use, sale, transport and importation of explosives	Departments of Explosives, Ministry of power, Energy and Mineral resource
Ammonium Nitrate Rules, 2018	To regulate the manufacture, modification, possession, packaging, use, sale, transport, loading, unloading and importation of ammonium nitrate	Departments of Explosives, Ministry of Power, Energy and Mineral resource
Petroleum Act, 2016	To regulate the manufacture, possession, use, sale, transport and importation of petroleum products	Departments of Explosives, Ministry of Power, Energy and Mineral resource
<b>2. Storage/Industrial Facilities</b>		
The Environmental Conservation Act (ECA), 1995; Environmental Conservation Rules (ECR), 1997; National 3-R strategy, 2010	To provide standards (Green, Orange-A, Orange-B, Red category) for industrial units.	Department of Environment
Bangladesh National Building Code (BNBC), 2015	To provide building guidelines including for industrial and hazardous indoor facilities	Ministry of Housing & Public Work
LPG storage, Bottling, Transportation and Dispensing Codes and Standards, 2016	To establish minimum requirements for storing, bottling, transporting, and dispensing liquefied petroleum gas (LPG)	Bangladesh Energy Regulatory Commission (BERC)
Petroleum Rules, 2018	Petroleum product storage design layout, transportation, hazardous area classification	Departments of Explosives, Ministry of Power, Energy and Mineral resource
<b>3. Transportation</b>		
Road Transport Act, 2018	Precautions for transport of flammable substances and Penalty for violation	Ministry of Road Transport and Bridges
<b>3. Safety/Disaster Management</b>		
Factories Act, 1965; The Factory Rules, 1979	To provide rules for health and Hygiene and Safety of workers	Department of Inspection for Factories and Establishments (DIFE), Ministry of Labour and Employment (MoLE)
Bangladesh Labour Law, 2006 (Amended in 2013)	To ensure occupational safety through safety committee (provides chemical safety manual)	DIFE, MoLE
National Occupational Health and Safety Policy, 2013	To ensure workplace safety and occupational health	DIFE, MoLE

Source: Trademap database.

## 4. CHEMICALS RELATED CONCERNS WITHIN ICDs AND PERFORMANCE OF MONITORING AGENCIES

### 4.1 Concerns related to ICDs handling chemicals

Even though the inland container terminal started its operation in 1996, active policies regarding this sector are being newly developed. Under the new policy, ICDs need to be established beyond 20 km radius of Chittagong city. In that consideration, most of the existing ICDs need to relocate to new places to fulfil the criteria which are unlikely to happen in the short run. The term and condition is likely to be imposed on new ICDs. However, given the increasing amount of chemicals handled by these ICDs located in the city, proper safety protocol is needed to minimize the probability of accidents happening whereas in reality, most ICDs are found with different levels of non-compliance. These include the continuation of operation without renewal of licenses, depots having diesel pumps, and lack of fire hydrant facilities. Additionally, the safety protocol maintained by Chittagong Port Authority (CPA) regarding hazardous chemicals itself seems to be inadequate. According to CPA, importers need to get their hazardous chemicals released from the port within 72 hours of arrival. Still, in order to store these hazardous goods even for 72 hours, CPA itself is not yet ready. So, CPA is recently planning to set up a warehouse for 'imported' IMO-listed goods.

### 4.2 Enforcement and monitoring issues with ICDs handling chemical

As for the monitoring, the national monitoring agencies of Bangladesh could not ensure proper monitoring which resulted in the International Maritime Organization (IMO) finding and informing the shipping ministry of the lack of proper compliance with the code in 2016. The audit report of the IMO is one of the 17 audit objections. They pointed out that Bangladesh is not following the International; Maritime

Dangerous Goods (IMDG) code properly. The IMO suggested the shipping authorities form a committee to oversee the implementation of the codes. However, this proposal saw no headway in five years. An example of the lack of monitoring is reflected in the BM depot fire incident. The key contributing factor leading to the incident can be summarized as follows:

- The license of BM Depot was renewed on two instances in 2016. The depot officials applied for license renewal on both instances after the license had expired. The depot authorities in 2020 applied for renewal after 3 months and 16 days of expiry. The customs authorities served a show-cause notice for the delay and the depot authorities got their license renewed just upon a commitment that they would not make the same mistake again.
- The BM Depot authority obtained an 'orange category' license to store and handle containers and export-oriented goods like RMG and food items. To store chemicals, however, a 'red category' license is required. While availing the clearances, they flouted the directives in practice.
- The probe committee members found a diesel pump in the compartment of the depot and the explosion could have been much more severe had the diesel pump caught fire. The depot authorities did not seek clearance from the fire department for such a pump. It was also revealed that no such application was made to Bangladesh Petroleum Corporation (BPC).

The above-mentioned major issues could have been addressed and solved by now if the monitoring authorities took follow-up measures after proper inspection.

## 5. VIETNAM CASE ON CHEMICAL SAFETY AND SECURITY MANAGEMENT

Vietnam's chemical management system can be suggested as a good example for Bangladesh. According to "Labour and Social



Trends in Vietnam 2009/10," a joint report published in June by Vietnam's labour ministry and the International Labour Organization (ILO), the number of accidents increased dramatically from approximately 4,164 injured in 4,050 accidents in 2005 to 6,421 injured in 6,250 accidents in 2009. Because of these high accident rates, the government later implemented a comprehensive chemical management framework (ILO, 2010).

The chemical management framework followed in Vietnam consists of the following three parts: i) a well-established institutional framework, ii) a well-developed, detailed legislation framework that includes regular training, safety, and monitoring procedures, and a national chemicals inventory; and iii) a database that lists all the chemicals that are produced, imported, and commercialized in Vietnam (Ministry of Industry and Trade, 2018). They also have a central chemical control authority named Vietnam Chemicals Agency (Vinachemia) under the Ministry of Industry and Trade (MoIT). Vietnam Chemical Agency (Vinachemia) carries out the function of advising and assisting the Minister of Industry and Trade in state management and law enforcement on chemical activities. The Vinachemia organizes and manages public service activities within its management scopes according to the provisions of law and the decentralisation and authorisation of the Minister. All these combined contributed to the growth of the chemical sector in Vietnam.

## 6. CONCLUSION

Even though the 2013 Labour Act amendments concern workplace safety for industrial facilities, the industry is required to adhere to a manual on chemical safety. No regulations are now in place to address particularly chemical usage safety and high-hazard installation safety. It has not yet been established how to assess and manage the risks associated with certain chemicals in terms of how they may affect consumers, workers, and the environment. At the national or organisational level, the process of incident inquiry lessons learned is also non-existent. Investigations focus on identifying the offender rather than the underlying issue.

This policy brief puts forward the following recommendations for better institutional practices by the public agencies:

**a) *Exclusive chemical-oriented framework needs to be designed by the public authority***

A comprehensive industrial safety framework for hazardous substances is required. Such a framework should cover the whole value chain including production, transportation, storage, shipment, and delivery. Necessary amendment of rules related to the handling of these chemicals concerning all stages of the value chain needs to be undertaken.

**b) *Better enforcement of laws and regulations needs to be ensured***

There are institutional weaknesses across the value chain of dangerous chemicals which need to be addressed—in this case, it is related to ICDs. These include NBR, Customs, FSCD, DoE, DIFE, Boiler Authority, and Bangladesh Navy. These authorities are related to licensing, registration, certification, and renewal of legal documents. The concerned authorities appear to bypass their due diligence in ensuring compliance which caused the increasing risks in the hazardous chemicals trade.

**c) *Monitoring and inspection made by public authorities need to be transparent***

Bangladesh Chemical Industries Corporation (BCIC) covers a very negligible number of enterprises that are dealing with chemicals. The data under BCIC is not nearly adequate and updated. Moreover, they are not assigned with any regulatory power to ensure safety in chemical handling. A chemical cell under DIFE as well as a database of the factories dealing with chemicals including the nature of their work, raw materials they use, and the level of risks involved in the factories should be created. The database should also include regular follow-up measures and non-compliance reports prepared by the



## ACRONYMS

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BCIC	Bangladesh Chemical Industries Corporation
BERC	Bangladesh Energy Regulatory Commission
BICDA	Bangladesh Inland Container Depot Association
BMCD	BM Container Depot
BPC	Bangladesh Petroleum Corporation
CFS	Container Freight Station
CPA	Chittagong Port Authority
DIFE	Department of Inspection of Factory and Establishment
DoE	Department of Environment
ECA	Environmental Conservation Act
ECR	Environmental Conservation Rule
FBCCI	Federation of Bangladesh Chambers of Commerce and Industry
FSCD	Fire Service and Civil Defence
H2O2	Hydrogen Peroxide
ICD	Inland Container Depot
ILO	International Labour Organization
IMDG	International; Maritime Dangerous Goods (code)
IMO	International Maritime Organization
LPG	Liquefied Petroleum Gas
MoIT	Ministry of Industry and Trade (Vietnam)
MoLE	Ministry of Labour and Employment
NBR	National Board of Revenue
RMG	Readymade Garments
SMI	Survey of Manufacturing Industries

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## ABOUT THE STUDY

This policy brief is prepared under the study titled “Growth and Decent Employment in RMG and Non-RMG Industries: A UNGPs Perspective” undertaken by the Centre for Policy Dialogue (CPD) in collaboration with Christian Aid

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